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Subject: BETHPAGE WATER DISTRICT WELL 6-2 PILOT TEST REPORT
Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage

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1. INTRODUCTION

This Technical Memorandum (TM) prepared by Resolution Consultants (Resolution) presents the results of a pilot test that utilized the Bethpage Water District (BWD) Plant 6, Well 6-2 (BWD 6-2; N-8941). The pilot test was performed to determine the hydraulic influence of pumping well BWD 6-2 on the Operable Unit 2 offsite groundwater plume. The test was conducted from March through April 2016.

2. SCOPE AND OBJECTIVES

The objective of the pilot test was to conduct a short-term pilot test wherein well BWD 6-2 would be pumped in a near continuous manner while water level data would be collected from existing wells in the surrounding aquifer. The purpose of the monitoring was to evaluate the long-term feasibility of operating well BWD 6-2 to help mitigate the trichloroethene (TCE)-contaminated groundwater in the area of the well. To achieve the objective, Resolution Consultants was required to execute a subcontract with BWD to operate and maintain well BWD 6-2 and the associated water treatment system, manage distribution and/or disposal of the recovered groundwater, and conduct normal water sampling and analysis. Resolution simultaneously monitored water levels in surrounding wells, collected air samples to assess groundwater treatment impacts to ambient air quality, and monitored operation of the groundwater treatment system. The water level data collected was used to observe the response of the aquifer to pumping and to characterize the local

hydraulic parameters of the aquifer. This information was then used to evaluate the hydraulic influence of well BWD 6-2 and is provided to support a feasibility study of using well BWD 6-2 to mitigate the local plume. This TM has been prepared to document the data and collection activities, describe the data interpretation methods, present the aquifer parameters calculated from the data assessment, and present an evaluation of the hydraulic influence associated with the operation of well BWD 6-2.

2.1 Report Organization

The remaining sections of this Technical Memorandum present the following:

- Section 3 – Data collection methods used for monitoring site water levels during well BWD 6-2 pumping cycles; a summary listing of pump operation times and flow rates for each pumping cycle; site weather data that was collected and used to access potential aquifer recharge from rainfall and aquifer response to barometric pressure changes; air samples that were collected and used to evaluate potential impacts of groundwater treatment on local ambient air quality; and groundwater samples that were collected just prior to the start of the pilot test that reflect the baseline contaminant concentration levels of the TCE plume.
- Section 4 – Provides a description of the physical and hydraulic parameters of the sediments that make up the Magothy aquifer that has been impacted by the TCE plume that is migrating to the southeast with groundwater flow.
- Section 5 – Presents trends in the observed (i.e., recorded) water levels at 24 observation wells that were monitored during four weeks of well BWD 6-2 pumping; an assessment of the impacts of barometric changes with regard to water level fluctuations and the observed water level trends; and describes how the water level changes that occurred in response to constant rate pumping at well BWD 6-2 were interpreted and modeled to estimate the hydraulic properties of the local aquifer in which the pumping was conducted.
- Section 6 – Describes two lines of evidence based on Environmental Protection Agency (EPA) (2008) guidance, consisting of water level mapping and the use of analytical equations, that were used to evaluate the hydraulic influence of well BWD 6-2 pumping and to estimate the capture zone of the local TCE plume.
- Section 7 – Presents a summary of the samples collected to assess the effectiveness of the groundwater treatment system used by BWD to remove contaminants and to protect the local water supply; a summary of ambient air sample results compared to background and risk-based exposure levels; and a summary of the quarterly groundwater sampling results for samples collected in the week prior to the start of the pilot test monitoring that represent baseline conditions.
- Section 8 – Provides a summary and conclusions based on the data monitoring, analyses, and results presented in the above sections.

3. DATA COLLECTION METHODOLOGY

Field data collected during the pilot test consisted of the following: water levels recorded at 5-minute intervals in observation wells (existing monitoring wells in the local aquifer); pumping intervals and flow rates for each BWD and nearby remediation wells; on-site weather data to support air dispersion modeling and air sampling; ambient air sample collection at locations up- and down-wind of the Plant 6 air stripper discharge tower; groundwater sampling from observation wells in the Magothy aquifer around well BWD 6-2; and sampling the groundwater influent and effluent of the BWD Plant 6 water treatment facility.

Figure 3-1 shows the location of Plant 6 (i.e., location of wells BWD 6-2/6-1), the location of existing wells used for water level observations and where groundwater samples were collected, and other BWD supply wells in the general area (e.g. BWD 4-1, 4-2, and 5-1 to the east and southeast of BWD 6-2). The locations of nearby remediation extraction wells [GM-38 hot spot wells RW-1 and RW-2 to the west of BWD-2; On-Site Containment Treatment (ONCT) Wells-17, -18, and -19 to the north of BWD 6-2] are also shown in Figure 3-1. Figures 3-2 and 3-3 show the details of BWD Plant 6 along with the location of the portable weather station and air sample collection points for each date of collection.

3.1 Water Level Data

A total of 24 wells, at 10 geographic locations, were utilized to monitor water levels during the pilot test (see Figure 3-1). Well clusters screened in the Magothy aquifer [i.e., two or three wells each screened at a different depth below ground surface (bgs)] were monitored at most locations. Table 3-1 provides construction and location details for the observation wells monitored during the pilot test.

Water levels were recorded by Resolution in the observation wells using electronic data loggers placed a sufficient distance below the static water level in the well to allow for fluctuation of the water level above the logger during the monitoring period. The loggers were decontaminated prior to use and set up per manufacturer's specifications. The loggers were programmed to record the change in total pressure in each well at 5 minute intervals. An additional data logger was used to record barometric pressure at well location RE104D1. The data were periodically downloaded from the data loggers. The water level data set and pumping records used in this analysis extend from one week prior to the start of the pilot test week #1 pumping cycle through the approximate end of

aquifer recovery following completion of the week #6 pumping cycle (March 15, 2016 through April 30, 2016). Data loggers were not installed at wells RE107D3, RE123D1/D2, and RE126D1/D2/D3 until March 23, 2016; and malfunctions of the data loggers at wells RE103D1/D2 resulted in delayed data collection in these wells. Water levels were not monitored in the BWD supply wells due to access and equipment restrictions; however, historical well testing data was received from BWD that contained specific capacity information that was used to estimate the drawdown and pumping water levels in well BWD 6-2.

The electronic loggers placed in the wells contained non-vented pressure gauges that recorded absolute pressure. A barometric logger was simultaneously used to continuously record barometric pressure for the area. The barometric data were subsequently used to correct the recorded absolute pressure, using software provided by the logger manufacturer, to produce a record of the water pressure in each well at each time recorded. The depth to water was also manually measured in each well at recorded times during which the loggers were installed and referenced to the surveyed top of well casing elevation. These data allowed the recorded water pressure in each well to be converted into groundwater elevation data at five-minute intervals over the monitoring period. Tabular water elevation data recorded by the loggers is provided on disc in Attachment A.

In consideration of the screen depth intervals of the observation wells (see Table 3-1) and of the known stratification of the thick Magothy aquifer, and based on their depth relationship to the screen interval of well BWD 6-2, the observation wells were grouped into aquifer depth-zone intervals as follows:

- Shallow Zone – wells screened between 480 to 575 ft depth, with the exception of well RE104D1 that is screened at 350 ft depth,
- Intermediate Zone – wells screened between 590 to 710 ft depth, and
- Deep Zone – wells screened between 710 ft depth and the top of Raritan Clay at approximately 880 ft depth

Figure 3-4 provides a schematic of the observation well screen depth intervals in relation to the screen depth of well BWD 6-2 (and BWD 6-1) and with respect to their distance from BWD 6-2, regardless of their azimuth from the well. As indicated in Figure 3-4, and as listed in Table 3-1, there are 7 wells in the shallow, 9 wells in the intermediate, and 8 wells in the deep aquifer zones (as defined for this TM). The grouping of the wells in each of the three zones was also supported by the observed change in water levels (i.e., drawdown, discussed in following sections) during the

pumping of BWD 6-2; that is, the wells in a given group appeared to experience a similar range in the magnitude of drawdown due to pumping, with consideration given to their distance from BWD 6-2.

Also schematically noted in Figure 3-4 are the generalized geologic facies represented by the layered sediments, the approximate depth of the Raritan Clay (bottom of Magothy aquifer), and intervals of persistent marine clay horizons that have been mapped across the area using environmental sequence stratigraphy (ESS; Resolution, 2016; unpublished in Attachment B). The ESS features are based on depositional interpretation of lithologic and gamma logs for the numerous vertical profile borings (VPBs) that have been installed by Resolution during various phases of Navy site investigation (Resolution, 2013 through 2016) in conjunction with published reports describing the Magothy aquifer.

3.2 Pumping Data

In consultation with BWD, and in accordance with the pilot test work plan (Resolution, 2015) in concurrence by New York State Department of Environmental Conservation (NYSDEC), Resolution provided a pilot test pumping schedule that was implemented by BWD. The pumping cycles were designed to provide periods of controlled stresses on the aquifer during the water level monitoring and facilitate interpretation of the observed water level changes as a constant rate aquifer pumping test for well BWD 6-2. Several pumping cycles were specified over a period of two months to increase the likelihood of obtaining a data set free of significant random stresses (e.g., large rainfall events; inconsistent pumping cycles at other municipal or remediation wells in the general area) on the local aquifer that would be difficult or impossible to quantify during the analysis.

The pilot test pumping cycles began on March 21, 2016, and ended April 29, 2016, for a total of six weeks. The schedule consisted of alternate weeks (Monday through Friday) of continuous pumping at BWD Plant 6 using either BWD 6-2 or BWD-6-1 for the first four weeks, with both wells idle on weekends, followed by a two-week continuous pumping of BWD 6-2 (see Table 3-2). The non-pumping weeks for well BWD 6-2 (i.e., Weeks #2 and #4 when only well BWD 6-1 was pumped at Plant 6) allowed for the collection of influent/effluent samples near the end of each BWD 6-2 pumping cycle and the receipt of laboratory quick-turn analyses before the well was turned back on. This allowed the effectiveness of the treatment system to be documented and would identify if chemical breakthrough occurred so that measures could be implemented to protect the quality of

the water distributed by BWD. The sampling and quick-turn analyses were also required by NYSDEC as a condition for concurrence of the pilot test work plan. The sample results are presented in a later section of this TM; all treated water pumped and distributed during the pilot test met the NYSDEC requirements for potable water.

During and between the well BWD 6-2 pilot test pumping cycles, the other supply wells (BWD 4-1, 4-2, 5-1, and 6-1) were operated by BWD as needed to meet the water supply demand or for periodic sampling; well BWD 6-1 was operated continuously during Week #2 and Week #4 and well BWD 4-1 was only operated for short intervals to conduct sampling. The real-time operational data for all five BWD supply wells in the area of the pilot test was recorded by BWD personnel and provided to Resolution throughout the pilot test. Tabular pumping records provided by BWD are included in Attachment B.

Several additional groundwater extraction wells were in use during the pilot test in the local area. Three remediation wells (Wells 17, 18, and 19 see Figure 3-1) lying within and along the southern property line of the NWRIP facility, north of well BWD 6-2, were operated by Northrop Grumman Corporation; these wells are known as the ONCT wells. Two remediation wells, RW-1 and RW-3, located east of BWD 6-2, in the vicinity of BWD 4-1 and 4-2 and operated by Korman (Navy contractor), are known as the GM-38 hot spot wells. The daily operational data for the ONCT Grumman recovery wells indicate that with the exception of short pumping interruptions these wells are operated continuously at a near constant rate. Operation data for the GM-38 remediation wells shows that these wells are likewise operated continuously at a near constant rate. The pumping records received for these wells are provided in Attachment B. Based on this information, it was assumed that near steady-state equilibrium has generally been achieved and is maintained in the aquifer in the vicinity of all these recovery wells during their operation. It was concluded that constant pumping at these wells likely resulted in little impact on water level changes observed at the observation wells during the pumping cycles of BWD 6-2, with the exception of intermittent pump shutdowns or reductions in extraction rates.

Table 3-2 provides the daily pumping schedule and pumping duration for each supply and remediation well (for which data are available) for the duration of the pilot test pumping cycles.

3.3 Site Weather Data

A portable weather station was installed by Resolution at BWD Plant 6 to collect meteorological data to support air dispersion modeling. The modeling was used to define locations for the collection of ambient air samples during the pilot test. A Davis Vantage Pro2 Plus weather station was set up approximately 95 feet northwest of the BWD Plant 6 air stripping tower. The station recorded the time, temperature, dew point, wind speed, wind direction, wind chill, heat index, relative humidity, barometric pressure, UV index, rain rate, and precipitation at ten minute intervals. The location of the weather station at Plant 6 is shown on Figures 3-2 and 3-3. The unit was downloaded periodically and the data was compiled to provide inputs for air modeling that was used to support air sample collection.

3.4 Air Samples

Ambient air samples were collected by Resolution up- and down-wind of the air stripping tower located at BWD Plant 6. The samples were collected during the operation of well BWD 6-2 and active treatment of recovered groundwater to assess the concentration of Volatile Organic Compounds (VOCs) in air downgradient of the air stripper. Air dispersion modeling based on site meteorological data was used prior to sample collection to define the optimum location.

Air samples were collected on March 24, 2016 and April 19, 2016 and submitted to Katahdin Analytical Services for analysis of VOCs via Method TO-15. Sampling times were chosen based on the following criteria: air samples were collected for a 24 hour period of time when the BWD was pumping and treating groundwater recovered only from well 6-2; prior to sampling, data extracted from AIR Resource Laboratory's READY website and the portable weather station was used to run the AERMOD model for a period of several days; the model was reviewed to determine the most relevant location to place the summa canisters so that they would draw air from the area of estimated highest concentration over a 24 hour period.

On March 24, 2016, one summa canister was placed approximately 120 feet northeast of the air stripping tower and a second canister was placed approximately 305 feet north of the air stripping tower. These sample locations were downwind of the tower and can be seen in Figure 3-2.

On April 19, 2016 three canisters were used to collect air samples. The summa canisters were placed as follows: one was placed approximately 120 feet north of the air stripping tower, the

second was approximately 100 feet south, and the third was approximately 345 feet south of the air stripping tower. One sample location was upwind and the remaining two were located downwind of the air stripper discharge. The locations are shown in Figure 3-3. Samples results are presented in Section 7.2 of this report.

3.5 Groundwater Samples

Groundwater samples were collected by Resolution just prior to the initiation of the BWD PT as part of the regularly scheduled quarterly sampling that is conducted by the Navy under CTO WE15. Samples were collected at wells in the area of BWD 6-2 the week of March 13, 2016. The sampling was conducted in accordance with the UFP SAP Addendum – Groundwater Sampling Using Low Stress (Low Flow) Purging and Sampling Protocol (Resolution, 2013). The samples were analyzed for the chemicals of interest using EPA Methods 8260C (VOCs) and 8270C SIM (SVOCs) by Katahdin Analytical Services, a New York State and Navy approved laboratory. The sample results are presented in Section 7.3 of this report.

Groundwater samples were collected weekly by BWD personnel during the pilot test from the influent and effluent of the water treatment system that receives the groundwater recovered from wells BWD 6-2 and 6-1. These samples were submitted by BWD to PACE Analytical laboratory, Melville, NY for analyses of VOCs and 1,4-dioxane. Upon receipt of the weekly laboratory reports, the sample results were provided by Resolution to Mr. Henry Wilkie at the NYSDEC in accordance with the pilot test work plan. The results are presented in Section 7.1 of this report.

4. AQUIFER BACKGROUND

Sedimentary deposits lying below the ground surface in the area of the BWD supply wells in Nassau County consist of an average 800 feet thickness of unconsolidated overburden lying on crystalline bedrock known as the Hartland Formation. The overburden is typically divided into four geologic units: the upper Pleistocene deposits; the Magothy Formation; the "Raritan Clay" (an upper clay member of the Raritan Formation); and the Lloyd Sand member of the Raritan Formation below the Raritan Clay.

The upper Pleistocene deposits are present at the ground surface, range in thickness from approximately 50 to 100 feet, and consist of glacial till and outwash deposits of medium to coarse sand and gravel interbedded with lenses of fine sand, silt, and clay (Smolensky and Feldman, 1995); these deposits form the Upper Glacial Aquifer. This aquifer is unconfined in the Bethpage area and is directly recharged by rainfall that is largely collected by storm water systems in developed areas and routed to recharge basins for infiltration.

The Magothy Formation lies directly below the upper Pleistocene and has a thickness ranging from 650 to 900 feet. The saturated formation is known as the Magothy aquifer and is characterized as predominantly fine to medium sands and silts interbedded with zones of sandy clay and clay. Sand and gravel zones are found near the bottom of the Magothy in some areas at depths of 600 to 880 feet below ground surface (bgs). Investigations performed by the Navy indicate that the bottom of the Magothy (i.e., top of Raritan Clay) can extend from depths of 700 to greater than 1,000 feet bgs in the area of the VOC plume. While the top and upper portion of the Magothy aquifer is known to be unconfined (i.e., a water table in direct contact with the atmosphere), layered stratification typical of these thick sedimentary deposits and numerous, generally discontinuous, lenses of silt and clay suggest that confinement of the aquifer may increase with depth (Isbister, 1966). While these individual lenses of less permeable material (silt and clay) likely do not in and of themselves represent distinct confining units, they may act to locally reduce vertical groundwater flow under natural gradients. However, substantial pumping rates used by water supply wells BWD 6-2 are known to impose a hydraulic stress at depth within their zone of influence that enhances vertical flow of groundwater and contaminants across and/or around these lenses.

The Magothy aquifer is the major source of public water in Nassau County. The aquifer is in direct contact with, and is recharged by downward groundwater flow from, the overlying Upper Glacial

aquifer in the area of the VOC plume and the BWD wells. Glacial outwash consisting of more permeable sands and gravel deposits that lies immediately below the ground surface in the VOC plume area allows for relatively rapid recharge (i.e., within a few days) to the water table (Isbister, 1966). The rapid recharge is also likely enhanced by numerous recharge basins in the area that are designed to promote infiltration to the local water table. The most productive water bearing zones in the Magothy aquifer are the more or less discontinuous zones of sand and gravel that lie at greater depths within the overall finer-grained matrix of the Magothy aquifer (basal 100 to 150 feet of the formation; Isbister, 1966).

5. AQUIFER CHARACTERIZATION

An objective of the pilot test was to assess the hydraulic influence of pumping at well BWD 6-2 on the local aquifer. The water level monitoring data that was collected allows for two methods of analysis, one based on direct observation of the hydraulic impacts of a known pumping rate and duration on the local aquifer (observed water levels), and another based on determining the aquifer parameters of transmissivity (T) and storativity (S) using aquifer test analysis, from which the hydraulic impacts can be predicted (i.e., modeled) for any pumping rate or duration. In addition, an assessment was conducted to evaluate the impact of barometric pressure changes on well water levels. The results of these data analysis methods are presented in this section.

5.1 Observed Water Levels

Water level elevation trends for the observation wells (listed in Table 3-1) prior to the start of the pilot test and during the four weeks of controlled pumping at BWD 6-2 are presented on hydrographs provided in Attachment A. Tabular data that was used to construct the plots are provided in Excel® format on disc in Attachment A. The water elevations were determined from the total pressure readings recorded by the data loggers at 5-minute intervals; the absolute pressure data were corrected for barometric pressure changes and transformed to water elevations based on the manually-recorded depth to water below top of well casing and the surveyed top of well casing elevation for each well. Note that all of the hydrographs for each week of monitoring use the same elevation scale (vertical axis) and the water elevation trends for each week are directly comparable. All hydrographs use a consistent plot color for each well location (e.g., wells RE104D1/D2/D3 are always shades of green) and the sequence of wells in each plot legend begins with the well closest to BWD 6-2 and ends with the well furthest from BWD 6-2 (regardless of azimuth). In addition, the

pump operation interval for each BWD well is indicated on the hydrographs, as is the barometric pressure trend (in feet of water). Rainfall that occurred during the entire monitoring period is presented in Figure 5-1.

5.1.1 Pre-Pilot Test Trend

Water elevation trends (hydrographs) for the week prior to Week #1 of pilot test pumping (March 15 through 22) are provided in Attachment A as Figures A-1, A-2, and A-3 for wells screened in the deep, intermediate, and shallow aquifer zones, respectively. This data provides an example of the hydraulic impacts on the aquifer during typical water supply pumping cycles conducted by BWD. The BWD supply well pumping intervals are shown on each figure; all BWD wells pump at average daily rates between 1,150 to 1,222 gallons per minute (gpm) when operating and the screen depth interval for each well is provided in Table 3-1. Wells BWD 6-2 and 6-1 are located closer to all observation wells than any other BWD supply well (see Figure 3-1). As indicated on Figure 5-1, rainfall was infrequent during the week prior to the start of the pilot test with a maximum daily total of 0.63 inches on March 15. It should be noted that data loggers were not installed at wells RE107D3, RE123D1/D2, and RE126D1/D2/D3 until March 23 and data was not recorded at wells RE103D1/D2 due to a malfunction. The start of the pilot test Week #1 pumping cycle at well BWD 6-2 occurred at 6:30 am on March 21 and is indicated near the end of Pre-Pilot Test hydrographs.

The hydrographs show that the overall baseline water level elevations were consistent for the week for each well, although frequent, short term fluctuations (rise or fall in water elevation) occur that are coincident with BWD pumping intervals. The largest magnitude fluctuations in each aquifer zone are coincident with short operating periods for well BWD 6-2 (the closest supply well) and demonstrates that this well has hydraulic influence across the Magothy aquifer between approximately 350 to 880 feet depth. The largest magnitude of impact from well BWD 6-2 occurs in the deep zone, as expected since the well is screened in this zone; progressively less impact on water levels is observed for the intermediate and shallow zones. Impact is noted in deep zone well RE123D3 that is located 4,155 feet to the NW of well BWD 6-2 (hydraulically up gradient); this well is also hydraulically up gradient of the ONCT remediation wells located at NWIRP. All wells in all aquifer zones show a nearly immediate impact upon the startup of the Week #1 pumping cycle at well BWD 6-2 at 6:30 am on March 21.

Short operating periods for well BWD 6-1 are shown to be coincident with smaller magnitude fluctuations in the shallow and intermediate zone, but show little impact on the deep zone; this is consistent with the screen interval of well BWD 6-1 that lies in the shallow zone (compared to well BWD 6-2 that lies in the deep zone). Well BWD 6-1 was pumped at a slightly greater rate, average of 1,219 gpm, compared to well BWD 6-2, average of 1,156 gpm, during the Pre-Pilot Test period. The relatively lesser impact of well BWD 6-1 pumping on water levels in the shallow zone compared to the greater impact of well BWD 6-2 pumping on water levels in the deep zone suggests that the yield of the upper zone is greater. The lack of impact by well BWD 6-1 on the deep zone compared to the greater impact of well BWD 6-2 on the shallow zone also suggests that shallow and possibly intermediate zones have higher yield than the deeper zone (because those zones are able to provide the water required by pumping at well BWD 6-1, at a slightly greater rate than well BWD 6-2, without impacting the deep zone).

Well BWD 5-1 is shown to be pumping during most of the Pre-Pilot Test period. This well is screened in the intermediate and deep zones, but is located further from all observation wells than BWD 6-2; it is closet to wells RE105, RE104, and MW-117-5 (see Figure 3-1). Deep zone wells MW-117-5, RE105D2, and RE104D3/D2 show fluctuations that are clearly coincident with non-pumping intervals at well BWD 5-1 (rising water levels, early am on March 17, 19, and 22). More distant wells RE103D3, RE120D3, RE122D3, and RE123D3 in the deep zone do not show a clear impact. Similar, but lessor magnitude impacts are shown in the intermediate and shallow zones coincident with well BWD 5-1 non-pumping intervals. These observations indicate that well BWD 5-1 has hydraulic influence on each zone of the Magothy aquifer, but because it is more distant the well's impacts on the observation well water levels are less than those from well BWD 6-2.

Well BWD 4-1 did not operate during the Pre-Pilot Test period. Well BWD 4-2 operated during short intervals that are mostly coincident with pumping at BWD 5-1 and 6-2. Both wells BWD 4-1 and 4-2 are screened in the shallow zone (see Table 3-1) and are closest to wells RE104, MW-117-5, and RE105 (see Figure 3-1). Fluctuations coincident with the operation of well BWD 4-2 are difficult to identify on the water level hydrographs, likely due to overlap with pumping at other wells. However, beginning around 5 am on March 18 well BWD 4-2 stops pumping for about 1 hour during which time pumping at well BWD 5-1 is constant. The water levels in the closest wells (e.g. RE104D3/D2, MW-117-5, and RE105D2) in all aquifer zones show a distinct rise in water levels at this time indicating that well BWD 4-2 has hydraulic influence on each zone of the Magothy aquifer.

5.1.2 Week #1

The water elevation trends for the initial weekly pumping cycle at BWD 6-2 (Week #1: March 21 through 25) is shown in Attachment A, Figures A-4, A-5, and A-6 for wells screened in the deep, intermediate, and shallow aquifer zones, respectively. The BWD supply well pumping intervals are also shown on each figure. Correlation of water level changes with pumping cycles demonstrates that the major influence on the local aquifer was from pumping at well BWD 6-2. Well BWD 6-2 operated continuously from 6:30 am on March 21 through 10:45 am on March 25 at an average rate of 1,151 gpm; the remaining BWD wells pumped at average rates between 1,198 to 1,205 gpm, but for intervals of only 3 hours or less during Week #1 (see Table 3-2). The screen depth interval for each well is provided in Table 3-1. As indicated on Figure 5-1, rainfall was infrequent during Week #1 of the pilot test with a maximum daily total of 0.22 inches on March 21. It should be noted that data loggers were installed in wells RE107D3, RE123D1/D2, and RE126D1/D2/D3 in the pm hours of March 23 during Week #1 and that data logging did not begin in wells RE103D1/D2 until March 29 and 7, respectively, due to a logger malfunctions.

Each aquifer zone shows that water levels were rising in the early am hours of March 21 in response to a cessation of all BWD pumping at midnight on March 20. Subsequently, wells that are closest to well BWD 5-1 (RE105D1/D2, MW-117-5, RE104D1/D2/D3) show a decrease in water levels that begins approximately 5:30 am on March 21 when well BWD 5-1 begins pumping again. At 6:30 am when well BWD 6-1 begins pumping, a clear response to the combined pumping of wells BWD 6-2 and 5-1 is shown on the hydrographs for each aquifer zone. Well BWD 5-1 shuts off at 9:15 am (pumping duration of 3 hours, 45 minutes) and the continuation of decreasing water levels are coincident with pumping only at well BWD 6-2. Well RE104D2 is noted to have a strong sensitivity to brief pumping intervals at well BWD 5-1 and water levels rebound when well BWD 5-1 goes off. All wells in all aquifer zones reach a near stabilized water level by about midnight on March 2 that is maintained by the constant rate pumping at well BWD 6-2 for the remainder of Week #1 pumping. Brief intervals of pumping at well BWD 5-1 on March 23, 24, and 25 are shown to temporarily decrease water levels in the closest wells in the deep zone, but only small magnitude decreases in water levels are observed at the closest wells in the intermediate and shallow zones. Conversely, brief intervals of rising water levels occur in the intermediate and shallow zones on March 23 and 24 that are not correlated with pumping changes in the BWD supply wells or with rainfall. The larger magnitude of response on March 24 at wells RE123D1/D2 and RE126D1/D2

that are located north of BWD 6-2, and the progressively lower magnitude of response in the more southern observation wells, suggests that the rising water levels correlate with reductions in aquifer stress to the north that correlate with brief pumping downtimes (3 and 1 hours, respectively) in the On-site Containment Treatment (ONCT) remediation wells on these dates (see Table 3-2 and pumping records in Attachment B). Water levels in all wells in all aquifer zones are shown to fully recover from the impact of well BWD 6-2 pumping within 6 to 10 hours after pumping stops on March 25; however, it is noted that well BWD 4-2 is pumping during the recovery period, which suggests that full recovery may not have occurred.

5.1.3 Week #3

The water elevation trends for the second weekly pumping cycle at BWD 6-2 (Week #3: April 4 through 8) is shown in Attachment A, Figures A-7, A-8, and A-9 for wells screened in the deep, intermediate, and shallow aquifer zones. The BWD supply well pumping intervals are also shown on each figure. Well BWD 6-2 operated continuously from 0:00 am on April 4 through 12:00 pm on April 8 at an average rate of 1,154 gpm; the remaining BWD wells pumped at average rates between 1,197 to 1,230 gpm when operating. The screen depth interval for each well is provided in Table 3-1. As indicated on Figure 5-1, rainfall was infrequent during Week #3 of the pilot test with a maximum daily total of 0.41 inches on April 4.

Each aquifer zone shows that water levels were decreasing in the late pm hours of April 3 in response to pumping at BWD 4-1 until the well was turned off at the start of Week #3 pumping at midnight (March 4, 0:00 am). Water levels are observed to decrease coincident with the start of pumping at well BWD 6-2. Wells that are nearest to BWD 6-2 show the greatest initial water level decline in each aquifer zone (and recovery during the brief BWD 6-2 off interval). It is noted that well RE107D3 that is screened at a depth consistent with the intermediate zone showed a greater impact than all other intermediate wells even though this well is further away from BWD 6-2 than most other intermediate wells. And similar to Week #1, water levels at wells RE104D2/D3 are shown to have a strong sensitivity to brief pumping intervals at wells BWD 4-1, 4-2, and 5-1. Following the brief interruption in BWD 6-2 pumping late on April 4, water levels in all wells in all aquifer zones become essentially stable in response to the constant rate pumping at well BWD 6-2 for the remainder of Week #3 pumping. A brief interval of pumping at well BWD 5-1 on April 5 is shown to temporarily decrease water levels in the nearest well in each aquifer zone. Conversely, an interval of rising water levels, beginning in the late pm hours of April 6, occurs in all aquifer

zones that does not correlate with pumping changes in the BWD supply wells or with rainfall. Barometric pressure begins a decreasing trend somewhat earlier on April 6 that appears to correlate with the rising water levels, but the abrupt changes in water levels shown in the shallow and some intermediate wells during this interval strongly suggests that the impact is due to an interruption of aquifer stress (e.g., pumping). Similarly, there is an abrupt rise in water levels in all aquifer zones, that is again greatest in the intermediate and shallow zones, that occurs at mid-day on April 8 just before the end of Week #3 pumping at BWD 6-2. As was observed during Week #1, both of these intervals of rising water levels showed a larger magnitude of impact in observation wells to the north (nearest the ONCT wells) and diminishing impact in observation wells to the south. As was observed during Week #1, this suggests a reduction or an interruption of pumping in the ONCT wells that correlates with pump downtimes on these days (see Table 3-2 and Attachment B). As was observed for Week #1, water levels in all wells in all aquifer zones are shown to recover from the impact of well BWD 6-2 pumping within 6 hours after pumping stops on April 8, although the operation of well BWD 4-2 during this time likely prevented full aquifer recovery.

5.1.4 Weeks #5 and #6

The water elevation trends for the third weekly pumping cycle at BWD 6-2 (Weeks #5 & #6: April 19 through 29) is shown in Attachment A, Figures A-10, A-11, and A-12 for wells screened in the deep, intermediate, and shallow aquifer zones. Well BWD 6-2 operated continuously from 0:00 am on April 18 through 12:00 pm on April 29 at an average rate of 1,150 gpm and the remaining BWD wells pumped at average rates between 1,191 to 1,227 gpm when operating. The screen depth interval for each well is provided in Table 3-1. As indicated on Figure 5-1, rainfall was infrequent during Weeks #5 and #6 of the pilot test with a maximum daily total of 0.41 inches on April 23.

The figures show the abrupt decrease in water levels in all aquifer zones at the start of BWD 6-2 pumping on April 18, similar to what was observed at the start of Weeks #1 and #3 pumping cycles. As shown in Table 3-2, wells BWD 4-2 and 5-1 were operated on the days leading up to Weeks #5 and are responsible for the downward trend in water levels at the start of the pumping cycle. Subsequently, well BWD 4-2 was operated for various intervals every day during Weeks #5 and #6 to meet the water supply demand on BWD; the impacts of this pumping is clearly observed on the hydrographs and the off/on cycles for well BWD 4-2 are observed as numerous short-term peaks and valleys in the water levels, particularly for deep wells nearest to BWD 4-2 (e.g. MW-117-

5, RE105, RE104). Because of the numerous off/on cycles, presentation of the pumping intervals was not included on the hydrographs, but the daily total pumping hours for each well is listed in Table 3-2.

Water levels in the shallow and intermediate aquifer zones demonstrate an abrupt but brief rise on April 22 and an abrupt and sustained rise from April 23 through mid-day on April 25. Several wells showed a recovery of water levels to an elevation greater than at the start of pumping by well BWD 6-2. As shown in Table 3-2, 0.41 inches of rainfall occurred on April 23, but the magnitude of rising water levels is clearly greater than the rainfall or barometric impacts on the aquifer. Table 3-2 indicates that well BWD 4-2 was pumped for shorter intervals during this period, but the water level rise (approximately 3 feet) observed in the northern-most shallow and intermediate wells and the diminishing impacts to wells located further south suggest that an interruption of pumping in one or more up gradient ONCT wells was responsible. These observations correlate with pump downtimes in the ONCT wells (see Table 3-2 and Attachment B) that were persistent from April 21 through April 25, and suggest that pumping of the ONCT wells also has a greater influence on nearby wells in the shallow and intermediate wells than either well BWD 6-2 that is screened in the deep aquifer zone or well BWD 4-2 that is screened in the shallow aquifer zone.

5.1.5 Observed Water Levels Summary

Inspection of the trends in water levels and their responses to pumping cycles documented during Weeks #1, #3, and #5 and #6 of the pilot test have identified several features of the hydraulic influence of well BWD 6-2 on the local aquifer, as follows:

- Pumping well BWD 6-2 at nominal operation rates (e.g., 1,151 to 1,154 gpm) has a near immediate influence on the vertical distribution of potentiometric head across a large vertical interval of the deep Magothy aquifer (400 vertical feet). Water levels in shallow, intermediate, and deep zone wells (screened between 480 ft depth and the top of Raritan Clay at approximately 880 ft depth) that are located from 1000 to 2000 feet away showed water level drawdown of approximately 1 to 3 feet.
- The lateral impacts of well BWD 6-2 nominal pumping were clearly observed in the most distant observation well, RE123D3 (4,155 ft) that is located up gradient of the ONCT pumping. Over 1 ft of drawdown was observed at RE122D3 that is located 2,329 ft away from well BWD 6-2.
- Nominal pumping of 1,198 gpm at BWD 5-1, which is screened at a similar depth to BWD 6-2, has a cumulative impact on the hydraulic influence created by well BWD 6-2 at many of the observation wells monitored.

- Pumping at BWD 6-2 had a particularly strong impact on water levels at well RE107D3; pumping at BWD 5-1 has a particularly strong impact on water levels at wells RE104D2/D3. These observations reflect the heterogeneity of the aquifer materials.
- Nominal pumping at BWD 4-2, which is screened higher in the aquifer than BWD 6-2, has a cumulative impact on the hydraulic influence created by well BWD 6-2 at many of the observation wells that were monitored. This observation dictates that the capture zone achieved by pumping at well BWD 6-2 will likely be altered by pumping cycles at other BWD supply wells.
- Pumping by the ONCT wells likely has a dominant hydraulic influence on the shallow and intermediate aquifer zones, particularly for wells located north of well BWD 6-2. As above, this observation dictates that the capture zone achieved by pumping at well BWD 6-2 will likely be altered by a change in pumping at the ONCT remediation wells.

5.2 Barometric Pressure Assessment

The impact of barometric pressure changes on water levels in aquifers is typically characterized as the barometric efficiency (BE) of an aquifer. The BE is determined by relating water level changes in a well open to the atmosphere with changes in barometric pressure. The analysis must account for all stresses that impact the water levels in the well in order to differentiate those due to barometric pressure.

For the pilot test, there were no available well locations that were free of multiple pumping stresses, and no period of pumping cessation that could be used to directly assess the relationship between barometric pressure and water levels; the presence of numerous municipal supply and remediation wells in the Magothy aquifer results in multiple aquifer-wide stresses for which the magnitude and duration are not known (i.e., no background location available). In lieu of a background well, observation well water levels during intervals of known consistent pumping, during which water levels were relatively steady, were compared to changes in barometric pressure. This analysis strategy assumes that pumping has resulted in steady-state conditions during which changes in water levels are attributed to only barometric pressure changes. Figures A-13 and A-14 in Attachment A show the time periods A, B, and C from Weeks #1 and #3 of the pilot test pumping cycles that were selected for analysis; these intervals were selected because of the visual indication of an inverse relationship between the barometric pressure change and water levels, as would be expected for an aquifer with barometric sensitivity. The analysis was conducted by correlating the incremental changes in water levels for several wells in the deep aquifer zone with the incremental change in barometric pressure, converted to feet of water, for each interval selected. Following the methods of Ferris, et al (1962), the correlations for the selected time

periods shown in Attachment A, Figures A-15, A-16, and A-17 are indicated by the best fit straight line through each data set based on linear regression. The R^2 factor (coefficient of determination) is high for each well indicating that the data have a strong relationship. Period A represents a time of increasing barometric pressure during which water levels would be expected to fall, and Periods B and C represent times of decreasing barometric pressure during which water levels would be expected to rise for a sensitive aquifer. For a successful analysis the slope of the best-fit straight line for each correlation should be similar, should be less than unity, and would represent the BE of the aquifer. As can be seen in Attachment A, Figures A-15, A-16, and A-17, there is no consistency in the results. Values greater than unity (see Period A) are an indicator of recharge to the aquifer (e.g., interruption of pumping). The conclusion from the analysis is that an estimate of BE from the selected data are not reliable due to the presence of variable stresses on the aquifer from pumping that cannot be differentiated from barometric pressure.

The BE provides a mathematical correction factor that can be applied to the observed water levels to filter out changes in water levels due solely to barometric pressure. Depending on the how the water level data are being used and the magnitude of change, accounting for the BE may not be significant to the accuracy of the results. For example, the hydrographs for Weeks #1 and #3 (Attachment A, Figures A-4 through A-12) show that barometric pressure change was generally of low magnitude (i.e., a change of 0.2 to 0.3 feet of water) on March 21 and April 4 during the initial period of water level drawdown due to pumping at well BWD 6-2. As discussed in subsequent sections of this TM, the data used to calculate aquifer parameters and to observe and predict the well BWD 6-2 capture zone occurred during these initial pumping periods of Weeks #1 and #3. If the BE of the aquifer were 0.5 (regarded as conservatively high for the semi-confined Magothy aquifer), then the maximum correction to water levels would be 0.15 feet. Compared to the range of changing water levels (1 to 3 feet) during the initial drawdown, the maximum correction would range between about 15 to 5 percent. This magnitude of error is likely within the overall range of error associated with the observational and analytical methods used to derive aquifer parameters and estimate dimensions of the capture zone in this TM.

5.3 Aquifer Pumping Test Analyses

The water levels from the observation wells during the pilot test pumping cycles were analyzed to estimate the hydraulic characteristics, namely the transmissivity (T), and the storativity (S), of the Magothy aquifer. As described in the previous sections, pumping cycles for well BWD 6-2 during

Weeks #1 and #3 provided water level trends in most observation wells that predominantly reflected the pumping at well BWD 6-2 with only brief intervals of influence from other pumping wells (e.g., BWD 5-1, 4-2). On the other hand, water levels observed during Weeks #5 and #6 demonstrate the influence of numerous pumping well stresses on the aquifer that make analyses of the aquifer parameters highly complex. For this reason, the aquifer pumping test analyses utilized only Weeks #1 and #3 water level data sets to estimate aquifer parameters.

The Week #1 and #3 water level data were converted into drawdown (i.e., the incremental change in water level with respect to the initial water level at the time pumping began) and plotted verses the time after pumping began in minutes for each weekly pumping cycle. As was presented in the above sections for the water level trends (i.e., hydrographs), drawdown plots are provided in Attachment C for each aquifer zone for Week #1 (Figures C-1 through C-3) and Week #3 (Figures C-4 through C-6). The pumping cycles for each week were as follows:

- For Week #1, the start of the pumping cycle (i.e. time = 0 minutes) began when well BWD 5-1 started pumping at 5:30 am on March 21; well BWD 6-2 began pumping at 6:30 am (1-hr later); the Week #1 pumping cycle ended at 10:45 am on March 25.
- For Week #3, the start of the pumping cycle began when well BWD 6-2 began pumping at 12:00 am on April 4 and ended at 12:00 pm on April 8.

The aquifer pumping test analysis was conducted using the AQuifer TESt SOLVer (AQTESOLV) for Windows computer program (Version 4.50 Professional from HydroSOLVE) that is formulated to analyze field data from aquifer tests. The program's automated type-curve matching feature that uses a nonlinear least squares procedure was used to find a best-fit statistical match with the observation well data. The observation well data were analyzed for time verses drawdown using the Hantush-Jacob (1955)/Hantush (1964) model for leaky confined aquifers without aquitard storage. A description and list of assumptions for use of the Hantush-Jacob leaky aquifer model is provided in Attachment C. This model is generally consistent with the semi-confined properties of the Magothy aquifer at depth and was used successfully for a prior aquifer pumping test analysis conducted at well BWD 6-2 (Tetra Tech, 2013). This model allowed for partial penetration of the aquifer by both the pumping and observation wells, which was considered a required feature for the analysis due to the broad spectrum of observation well screen intervals in the aquifer. Furthermore, as can be seen on the drawdown plots provided in Attachment C, all wells reached a near steady-state drawdown within about the first day of pumping, a response that is consistent

with leaky aquifer conditions. The use of variably spaced, multiple observation well data located in various directions, given their similar responses, was deemed reasonable to deduce the bulk aquifer properties in the area of well BWD 6-2.

Data collected by the Navy during field investigations to install the observation wells has documented that the Magothy aquifer extends to depths of 700 to 1,000 feet below ground where the Raritan clay marks the bottom of the aquifer. Glacial sediments lying at the ground surface to a depth of about 100 feet in the area of the pilot test are identified as the Upper Glacial aquifer; this aquifer is in direct contact with and hydraulically connected to the underlying Magothy aquifer. The depth to water below ground was recorded to be in the range of 40 to 50 feet in the observation wells during the pilot test. The multi-layered, saturated sedimentary intervals of the Magothy aquifer represent a range of physical and hydraulic properties, but the presence of a laterally persistent aquitard layer has not been identified. The thick aquifer is conceptualized to host a heterogeneous sequence of stratified aquifer layers that are in direct hydraulic communication. As noted in Section 4, the presence of numerous thin intervals of silts and clays, particularly in the upper to mid Magothy formation, results in semi-confined aquifer conditions at depth where a greater percentage of sand and gravel is observed and where well BWD 6-2 and the observations wells are screened.

The leaky confined aquifer model was run in AQTESOLV for each aquifer zone as previously identified based on the screen depth intervals of the observation wells and the similar magnitude of responses observed for water levels (i.e., drawdown due to pumping) in the wells within each aquifer zone. This allowed for inspection of the properties of each aquifer deep zone in response to the pumping of well BWD 6-2 (that is screened in the deep zone). For both weeks, the data from the start of pumping to 1000 minutes after pumping began (i.e., 33 hours) was used as the focus of the analysis to reduce potential impacts from other aquifer stresses (e.g., intervals of known and undocumented pumping, changes in barometric pressure). In addition, Driscoll (1986) indicates that drawdown data prior to an observed change in the slope of the drawdown curve should be used for the calculation of T and S. The model output for the Weeks #1 and #3 analyses for each aquifer depth zone are provided in Attachment C (Week #1, Figures C-7 through C-9; Week #3, Figures C-10 through C-12).

Table 5-1 summaries the model results for T and S for each aquifer zone and provides comments regarding the analyses. Because the analysis used observed water level data from widely spaced and variable screen depths for each aquifer zone, and relied upon best-fit type curve matching, the results represent bulk aquifer properties. Table 5-1 also provides the model generated values for 1/B (the leakage factor) and Kz/Kr (ratio of vertical to radial hydraulic conductivity) that reflects the relative ease with which water can move through the aquifer vertically verses horizontally. The bottom section of Table 5-1 provides average parameter values based on both Weeks #1 and #3 test results and values that represent an 'aquifer composite' using the thickness-weighted results for each zone.

In addition to type curve matching during the aquifer test data analysis, the aquifer thickness used in the model and the drawdown in the aquifer at well BWD 6-2 were found to have significant effects on estimating the aquifer parameters. As discussed, the layered sediments that comprise the Magothy aquifer represent a range of hydraulic properties and the depth at which the lower portion of the aquifer (in which well BWD 6-2 and observation wells are screened) becomes effectively semi-confined is not known. This unknown interval of the lower Magothy aquifer may also be considered the primary zone from which well BWD 6-2 draws groundwater. In consideration of this uncertainty, the aquifer thickness was varied during the initial attempts at automated curve matching in the AQTESOLV program and was used as a calibration parameter to refine type curve fits with the observed data. It was found that the aquifer drawdown predicted by the model at well BWD 6-2 was sensitive to the aquifer thickness. Although water levels, and thus drawdown, were not monitored at well BWD 6-2 during the pumping cycles, historical well test data that included pumping rates, static and pumping water levels was provided by BWD. This data is summarized in Table 5-2 along with the calculated mean specific capacity of well BWD 6-2. The lower portion of Table 5-2 presents a drawdown estimate for the aquifer at well BWD 6-2 for a range of well efficiencies. Assuming a well efficiency between 70 and 80 percent indicates that aquifer drawdown at well BWD 6-2 would be about 30 feet. This value of drawdown was then used in the AQTESOLV modeling as a qualitative target for the curve matching and thus constrain the range of aquifer parameters, including aquifer thickness, utilized in the type curve fitting. Implementation of these procedures during the modeling resulted in a reasonable fit with the drawdown measured in the observation wells using an aquifer thickness of 470 feet [i.e., depth interval of 410 feet to 880 feet (i.e., bottom of aquifer at Raritan Clay, see Figure 3-4)]. The effective top of the aquifer at a depth of 410 feet is supported by other lines of evidence: 1)

Environmental Sequence Stratigraphy (ESS) mapping (Resolution, 2016 unpublished in Attachment B) has indicated a change in the depositional environments at a depth of about 410 feet in the area of well BWD 6-2, and 2) well RE104D1 that is screened from a depth of 350 to 370 feet showed very little response to pumping at wells BWD 6-2 and 5-1 during Week #1 and Week #3 (see Attachment A, Figures A-6 and A-9).

Figures C-1, C-4, C-5, and C-6 provided in Attachment C show that wells RE104D2, RE107D3, RE104D1, and RE123D2 responded differently from all other wells within the same aquifer zone. The data from these wells are presented in the pump test analysis (Attachment C, Figures C-7, C-10, C-11, and C-12), but they were made inactive in the model to avoid negative impacts on the least squares regression analysis used in the automatic curve matching performed by AQTESOLV. It is noted that well RE104D1 is screened much shallower in the aquifer than all other shallow zone wells and may represent another aquifer zone. Well RE104D2 demonstrated more sensitivity to well BWD 5-1 pumping intervals compared to other wells screened in the deep zone, and less influence from well BWD 6-2 pumping compared to well RE104D3. Well RE107D3 demonstrated a large magnitude of drawdown from well BWD 6-2 pumping (considering its distance from well BWD 6-2) compared to other wells screened in the intermediate zone. The responses of wells RE104D2 and RE107D3 suggest these wells may be screened in a lens of sediment with different hydraulic properties than the bulk aquifer (represented by the other wells). Well RE123D2, as previously noted, is located up gradient (north) of the ONCT wells while all BWD supply wells are located south of the ONCT wells. As seen in the figures, the drawdown trends for well RE123D2 were consistent with those observed in the same aquifer zone and it is evident that pumping at BWD 6-2 exhibited hydraulic influence at these wells; however, it was excluded from the least squares analysis to avoid model convergence issues due to the potential for over-riding drawdown influence on the observed water levels (i.e, damping effect) from the ONCT wells.

6. CAPTURE ZONE ANALYSIS

An objective of the pilot test was to evaluate the feasibility of using well BWD 6-2 to mitigate the TCE plume in the local aquifer. To address this objective, analyses were conducted to estimate the dimensions, shape, and projection of the groundwater capture zone that can be created by well BWD 6-2 pumping. The water level monitoring and aquifer parameter data that was presented in Section 5 supported investigation along two lines of evidence consistent with EPA (2008) guidance

for capture zone analysis: 1) water level mapping, and 2) analytical calculations of capture zone dimensions.

Water levels recorded during Weeks #1 and #3 were combined with aquifer drawdown modeling and used to map the pumping potentiometric surface, the areal extent of drawdown, and changes in flow gradients resulting from pumping at well BWD 6-2. The resulting water-level based maps provided information that supported placement of a dividing flow line (i.e., and the flow stagnation point down-gradient of the pumping well) around well BWD 6-2 at the time of observed maximum drawdown and estimation of the observed capture zone.

The analytical line of evidence for assessing the capture zone created by well BWD 6-2 pumping used equations in EPA guidance (2008) to calculate the dimensions of the capture zone. The equations use the aquifer transmissivity, the background horizontal flow gradient, and the pumping rate to estimate the dimensions of the capture zone.

While neither line of evidence was found to be independently definitive, the combined results of the two approaches are believed to depict a reasonable estimation of the deep capture zone effected by well BWD 6-2 pumping. The capture zones resulting from both lines of evidence (observed and analytical) are presented as overlays on the current TCE plume maps. Overlaying the capture zones on the plumes mapped for various aquifer depths that correspond with the vertical zone of influence of well BWD 6-2 allows for an estimation of the plume areas that are likely to be mitigated by pumping at well BWD 6-2.

6.1 Water Level Maps

As presented in previous sections, water levels were monitored at 10 geographic locations and at multiple aquifer depth zones using 24 observation wells during the pilot test. The water levels for the wells screened in the deep, intermediate, and shallow aquifer zones reflect the real-time hydraulic influence of pumping at well BWD 6-2 on that depth interval across the aquifer. Data collected from early intervals of pumping during Weeks #1 and Week #3 are regarded as the best indicator of hydraulic influence since they represent a time when well BWD 6-2 imposed the dominant aquifer stress, times when other aquifer stresses were not apparent or transient, and the time when approximate steady state flow conditions and maximum drawdown were observed. Steady-state flow was demonstrated by a leveling out of water levels and stabilization of drawdown

in observation wells that occurred at approximately 1000 minutes after pumping began (i.e., t = 1000 mins) during both Weeks #1 and Week #3 pumping cycles (see Hydrograph Figures in Attachment A and Drawdown Figures in Attachment C). The field recorded water levels for t=0 mins and t = 1000 mins are summarized in Table 6-1.

The water level maps were prepared for the deep aquifer zone to help visualize the groundwater flow lines, the area of pumping influence, and the capture zone for the deep aquifer zone (in which well BWD 6-2 is screened). These maps were prepared for the time immediately before pumping began (i.e., t = 0 mins) and the time when steady flow prevailed (t = 1000 mins) for Week #1 and Week #3. The process to prepare the potentiometric surface maps consisted of the following:

- The observed water levels for each deep zone observation well were plotted on a map for t = 0 mins for both Week #1 and Week #3. This data represents the local potentiometric conditions just prior to the start of the Week #1 and Week #3 pumping cycles for well BWD 6-2 at a time when the well had been idle (i.e., no pumping of wells BWD 6-1 or 6-2 at BWD Plant 6 for two days).
- Next, the observed deep water levels were imported to the SURFER® program and contouring of the data was conducted to produce the potentiometric surface map for the deep aquifer zone at t = 0 mins. The default SURFER® krigging algorithm (an interpolative statistics-based procedure that determines values at gridded nodes within the spatial area of known values of a parameter) was used to model the potentiometric elevation grid; experience and literature references have demonstrated that this method generally produces reasonable results for many sites. The potentiometric surface maps presented in the figures relied on professional judgement, familiarity with the local hydrogeology, and knowledge of site conditions and prior potentiometric maps of the area to confirm the reasonableness of the modeled contours presented.
- Because aquifer water levels were not monitored at well BWD 6-2, water levels for this location were interpolated from the potentiometric surface derived from the water levels at the surrounding deep observation wells. In SURFER®, the potentiometric elevation of the grid cell containing well BWD 6-2 was used to represent the water level at the well (as noted in Table 6-1).
- A second line of evidence to support the SURFER® modeling used to derive the well BWD 6-2 water level consisted of performing manual, liner interpolation of the observation well water levels surrounding well BWD 6-2. The contours and water levels resulting from this manual interpolation technique were consistent with the SURFER®-generated water levels at the well BWD 6-2 location.

Figures 6-1 and 6-2 present the t = 0 mins deep zone potentiometric surface maps for Week #1 and Week #3. The field recorded water levels summarized in Table 6-1 are posted for each observation well along with the interpolated water levels for well BWD 6-2. The potentiometric surface contours draw from the water levels show a north northwest by south southeast groundwater flow direction that is consistent with the area-wide potentiometric surface that has been previously mapped (Resolution, 2015d). The Week #1 and #3 contours are very similar, and the consistent contour spacing reflects the non-pumping status of well BWD 6-2.

Mapping the deep potentiometric surface at t = 1000 mins (i.e. pumping conditions) was conducted using additional data and different interpolation methods. As discussed above, water levels were not monitored in the aquifer at well BWD 6-2. In addition, the density and distribution of observation well data did not provide the data points necessary to interpret potentiometric contours that represent the cone of depression resulting from well BWD 6-2 pumping (i.e., horizontal gradient well pairs were not available, as described in EPA guidance). To support mapping of the pumping potentiometric surface, the leaky-aquifer model and local aquifer parameters presented in Section 5 were used in AQTESOSLV to model the drawdown at well BWD 6-2 at t = 1000 mins. The model was also used to produce distance-drawdown plots resulting from pumping at well BWD 6-2 and to create additional data points for mapping the potentiometric surface. The model was run using the specific aquifer parameters and pumping rates generated for the Week #1 and Week #3 aquifer test analyses (see Section 5). As shown in Table 6-1, the model predicted drawdown in the aquifer at well BWD 6-2 was 34.1 and 33.1 feet, respectively, for Weeks #1 and #3. Subtracting the predicted aquifer drawdown from the Week #1 and #3 t = 0 mins water levels resulted in pumping water levels of 17.3 and 17. 8 feet, respectively for Week #1 and #3 at well BWD 6-2 (see Table 6-1).

The model-generated distance-drawdown plots for Week #1 and #3 at t = 1000 mins are provided in Attachment C (near field and far field plots provided). Drawdown was extrapolated from these plots for observation points located at selected distances (up- and down-gradient) from well BWD 6-2; these data are presented in the upper portion of Tables 6-2 and 6-3, respectively, for Week #1 and #3. Using the average background gradient listed in the table notes for each week (refer to Figures 6-1 and 6-2) and the background water level at well BWD 6-2, background water levels (t = 0 mins) were calculated for each observation point and are presented directly above the modeled drawdown on each table. The pumping water levels for t = 1000 mins were calculated by

subtracting the drawdown from the background water level at each observation point and are presented directly below the drawdown. Each table includes a graphic plot of the background and pumping water levels that represents the water levels along a groundwater flowline through the well BWD 6-2 location. The downgradient stagnation point along this flowline, as highlighted in the upper portion of each table, and as visible on the plot of pumping water levels, occurs at the peak elevation of the downgradient pumping water levels. For Week #1, the stagnation point was estimated to correspond with an elevation of 46.7 feet and was located 1,800 feet downgradient of well BWD 6-2; for Week #3, the stagnation point was estimated to correspond with an elevation of 46.28 feet and is located 1,550 feet downgradient of well BWD 6-2. Because the distance-drawdown modeling was conducting using the modeled aquifer properties derived using a best-fit type curve analysis for each week's aquifer test analysis, and because the leaky aquifer model assumes homogeneous aquifer conditions, the distance-drawdown results are considered close approximations and may vary from observed conditions, particularly as the observation point distance from well BWD 6-2 increases. However, the good agreement between model predicted drawdown and observed drawdown at the observation wells indicates the differences are small (10 percent difference or less).

At the bottom of Tables 6-2 and 6-3 a listing of pumping water levels is provided that were used to support interpretation of the t = 1000 mins potentiometric surfaces for each week. These calculated pumping water levels were plotted on a flowline drawn through well BWD 6-2 and used in conjunction with the observation water levels at t = 1000 mins to manually interpret the potentiometric surface contours. Figures 6-3 and 6-4 present the t =1000 mins deep zone potentiometric surface maps for Week #1 and Week #3, respectively. The field recorded water level is posted for each observation well along with the model-derived pumping water level for well BWD 6-2; the pumping water levels listed in Table 6-2 and 6-3 are not shown on these figures, but were used to identify the stagnation point and for interpreting and drawing the potentiometric contours in proximity to well BWD 6-2. Linear interpretation of water elevations between observation well pairs were used for locating and orienting the contours at more distant locations from well BWD 6-2 (e.g., between wells RE123 and RE122). The resulting potentiometric surface shows the cone of depression created by well BWD 6-2 pumping in the deep aquifer zone. A line approximating the dividing flow line around well BWD 6-2 represents the observed deep aquifer capture zone for each week. This line begins at the stagnation point and was extended up-gradient to intersect the potentiometric contours at right angles. Capture zone dimensions for the

stagnation point distance, the total capture zone width at well BWD 6-2, and at the up-gradient end of the dividing flow line (3700 ft from well BWD 6-2) for the observed capture zone are summarized in the upper portion of Table 6-4.

Due to the absence of observation wells at cross gradient locations up-gradient of well BWD 6-2, extension of the contours to the east and west of the background gradient flow line through well BWD 6-2 was based on limited data and includes significant uncertainty; the contours are dashed in these areas of Figures 6-3 and 6-4. While the contours to the west were bounded by the observed elevations at wells RE122D3, RE103D3 and RE120D3, the extrapolated azimuth of the contours with respect to the background gradient flow line greatly impacts the location of the dividing flow line that represents the capture zone, that is, more or less curvature in the contour line greatly effects the width of the dividing flow line. Since control was limited to the east and to the far west, a conservative approach was used to extrapolate the curvature of the contours (i.e, the contours were draw to simulate the background gradient, thus limiting the width of the dividing flow line). The observation well density immediately surrounding well BWD 6-2 is greater, and the observed data coupled with the calculated stagnation point and pumping water levels were considered good control for the contours immediately around well BWD 6-2. The resulting uncertainty in the up-gradient width of the capture zone is addressed further in the following section for the analytical capture zone. However, the conservative approach used to draw the contours (application of the ambient gradient in areas of poor control) has likely resulted in underestimation of the capture zone width.

Potentiometric contours for the intermediate and shallow aquifer zones for t = 0 mins and t = 1000 mins were not constructed for several reasons:

- Several data loggers had not been installed at the start of Week #1 and the resulting data set in very limited (see Table 6-1)
- Additional well data are available for Week #3, however, the distribution of the monitored intermediate wells did not include a well located to the east of well BWD 6-2, and the shallow well data for well RE104D1, which is the only shallow well to the east of well BWD 6-2, was deemed not representative of the water levels observed in the remaining shallow wells (i.e., 110 feet of screen elevation difference between well RE104D1 and the other shallow wells)
- These data limitations did not allow mapping of the potentiometric surfaces in the intermediate and shallow zones around well BWD 6-2

- Because well BWD 6-2 is screened in the deep aquifer zone, there is no direct method to determine the pumping water levels in these aquifer zones.

The water levels observed for the intermediate and shallow aquifer zones are not sufficient to assess the horizontal extent of capture in those zones due to pumping at well BWD 6-2, and supporting water levels were not able to be calculated; however, the data were evaluated relative to the vertical impacts of pumping at well BWD 6-2. Figures 6-5 and 6-6 show the drawdowns that occurred in the shallow, intermediate, and deep aquifer zones for Weeks #1 and #3 pumping, respectively. The water level data and calculated drawdowns are provided in Table 6-1. Using the observed drawdown data, the area where 1-foot of drawdown was observed in each aquifer depth zone was approximately mapped on each figure. The aerial extent of drawdown is shown to be relatively larger in the deep aquifer zone and decreases in size upward through the intermediate and shallow aquifer zones. The upward reduction in the size of the 1-foot drawdown area is expected due to the partial penetration of the aquifer by well BWD 6-2 (it is screened in the deep zone) and due to aquifer anisotropy, i.e., the low vertical to horizontal conductivity ratios deducted from the aquifer pumping test analyses (see Table 5-1). It is noted that the width of the 1-foot drawdown area in the deep zone is similar to the observed capture zone widths up-gradient of well BWD 6-2 for Weeks #1 and #3 (compare Figures 6-5 and 6-6 with Figures 6-3 and 6-4). Extending this relationship between the drawdown and the capture zone widths for the deep zone to the intermediate and shallow aquifer zones, and considering the partial penetration of well BWD 6-2 and aquifer anisotropy, it is deduced that the capture zones in the intermediate and shallow zones will be progressively smaller than what has been observed for the deep aquifer zone.

Figures 6-7 and 6-8 show the change in vertical head difference between wells screened in the shallow and deep zones and in the intermediate and deep zones, respectively, in response to the pumping conducted at well BWD 6-2 (i.e., increases in vertical head due to pumping). The data for Weeks #1 and #3 are shown on each figure. The wide distribution and poor density of this data does not support mapping of the change in vertical head differences, but it demonstrates the consistency of the pumping effects during two independent pumping cycles and documents the wide impacts of pumping at well BWD 6-2 on the vertical head distribution in the shallow and intermediate aquifer zones. Furthermore, these observed increases in the vertical head signify increases in the vertical gradient and reflect hydraulic conditions that suggest vertical capture of groundwater by well BWD 6-2 (although the area of capture cannot be delineated by these data).

6.2 Analytical Capture Zone Calculations

The analytical line of evidence for assessing the capture zone created by well BWD 6-2 pumping utilized standard equations to calculate the dimensions of the capture zone. The analytical equation details and assumptions from the EPA (2008) guidance are presented in Figure 6-9. It is noted that application of these equations is applicable to homogeneous, isotropic, confined aquifers; a fully penetrating pumping well; and no other sources of water to the pumping well (e.g., leakage from above or below). The conditions required by the assumptions are not strictly satisfied by the local aquifer and construction of well BWD 6-2, however EPA guidance states that application of these equations may be valid if input values are carefully considered and adjusted when the assumptions are violated. As described below, the inputs used for these equations have been adjusted to account for site-specific conditions, and rationale is provided. In addition, the observed capture zone distance to the stagnation point, based on modeling the pumping water levels, was used to calibrate the analytical model results.

Input values for the equations were derived from the site-specific estimates of aquifer transmissivity, T, provided in Section 5; the background hydraulic gradient for each aquifer zone at t = 0 minutes for Weeks #1 and #3 of the pilot test (see Figures 6-1 and 6-2); and consideration of aquifer stratification (e.g., anisotropy) and the partial aquifer penetration of well BWD 6-2. Because well BWD 6-2 is screened in the deep aquifer zone, the analysis was initially conducted only for that zone with inputs modified to simulate a fully penetrating well. As shown in Table 6-4, a thickness of 70 feet was assigned that represents the screen length of well BWD 6-2. A horizontal conductivity of 120 feet per day was used based on the deep aquifer properties estimated from the aquifer pump test analysis (see Table 5-1). The average background gradient of 0.00155 observed for Weeks #1 and #3 was also used (range of 0.0015 to 0.0016). Using these inputs a range of capture zone dimensions were calculated for a range of pumping flow scenarios because the flow contribution from only the 70-foot screen interval was unknown. Although the nominal flow rate of 1,153 gpm (average flow rate for Weeks #1 and #3) is shown as a point of reference, the vertical distribution of drawdown in the observation wells and the absence of known aquitards within the 470 foot thick aquifer zone across which the observation wells were screened suggest that all of the flow to well BWD 6-2 did not come solely from the well-screen interval in the deep aquifer zone. Following EPA guidance, flow factors of 1.5 (67%) and 2 (50%) were used to account for vertical flow from portions of the aquifer to above and below well BWD 6-2screen

interval and provide alternate capture zone scenarios. The calculated analytical stagnation point distance (i.e, Capture Zone downgradient [CZ, dwn]) shown in Table 6-4 for the 67 percent flow basis scenario was observed to closely approximate the distance shown in the table for the Week #1 observed capture zone. This similarity of the analytical equation result with the observed Week #1 capture zone stagnation point distance provided a calibration for the analytical equation flow input and indicates that 67 percent of the flow (733 gpm) to well BWD 6-2 was extracted from the70-foot well-screen interval in the deep aquifer zone. Table 6-4 also provides analytical estimates of the total capture zone width at the pumping well (CZ, well) and the total maximum capture zone width (CZ, max) located far up-gradient of well BWD 6-2 for the 67 percent flow basis scenario. Because the maximum up-gradient capture zone width is located far beyond the area of interest for well BWD 6-2, the EPA equation for calculating the distance between the dividing streamlines (i.e., total capture zone width) at any distance up-gradient of the pumping well (see Figure 6-9) was used to calculate the total capture zone width at selected distance up-gradient of well BWD 6-2 within the area of interest (i.e., between well BWD 6-2 and the southern NWIRP boundary); the results of this analysis are presented in Table 6-5.

The above results of the analytical equations for the deep aquifer zone suggest that 33 percent of the flow to well BWD 6-2 was derived from portions of the aquifer overlying (i.e. intermediate and shallow aquifers zones) and underlying the screened interval of the well BWD 6-2. This is consistent with the local geology that shows that well BWD 6-2 is screened in a gravel zone that is over- and under-lain by finer grained silty clay and silty sand dominated sediments (see ESS Section A-A', Attachment B). Collectively, the sediments overlying and underlying the 70-foot screen interval of well BWD 6-2 represent 400 feet of the 470 feet thick aquifer that provides the flow to the well. While data are not available to assess the individual flows contributed by these zones, flow to well BWD 6-2 from the intermediate and shallow aquifer zones was strongly indicated by the widespread drawdown and increases in vertical head distributions in multiple observation wells screened in these aquifer zones in response to well BWD 6-2 pumping. Well RE123D3, with a screen depth of 815 feet, was the only observation well screened below well BWD 6-2 that represents the underlying aquifer. Although this well is located 4155 feet to the north of well BWD 6-2 and up gradient of the ONCT wells, drawdown was observed in response to well BWD 6-2 pumping (see Figure C-1) suggesting that the underlying aquifer is likely contributing flow to well BWD 6-2. To assign flow contributions the shallow and intermediate zones were considered as a single overlying aquifer zone with a thickness of 300 feet and the underlying aquifer was assigned

the remaining aquifer thickness of 100 feet. Partitioning the flow based on the thickness-weighted averages of the overlying and underlying sediments results in three-fourths (i.e., 300 of 400 feet) of the remaining flow contribution to well BWD 6-2 from the shallow/intermediate aquifer zone. Therefore, a 25 percent flow basis (i.e., 0.75 times 33 percent remaining flow) was assigned to the shallow/intermediate aquifer zone for the analytical capture zone analysis. As shown in Table 6-4, the combined aquifer thickness of 300 feet, a horizontal conductivity of 82.5 feet per day based on the average shallow and intermediate aquifer properties estimated from the aquifer pump test analysis (see Table 5-1), and the average background gradient of 0.00155 observed for Weeks #1 and #3 was used to complete the analysis. As was presented for the deep aquifer zone, total capture widths calculated for the shallow/intermediate aquifer zone at selected distances up-gradient of well BWD 6-2 are included in Table 6-5. A capture zone analysis was not conducted for the aquifer underlying well BWD 6-2 because the plume has not been observed at that depth.

6.3 TCE Plume Capture

Figure 6-10 presents the deep aquifer capture zones that were based on the water level mapping and analytical calculation lines of evidence (described above in Sections 6.1 and 6.2). The capture zone areas are shown overlying the current TCE plume map for >700 depth because this depth is consistent with the deep aquifer zone in which well BWD 6-2 is screened (700 to 770 feet below ground surface). The observed capture zones for Week #1 and Week #3 based on water level mapping are shown (see Figures 6-3 and 6-4). The analytical capture zone was plotted using the dimensions presented in Tables 6-4 and 6-5 for a fully penetrating deep aquifer well with an extraction rate of 773 gpm; the axis of this capture zone was oriented parallel with the background flow direction through well BWD 6-2 on Figure 6-10. It is noted that the analytical capture zone is wider than either of the observed capture zones. The smaller width of the observed capture zones reflects the previously noted uncertainty associated with extrapolating the observed potentiometric contours in areas distant from well BWD 6-2 where observation well data were not available. That uncertainty lead to conservative placement of the observed dividing flow line that delineates the capture zone dimensions. Based on the variation in the capture zone dimensions and in consideration of the different lines of evidence used to delineate the areas, it is surmised that the areas shown represent the likely range of capture zones created by pumping well BWD 6-2 at the nominal pumping rate used in the calculations. The overlap of the deep analytical capture zone with the 500 parts per billion (ppb) plume contour for the >700 feet TCE plume indicates that well

BWD 6-2 pumping at 1,153 gpm would capture about 68 percent of the plume area for the largest capture zone.

Figures 6-11 and 6-12 present the shallow/intermediate aquifer capture zone described in Section 6.2 that was based only on the analytical calculation line of evidence. Water level mapping did not provide the data needed to delineate a capture zone for the shallow or intermediate aquifer zones. The capture zone area is shown overlying the current TCE plume map for >600 depth (Figure 6-11) and >500 feet depth (Figure 6-12) because these intervals are consistent with the shallow and intermediate aquifer zones that lie above the well screen depth interval of well BWD 6-2. The analytical capture zone was plotted using the dimensions presented in Tables 6-4 and 6-5 for a well that fully penetrates the combined shallow/intermediate aquifer zones with an extraction rate of 285 gpm; the axis of this capture zone was oriented parallel with the background flow direction through well BWD 6-2 on both figures. It is noted that the shallow/intermediate capture zone is significantly smaller than the capture zone depicted for the deep aquifer zone in Figure 6-10. This is consistent with the lower extraction rate (i.e., lower percentage of pumping flow to well BWD 6-2) from the shallow/intermediate aquifer zones and the higher transmissivity of this thicker aquifer interval. The smaller capture zone for the shallow/intermediate aquifer zones is also consistent with the location of the well screen for BWD 6-2 in a portion of the deep aquifer zone (i.e., partial penetration impacts of the pumping well). The overlap of the shallow/intermediate analytical capture zone with the 500 ppb plume contours for the >600 and >500 feet TCE plumes in Figures 6-11 and 6-12 indicates that well BWD 6-2 pumping at 1,153 gpm would capture about 15 and 17 percent, respectively, of the shallow and intermediate plume areas.

7. ANALYTICAL SAMPLE RESULTS

Air and groundwater samples were collected in conjunction with performance of the aquifer monitoring during the pilot test. As described in Section 3, the following samples were collected and analyzed for VOCs that are known contaminants in the groundwater plume in the vicinity of well BWD 6-2:

- Influent to, and effluent from, the BWD Plant 6 groundwater treatment system, i.e., groundwater pumped by wells BWD 6-1 and 6-2
- Ambient air from locations up- and down-wind of the groundwater treatment air stripping tower discharge location at BWD Plant 6, and
- Groundwater samples from observation wells that were monitored for water levels.

7.1 Treatment System Samples

BWD periodically collects water samples of the influent to and effluent from the groundwater treatment system at Plant 6 to monitor the system performance and to ensure quality of distributed water. The treatment system removes contaminants in the groundwater that result from hydraulic capture by wells BWD 6-1 and 6-2 of a portion of the VOC plume that has migrated downgradient in the Magothy aquifer form the former NWIRP. As a condition of the pilot test work plan prepared by Resolution (2015c), the NYSDEC required that weekly samples be collected of the influent and effluent during the operation of well BWD 6-2, tested for VOCs and 1,4-dioxane, and the results provided within 72-hours of collection. These samples were collected by BWD personnel and analyzed by PACE Analytical Laboratory that is a NYSDEC-approved facility. Samples were collected near the end of each weekly pumping cycle and the results were emailed to NYSDEC by Resolution when they were available. Table 7-1 summarizes the detected chemicals and identifies results that exceeded New York State criteria for potable water supplies. Copies of the laboratory reports are provided in Attachment D. These data show that TCE was the dominant VOC (maximum concentration of 1,440 µg/L), in terms of concentration, in the groundwater extracted by well BWD 6-2.

7.2 Ambient Air Samples

Ambient air samples were collected during two operational periods of the BWD Plant 6 groundwater treatment system during pumping cycles of well BWD 6-2. The sample canisters were placed on site based on air dispersion modeling that was performed using site-specific weather data. The samples were collected on March 24, 2016, and on April 19, 2016 at locations described in Section 3 and shown on Figures 3-2 and 3-3.

Tabular results of all air samples and the laboratory reports are provided in Attachment E. Table 7-2 lists the chemicals detected in ambient air and their concentrations and provides background and calculated risk-based concentrations for comparison. The risk calculation sheet based on United States EPA methodologies is provided in Attachment E.

7.3 Groundwater Samples

Groundwater samples were collected from observation wells used for monitoring water levels during the pilot test as part of the regular-scheduled quarterly sampling performed by the Navy.

The samples were collected immediately prior to the start of Week #1 pumping cycle. The samples are collected by Resolution and analyzed by Katahdin, a New York State and Navy Approved Laboratory, for the chemicals of interest using EPA Methods 8260C (VOCs) and 8270C SIM semivolatile organic compounds (SVOCs). The sampling methods, validation, and full laboratory reports are regularly published by the Navy (the 2016 first quarter report in preparation). An analytical summary of VOC results for the wells associated with the pilot test area is provided as Table F-1, Attachment F (wells MW-117, RE107D3, and RE126D1/D2/D3 were not sampled). The results provide a baseline for plume conditions in the vicinity of well BWD 6-2 at the start of the pilot test. The 2016 second quarter sampling scheduled for June 2016 may be used for comparison.

8. CONCLUSIONS

Four weeks of documented, constant-rate pumping were conducted at well BWD 6-2 between March 21 and April 29, 2016, per the work plan, BWD Well 6-2 Pilot Test Work Plan (Resolution, 2015c). Water levels were monitored using electronic data loggers at 24 observation wells in the surrounding Magothy aquifer throughout the BWD pumping cycles. The water level data along with pumping records from BWD and nearby remediation wells were used to perform aquifer test analyses and to estimate the aquifer properties and hydraulic capture zone created by pumping at well BWD 6-2.

Influent and effluent samples were collected weekly from the groundwater treatment system at the BWD Plant 6 to document the quality of treated water that was distributed during the pilot test. These samples showed that TCE was the only contaminant in the influent (i.e., untreated groundwater) to exceed New York start criteria for potable water supplies. The influent concentration of TCE in well BWD 6-2 ranged between 947 to 1,440 µg/L; treated water did not exceed criteria, but low concentrations of TCE were observed in the Week #5 and #6 effluent samples. The low concentrations of TCE (maximum 0.72 µg/L) in effluent signaled breakthrough for the treatment system and pumping at well BWD 6-2 was discontinued after Week #6 (April 29, 2016).

Ambient air samples were collected twice at the BWD Plant 6 during the operation of well BWD 6-2 to assess potential impacts to local air quality from the air stripper discharge during the pilot test. Several VOCs were detected in the upwind, on-site, and off-site air samples and estimated

concentrations of carbon tetrachloride and methylene chloride marginally exceeded the literature-based background concentrations (see Table 7-2). Detection of TCE in all ambient air samples exceeded the literature-based background, but only one of the two on-site air samples exceeded the calculated risk-based air concentrations (maximum of 34 µg/m^3 verses risk-based concentration of 32.4 µg/m^3). These results suggest that additional air monitoring of the current treatment system is needed to ensure ambient air quality.

Immediately prior to the start of the first pumping cycle on March 21, 2016, quarterly groundwater sampling was conducted that included the observation wells in which water level monitoring was being conducted; the analytical results provide a baseline snapshot of the plume prior to the pumping cycles. The next quarter of groundwater sampling is scheduled for June 2016.

The observation wells and well BWD 6-2 were constructed with well screens that were installed between depths of 350 to 835 feet in the Magothy aquifer. Because of the wide range of well screen intervals, the observation wells were grouped into deep, intermediate, and shallow aquifer zones for the aquifer characterization and capture zone analyses. The AQTESOLV computer program was used to evaluate the water level responses to pumping at well BWD 6-2 during Weeks #1 and #3 of the pilot test. The well responses for each aquifer depth zone were evaluated verses time of pumping using type curves representing a leaky, confined aquifer model. The automatic curve matching feature of the AQTESOLV modeling program, along with analyst professional judgement, were used to determine the best fit of the type curves to the water levels for each group of observation wells and aquifer parameters of T and S were calculated for each aquifer zone. The Week #1 and #3 results were similar and the average results for each aquifer zone of the Magothy aquifer are shown below.

Aquifer Zone	Transmissivity (T, ft2/day)	Storativity (S)	1/B (leakage factor)	Kz/Kr (vertical to radial hydraulic conductivity ratio)	Kr (ft/day)
Deep	56,420	0.0018	0.0003	0.0004	120
Intermediate	41,120	0.0004	0.0001	0.002	87
Shallow	36,825	0.0007	0.0002	0.0084	78
Composite Aquifer	45,009	0.0010	0.0002	0.004	96

Estimates of the hydraulic capture zone created by pumping at well BWD 6-2 were evaluated using two approaches: 1) mapping observed and modeled water levels to derive the potentiometric surface for each aquifer depth zone and mapping the capture zone based on groundwater flow lines, and 2) applying standard analytical equations using the site-specific bulk aquifer value of T, the background hydraulic gradient, and a pumping rate representative of the partial penetration of well BWD -2 to estimate the dimensions of the deep capture zone. A summary of the capture zone dimensions using each of the two methods is shown below.

Capture Zone Method and Aquifer Zone	CZ Distance down gradient* from well BWD 6-2 (feet)	CZ width at well BWD 6-2 (feet)	CZ Maximum width far up-gradient of well BWD 6-2 (feet)
Deep, Week #1 Observed-Modeled	1,800	4,500	na
Deep, Week 3 Observed-Modeled	1,550	4,400	na
Deep, analytical	1,819	5,711	11,422
Shallow/Intermediate, analytical	228	716	1,432

Notes: CZ – capture zone; pumping rates were 1151 and 1154 gpm for Week #1 and Week #3, respectively; pumping rate of 1153 gpm used for analytical CZs
(*) distance from well BWD 6-2 to down-gradient stagnation point
na – not available

To address the feasibility of using well BWD 6-2 to remediate the VOC plume, the capture zones summarized above were overlain on the most recent interpretations of the extent of the TCE plume at depths consistent with the deep, intermediate, and shallow aquifer zones that were monitored during the pilot test. Figures 6-10 through 6-12 show the dimensions of the deep, intermediate, and shallow capture zones with the TCE plume concentration contours at similar aquifer depths. These correlations indicate that continuous pumping at well BWD 6-2 at a nominal rate of 1,153 gpm would capture a maximum of 68 percent of the RE108 hot spot TCE plume with concentrations greater than 500 ppb at depths of 700 feet and 100 percent of the RE108 hotspot with concentrations greater than 1,000 ppb. Due to the partial penetration of well BWD 6-2, the capture

zone for the shallow/intermediate aquifer zones lying immediately above well BWD 6-2 is greatly reduced and is estimated to capture 15 to 17 percent, respectively, of TCE plumes with concentrations greater than 500 ppb in those aquifer zones (i.e, >600 and >500 feet) and 14 percent of concentrations greater than 1,000 ppb in those aquifer zones. Capture is also supported by the presence of VOCs, predominantly TCE at a maximum concentration of 1,440 µg/L, in the treatment system influent samples collected by BWD during the operation of well BWD 6-2 to monitor system effectiveness and distributed water quality. The widespread hydraulic influence of pumping at local remediation wells and other BWD supply wells that was documented during this pilot study indicates that the shape, size, and persistence of the capture zone achieved by well BWD 6-2 will be dependent upon pumping at the existing remediation wells and pumping cycles at the other BWD supply wells.

9. REFERRENCES

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FIGURE LIST

TABLE LIST

ATTACHMENTS

A. Well Hydrographs, Barometric Pressure vs Water Level Plots, and Data Files (on disc)
B. Pumping Well Records
C. Drawdown Plots, Aquifer Pump Test Analyses
D. BWD Plant 6 Water Sample Results and Laboratory Reports
E. Ambient Air Sample Results and Laboratory Reports
F. Analytical Data Summary for Wells Sampled by Resolution

FIGURES

F:\Projects\Navy\Bethpage WXE0817.0 Deliverables\7.2 CADD\GIS_files\Bethpage\MAP DOCS\MXD\MISC\PilotTest-BWD\2016 09 Rpt\F3-1 Location Map.mxd

GM-17SR
GM-17I
GM-17D
WELL 1
MW-2GF
GM-18S
GM-18I
GM-18D
VPB144
VPB39
GM-39D
GM-39D2
GM-33D2
N-10631
MW-3R
WELL 17
N-10600
GM-78S
GM-78I
VPB140
GM-20I
GM-20D
RE123D1
RE123D2
RE123D3
VPB157
VPB73
GM-73D
GM-73D2
GM-73D3
GM-21S
GM-21I
GM-21D
WELL 18
GM-19S
GM-19I
MW-5
MW-6
MW-4
GM-15S
GM-15I
GM-15D
MW-2
MW-3
VPB110R
GM-74I
GM-74D
GM-74D2
GM-74D3
WELL 19
VPB110
HN-41S
MW-111-4
Powell Ave
Broadway
State Hwy 135
N
Bethpage
N-10633
Central Ave
GM-79I
GM-79D
N-10628
VPB104
GM-37D
GM-37D2
N-9921
VPB141
GM-75D2
N-10624
N-10627
RE107D1
RE107D2
RE107D3
VPB160
RE126D1
RE126D2
RE126D3
N-10634
GM-71D2
GM-70D2
VPB156
RE122D1
RE122D2
RE122D3
VPB121
VPB142
RE108D1
RE108D2
GM-35D2
MW-116-5
BWD 4-1
BWD-691
GM-36D2
GM-36D
VPB117
MW-117-5
VPB138
RE104D1
RE104D2
RE104D3
N-10821
RW3-MW3
RW3-MW4
BWD-69
VPB5
BWD 4-2
RW2-MW1
RW-3
VPB137
RE103D1
RE103D2
RE103D3
RW3-MW1
RW3-MW2
GM-38D
GM-38D2
RW1-MW1
RW1-MW2
GM-34D
GM-34D2
BWD 6-2
BWD-8941
BWD-3876
VPB48
VPB38
RW-1
VPB118
VPB47
MW-118-5
N. Wantagh Ave
Hicksville Rd
Stewart Ave
VPB40
BWD-8004
RE105D1
RE105D2
VPB139
VPB122
VPB159
VPB154
RE120D1
RE120D2
RE120D3
RE137
BWD 5-1
State Hwy 135
Levittown
VPB165
RE131D1
RE131D2
RE131D3
Hempstead Tpke
VPB76
VPB129
TT101D
TT101D1
TT101D2
Union Ave
Plainedge
VPB155
RE121D1
RE121D2
VPB158
VPB150
Miller Pl
VPB148
RE114D1
RE114D2
RE114D3
Wantagh Ave
Seamans Neck Rd
VPB46
VPB149
Boundary Ave
VPB44
BPOW4-2R
BPOW4-1R
LWD-5303
VPB131
VPB50
VPB128
BPOW3-3
VPB130
BPOW
BPOW
BPOW

0 412.5 825 1,650 Feet

Legend

- Monitoring Well
- Vertical Profile Boring
- Water Supply Well
- Extraction Well
- Monitoring Well with Data Logger

NAVFAC

WELL LOCATION MAP

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: EV	DATE: 10/4/2016
APPROVED BY: —	DATE: —
FIGURE NO.: 3-1	REV: 0

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NAVFAC

MARCH 24, 2016 SUMMA CANISTER PLACEMENT
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE69
APPROVED BY: PS	DATE: 9/29/2016
APPROVED BY: —	DATE: —
FIGURE NO.: **3-2**	REV: 0

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NAVFAC

APRIL 19, 2016 SUMMA CANISTER PLACEMENT
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE69
APPROVED BY: PS	DATE: 9/29/2016
APPROVED BY: —	DATE: —
FIGURE NO.: 3-3	REV: 0

Figure 3-4. Schematic Showing Observation Wells Screens
NWIRP, Bethpage, NY

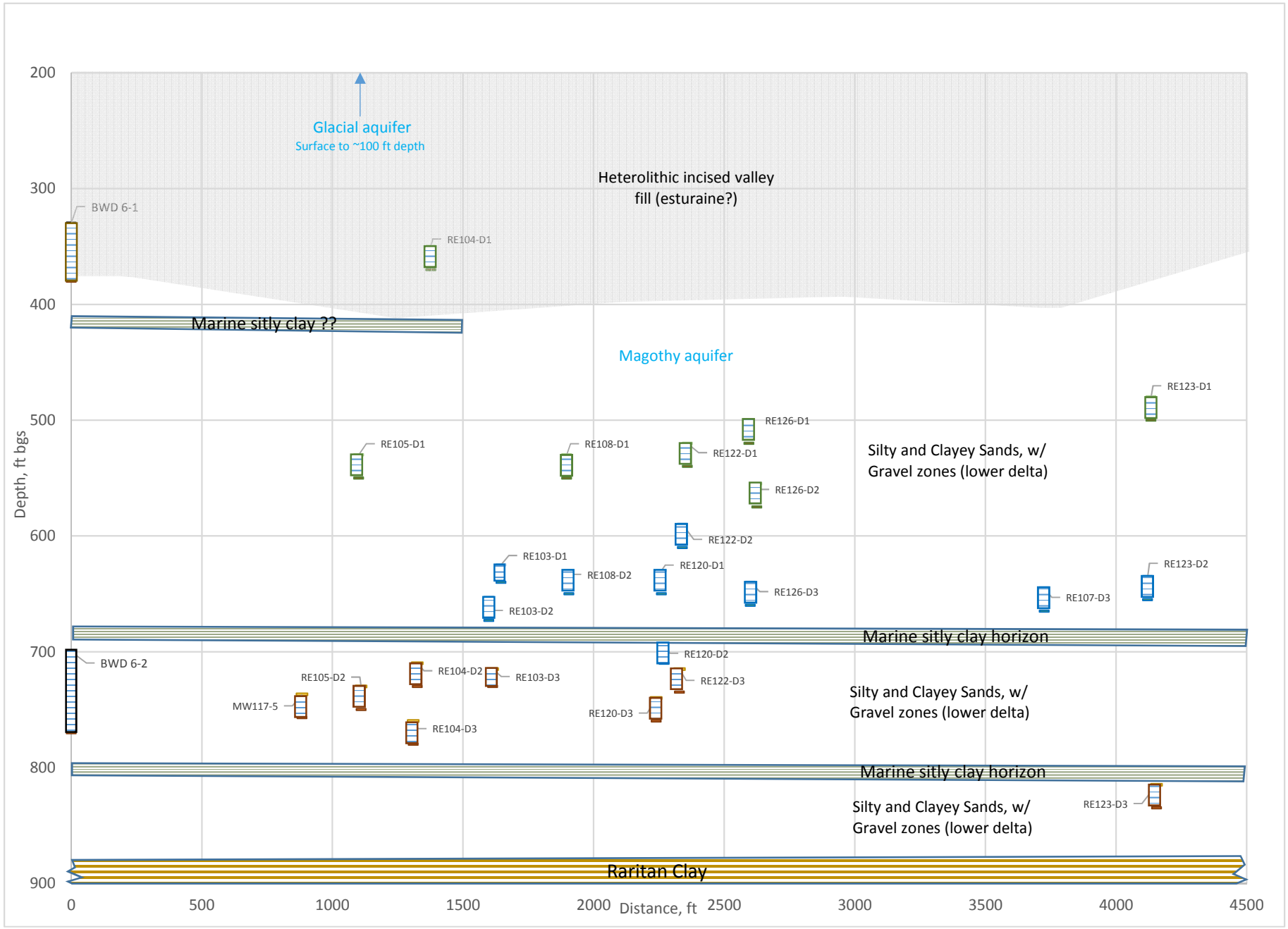
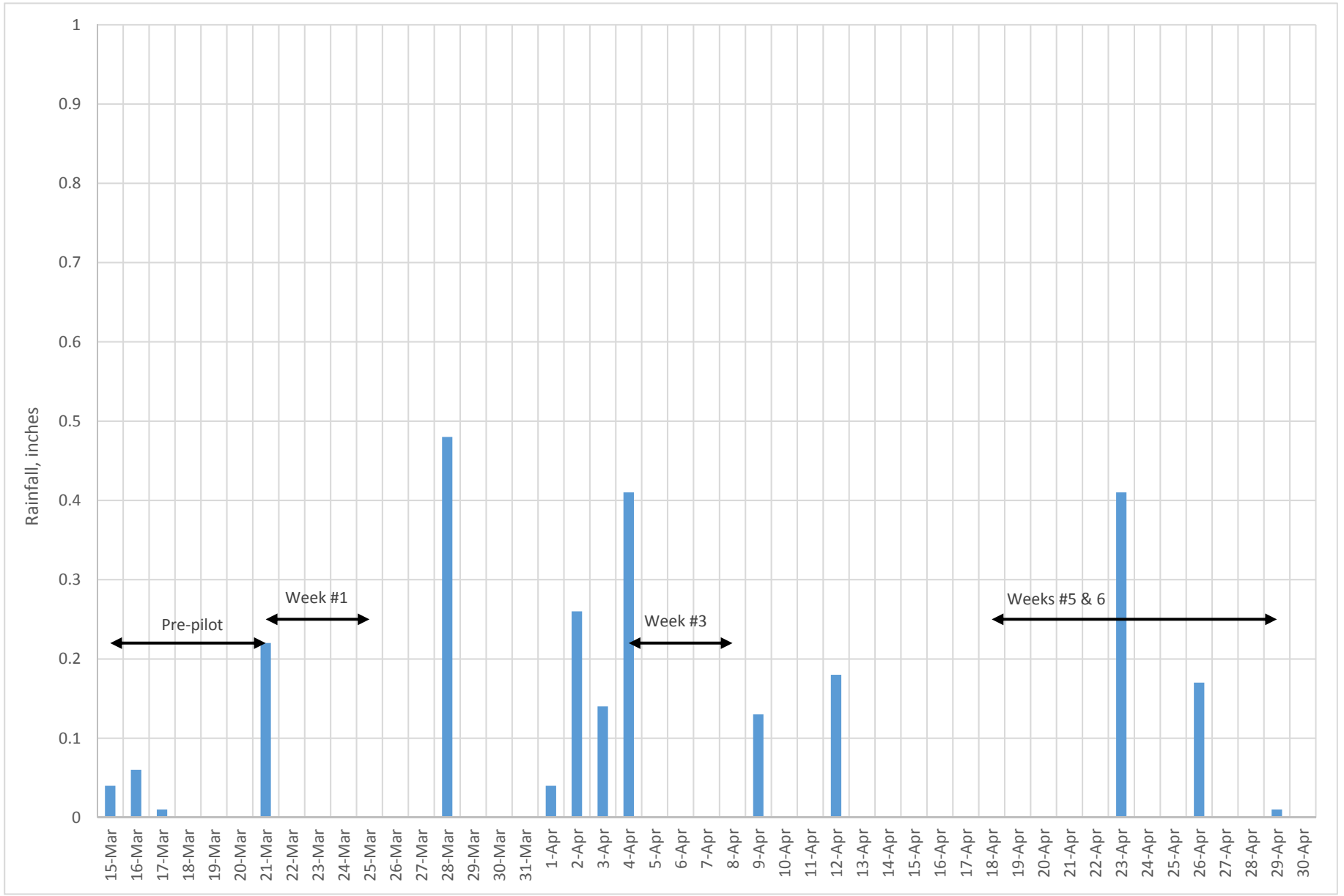


Figure 5-1. Daily Rainfall, BWD Plant 6 Weather Station
NWIRP, Bethpage, NY



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GM-17SR
GM-17I
GM-17D
WELL 1
MW-2GF
RE123D3
57.46 ft
GM-18S
GM-18I
GM-18D
VPB144
RE123D1
RE123D2
RE123D3
VPB157
VPB39
GM-39D
GM-39D2
GM-33D2
N-10631
MW-3R
WELL 17
VPB73
GM-73D
GM-73D2
GM-73D3
57 ft
N-10600
GM-78S
GM-78I
VPB140
GM-20I
GM-20D
GM-21S
GM-21I
GM-21D
N-9921
56 ft
N-10633
VPB141
GM-75D2
N-10624
N-10627
RE107D1
RE107D2
RE107D3
VPB160
RE126D1
RE126D2
RE126D3
N-10634
55 ft
RE122D3
54.45 ft
VPB156
RE122D1
RE122D2
RE122D3
VPB121
VPB142
RE108D1
RE108D2
GM-35D2
54 ft
GM-70D2
HN-41N
HN-41S
GM-19S
GM-19I
MW-5
MW-6
MW-4
GM-15S
GM-15I
GM-15D
MW-2
MW-3
VPB110R
GM-74I
GM-74D
GM-74D2
GM-74D3
WELL 19
VPB110
MW-111-4
WELL 18
GM-79I
GM-79D
N-10628
VPB104
GM-37D
GM-37D2
GM-71D2
MW-116-5
MW-117-5
52.46 ft
GM-36D2
GM-36D
VPB138
RE104D1
RE104D2
RE104D3
VPB117
MW-117-5
N-10821
RW3-MW3
RW3-MW4
BWD-6915
BWD-69
VPB5
VPB137
RE103D1
RE103D2
RE103D3
BWD6-2
51.4 ft
RE104D2/3
51.88 ft
RW3-MW1
RW3-MW2
RW-3
RW2-MW1
GM-34D
GM-34D2
RE103D3
53.27 ft
BWD-8941
BWD-3876
GM-38D
GM-38D2
RW1-MW1
RW1-MW2
VPB48
VPB38
RW-1
VPB118
VPB47
MW-118-5
52 ft
51 ft
50 ft
VPB40
BWD-8004
RE105D1
RE105D2
VPB139
VPB122
VPB159
VPB154
RE120D1
RE120D2
RE120D3
RE137
RE105D2
49.67 ft
VPB165
RE131D1
RE131D2
RE131D3
RE120D3
49.48 ft
VPB76
VPB129
TT101D
TT101D1
TT101D2
VPB155
RE121D1
RE121D2
VPB158
VPB150
VPB148
RE114D1
RE114D2
RE114D3
VPB46
BPOW4-2R
BPOW4-1R
LWD-5303
VPB149
VPB44
VPB131
VPB50
VPB128
BPOW3-3
VPB130
BPOW2-1
BPOW2-2
BPOW2-3
0 412.5 825 1,650 Feet
N
State Hwy 135
Broadway
Powell Ave
Central Ave
Hempstead Tpke
Union Ave
Stewart Ave
Nicksville Rd
N Wantagh Ave
Wantagh Ave
Miller Pl
Seamans Neck Rd
Boundary Ave
Bethpage
Levittown
Plainedge

Legend

- Monitoring Well
- Vertical Profile Boring
- Water Supply Well
- Extraction Well
- Potentiometric Surface Contours
- Background Gradient Flow Line

NAVFAC

DEEP ZONE WATER LEVELS
WEEK #1, T = 0 MINUTES
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: EV	DATE: 9/28/2016
APPROVED BY: —	DATE: —
FIGURE NO.: 6-1	REV: 0

F:\Projects\Navy\Bethpage WXE08\7.0 Deliverables\7.2 CADD\GIS_files\Bethpage\MAP DOCS\MXD\MISC\PilotTest-BWD\2016 09 Rpt\F6-2 Deep WL W3.mxd

GM-17SR
GM-17I
GM-17D
WELL 1
MW-2GF
GM-18S
GM-18I
GM-18D
VPB144
VPB39
GM-39D
GM-39D2
GM-33D2
N-10631
MW-3R
WELL 17
N-10600
GM-78S
GM-78I
VPB140
RE123D1
RE123D2
RE123D3
VPB157
RE123D3
57.31 ft
VPB73
GM-73D
GM-73D2
GM-73D3
GM-20I
GM-20D
GM-21S
GM-21I
GM-21D
WELL 18
GM-19S
GM-19I
MW-5
MW-6
MW-4
GM-15S
GM-15I
GM-15D
MW-2
MW-3
VPB110R
GM-74I
GM-74D
GM-74D2
GM-74D3
WELL 19
VPB110
MW-111-4
HN-41N
HN-41S
N
State Hwy 135
Powell Ave
Broadway
Central Ave
Bethpage
56 ft
N-10633
GM-79I
GM-79D
N-10628
VPB104
GM-37D
GM-37D2
N-9921
VPB141
GM-75D2
N-10624
N-10627
RE107D1
RE107D2
RE107D3
55 ft
VPB160
RE126D1
RE126D2
RE126D3
N-10634
54 ft
GM-71D2
GM-70D2
RE122D3
54.23 ft
VPB156
RE122D1
RE122D2
RE122D3
VPB121
VPB142
RE108D1
RE108D2
GM-35D2
53 ft
MW-117-5
51.88 ft
GM-36D2
GM-36D
VPB117
MW-117-5
VPB138
RE104D1
RE104D2
RE104D3
N-10821
RE104D2/3 50.94 ft
MW-116-5
BWD-6915
RW3-MW3
RW3-MW4
BWD-69
VPB5
VPB137
RE103D1
RE103D2
RE103D3
RE103D3
53.01 ft
52 ft
BWD 6-2
50.9 ft
GM-34D
GM-34D2
BWD-8941
BWD-3876
RW3-MW1
RW3-MW2
RW-3
RW2-MW1
GM-38D
GM-38D2
RW1-MW1
RW1-MW2
RW-1
VPB48
VPB38
VPB118
MW-118-5
VPB47
51 ft
50 ft
VPB40
BWD-8004
RE120D3
49.18 ft
RE105D1
RE105D2
VPB139
VPB122
VPB159
VPB154
RE120D1
RE120D2
RE120D3
RE137
RE105D2
49.17 ft
VPB165
RE131D1
RE131D2
RE131D3
Levittown
Plainedge
Hempstead Tpke
State Hwy 135
Hicksville Rd
N Wantagh Ave
Stewart Ave
Union Ave
VPB76
VPB129
TT101D
TT101D1
TT101D2
VPB155
RE121D1
RE121D2
VPB158
VPB148
RE114D1
RE114D2
RE114D3
Miller Pl
Wantagh Ave
Seamans Neck Rd
VPB46
BPOW4-2R
BPOW4-1R
LWD-5303
VPB149
VPB150
VPB44
Boundary Ave
VPB131
VPB50
VPB128
BPOW3-3
VPB130
BPOW2-1
BPOW2-2
BPOW2-3

0 412.5 825 1,650 Feet

Legend

- Monitoring Well
- Vertical Profile Boring
- Water Supply Well
- Extraction Well
- Background Gradient Flow Line
- Potentiometric Surface Contours

NAVFAC

DEEP ZONE WATER LEVELS
WEEK #3, T = 0 MINUTES
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: EV	DATE: 9/29/2016
APPROVED BY: —	DATE: —
FIGURE NO.: 6-2	REV: 0

F:\Projects\Navy\Bethpage WXE0817.0 Deliverables\7.2 CADD\GIS_files\Bethpage\MAP DOCS\MXD\MISC\PilotTest-BWD\2016 09 Rpt\F6-3 Deep WL 1000.mxd

GM-17SR
GM-17I
GM-17D
WELL 1
HN-41N
HN-41S
GM-19S
GM-19I
MW-5
MW-6
MW-4
GM-15S
GM-15I
GM-15D
MW-2GF
MW-2
GM-18S
GM-18I
GM-18D
VPB144
RE123D1
RE123D2
RE123D3
VPB157
MW-3
VPB110R
MW-111-4
VPB39
GM-39D
GM-39D2
GM-74I
GM-74D
GM-74D2
GM-74D3
WELL 19
VPB110
GM-33D2
RE123D3
56.86 ft
N-10631
VPB73
GM-73D
GM-73D2
GM-73D3
56 ft
MW-3R
WELL 17
WELL 18
N-10600
GM-78S
GM-78I
GM-20I
GM-20D
GM-21S
GM-21I
GM-21D
VPB140
N-10633
GM-79I
GM-79D
N-9921
55 ft
N-10628
VPB104
VPB141
GM-75D2
54 ft
VPB160
RE126D1
RE126D2
RE126D3
53 ft
GM-37D
GM-37D2
N-10624
N-10627
RE107D1
RE107D2
RE107D3
N-10634
52 ft
GM-71D2
GM-70D2
RE122D3
52.82 ft
VPB156
RE122D1
RE122D2
RE122D3
VPB121
VPB142
RE108D1
RE108D2
51 ft
GM-35D2
50 ft
MW-116-5
MW-117-5
47.76 ft
GM-36D2
GM-36D
RE104D2/3
49.57 ft
VPB117
VPB138
RE104D1
RE104D2
RE104D3
RW3-MW3
RW3-MW4
BWD-6915
BWD-69
VPB5
48 ft
47 ft
N-10821
MW-117-5
RE103D3
50.84 ft
VPB137
RE103D1
RE103D2
RE103D3
46 ft
49 ft
44 ft
RW3-MW1
RW3-MW2
RW-3
RW2-MW1
GM-34D
GM-34D2
BWD6-2
17.9 ft
BWD-8941
BWD-3876
GM-38D
GM-38D2
RW1-MW1
RW1-MW2
VPB48
42 ft
VPB38
RW-1
VPB118
VPB47
MW-118-5
VPB40
BWD-8004
RE120D3
47.96 ft
RE105D1
RE105D2
VPB139
VPB122
VPB159
VPB154
RE120D1
RE120D2
RE120D3
RE137
46.7 ft
RE105D2
46.11 ft
Stagnation
Point
VPB165
RE131D1
RE131D2
RE131D3
VPB76
VPB129
TT101D
TT101D1
TT101D2
46 ft
VPB155
RE121D1
RE121D2
VPB158
VPB150
VPB148
RE114D1
RE114D2
RE114D3
VPB46
VPB149
BPOW4-2R
BPOW4-1R
LWD-5303
VPB50
VPB128
BPOW3-3

N
State Hwy 135
Powell Ave
Broadway
N Wanagh Ave
Hicksville Rd
Jerusalem Ave
Hempstead Tpke
Union Ave
Miller Pl
Wantagh Ave
Seamans Neck Rd
Central Ave

Bethpage
Levittown
Plainedge

0 412.5 825 1,650 Feet

Legend

- Monitoring Well
- Vertical Profile Boring
- Water Supply Well
- Extraction Well
- Potentiometric Surface Contours (dashed where estimated)
- Potentiometric Elevation at Stagnation Point
- Background Gradient Flow Line
- Week #1 Observed Capture Zone

NAVFAC

DEEP ZONE WATER LEVELS
WEEK #1, T = 1000 MINUTES
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: EV	DATE: 9/29/2016
APPROVED BY: —	DATE: —
FIGURE NO.: 6-3	REV: 0

F:\Projects\Navy\Bethpage WXE0817.0 Deliverables\7.2 CADD\GIS_files\Bethpage\MAP DOCS\MXD\MISC\PilotTest-BWD\2016 09 Rpt\F6-4 Deep WL 1000 W3.mxd

GM-17SR
GM-17I
GM-17D
WELL 1
HN-41S
GM-19S
GM-19I
MW-5
MW-6
MW-4
GM-15S
GM-15I
GM-15D
MW-2GF
MW-2
GM-18S
GM-18I
GM-18D
VPB144
RE123D1
RE123D2
RE123D3
VPB157
MW-3
VPB110R
MW-111-4
VPB39
GM-39D
GM-39D2
GM-74I
GM-74D
GM-74D2
GM-74D3
WELL 19
VPB110
GM-33D2
RE123D3
56.94 ft
VPB73
GM-73D
GM-73D2
GM-73D3
N-10631
MW-3R
WELL 17
WELL 18
N-10600
GM-78S
GM-78I
GM-20I
GM-20D
GM-21S
GM-21I
GM-21D
VPB140
56 ft
55 ft
N-10633
GM-79I
GM-79D
N-9921
N-10628
VPB104
VPB141
GM-75D2
54 ft
VPB160
RE126D1
RE126D2
RE126D3
53 ft
GM-37D
GM-37D2
N-10624
N-10627
RE107D1
RE107D2
RE107D3
N-10634
RE122D3
52.84 ft
GM-71D2
GM-70D2
VPB156
52 ft
VPB121
VPB142
RE108D1
RE108D2
RE122D1
RE122D2
RE122D3
51 ft
GM-35D2
RE104D2/3
49.46 ft
MW-116-5
MW-117-5
47.75 ft
50 ft
GM-36D2
GM-36D
49 ft
VPB138
RE104D1
RE104D2
RE104D3
VPB117
RW3-MW3
RW3-MW4
BWD-691
BWD-69
VPB5
N-10821
MW-117-5
48 ft
VPB137
RE103D1
RE103D2
RE103D3
BWD 6-2
17.8 ft
44 ft
RW3-MW1
RW3-MW2
RW-3
RW2-MW1
GM-34D
GM-34D2
RE103D3
50.86 ft
BWD-8941
BWD-3876
GM-38D
GM-38D2
RW1-MW1
RW1-MW2
VPB48
47 ft
42 ft
VPB38
RW-1
VPB118
VPB47
MW-118-5
46ft
VPB40
BWD-8004
RE120D3
47.96 ft
RE105D1
RE105D2
VPB139
VPB122
46.3 ft
Stagnation
Point
VPB159
VPB154
RE120D1
RE120D2
RE120D3
RE137
RE105D2
46.01 ft
VPB165
RE131D1
RE131D2
RE131D3
46 ft
VPB76
VPB129
TT101D
TT101D1
TT101D2
VPB155
RE121D1
RE121D2
VPB158
VPB150
VPB148
RE114D1
RE114D2
RE114D3
VPB46
VPB149
BPOW4-2R
BPOW4-1R
LWD-5303
VPB50
VPB128
BPOW3-3

Bethpage
Levittown
Plainedge
Broadway
Powell Ave
State Hwy 135
Grant Ave
N Wantagh Ave
Hicksville Rd
Stewart Ave
Hempstead Tpke
Union Ave
Miller Pl
Wantagh Ave
Seamans Neck Rd

N

0 412.5 825 1,650 Feet

Legend

- Monitoring Well
- Vertical Profile Boring
- Water Supply Well
- Extraction Well
- Potentiometric Surface Contours (dashed where estimated)
- Potentiometric Elevation at Stagnation Point
- Background Gradient Flow Line
- Week #3 Observed Capture Zone

NAVFAC

DEEP ZONE WATER LEVELS
WEEK #3, T = 1000 MINUTES
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: EV	DATE: 9/28/2016
APPROVED BY: —	DATE: —
FIGURE NO.: 6-4	REV: 0

F:\Projects\Navy\Bethpage WXE0817.0 Deliverables\7.2 CADD\GIS_files\Bethpage\MAP DOCS\MXD\MISC\PilotTest-BWD2016 09 Rpt\F6-5 Deep DD 1000.mxd

GM-17SR
GM-17I
GM-17D
WELL 1
HN-41S
GM-19S
GM-19I
MW-5
MW-6
MW-4
GM-15S
GM-15I
GM-15D
MW-2GF
MW-2
GM-18S
GM-18I
GM-18D
VPB144
MW-3
VPB110R
MW-111-4
RE123D1
RE123D2
RE123D3
VPB157
VPB39
GM-39D
GM-39D2
GM-74I
GM-74D
GM-74D2
GM-74D3
WELL 19
VPB110
GM-33D2
RE123D3
0.6 ft
VPB73
GM-73D
GM-73D2
GM-73D3
N-10631
MW-3R
WELL 17
WELL 18
N-10600
GM-78S
GM-78I
GM-20I
GM-20D
GM-21S
GM-21I
GM-21D
VPB140
N-10633
GM-79I
GM-79D
N-10628
N-9921
VPB104
GM-37D
GM-37D2
VPB141
GM-75D2
VPB160
RE126D1
RE126D2
RE126D3
N-10624
N-10627
N-10634
RE107D1
RE107D2
RE107D3
GM-71D2
RE122D1 0.82 ft
RE122D2 1.01 ft
RE122D3 1.63 ft
RE108D1 1.01 ft
RE108D2 1.47 ft
GM-70D2
VPB156
VPB121
VPB142
RE108D1
RE108D2
RE122D1
RE122D2
RE122D3
GM-35D2
RE104D1 0.36 ft
RE104D2/3 2.31 ft
MW-116-5
MW-117-5 4.7 ft
GM-36D2
GM-36D
VPB138
RE104D1
RE104D2
RE104D3
N-10821
VPB117
MW-117-5
RW3-MW3
RW3-MW4
BWD-691
BWD-69
VPB5
VPB137
RE103D1
RE103D2
RE103D3
BWD6-2 33.5 ft
RW3-MW1
RW3-MW2
RW-3
RW2-MW1
GM-34D
GM-34D2
RE103D2 2.06 ft
RE103D3 2.44 ft
BWD-8941
BWD-3876
GM-38D
GM-38D2
RW1-MW1
RW1-MW2
VPB48
VPB38
BWD 6-2
RW-1
VPB118
VPB47
RE105D1 1.16 ft
RE105D2 3.56 ft
MW-118-5
VPB40
BWD-8004
RE105D1
RE105D2
VPB139
VPB122
VPB159
VPB154
RE120D1
RE120D2
RE120D3
RE137
VPB165
RE131D1
RE131D2
RE131D3
RE120D1/2 1.27 ft
RE120D3 1.52 ft
VPB76
VPB129
TT101D
TT101D1
TT101D2
VPB155
RE121D1
RE121D2
VPB158
VPB150
VPB148
RE114D1
RE114D2
RE114D3
VPB46
VPB149
VPB44
BPOW4-2R
BPOW4-1R
LWD-5303
VPB131
VPB50
VPB130
VPB128
BPOW3-3
BPOW2
BPOW2
BPOW2
1 ft
1 ft
1 ft
Bethpage
Levittown
Plainedge
Broadway
Powell Ave
Broadway
Central Ave
Hicksville Rd
N Wantagh Ave
Stewart Ave
State Hwy 135
Hempstead Tpke
Union Ave
Miller Pl
Wantagh Ave
Seamans Neck Rd
Boundary Ave
N
0 412.5 825 1,650 Feet

SHALLOW WELL
INTERMEDIATE WELL
DEEP WELL

Legend

- Monitoring Well
- Vertical Profile Boring
- Water Supply Well
- Extraction Well
- 1-ft Drawdown Areas, approximate

NAVFAC

SHALLOW, INTERMEDIATE, AND DEEP ZONE DRAWDOWN
WEEK #1, T = 1000 MINUTES
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: EV	DATE: 10/5/2016
APPROVED BY: —	DATE: —
FIGURE NO.: 6-5	REV: 0

F:\Projects\Navy\Bethpage WXE0817.0 Deliverables\7.2 CADD\GIS_files\Bethpage\MAP DOCS\MXD\MISC\PilotTest-BWD\2016 09 Rpt\F6-6 Deep DD 1000 W3.mxd

GM-17SR
GM-17I
GM-17D
WELL 1
HN-41S
GM-19S
GM-19I
MW-5
MW-6
GM-15S
GM-15I
GM-15D
MW-4
MW-2GF
RE123D1 0.08 ft
RE123D2 0.13 ft
RE123D3 0.37 ft
RE123D1
RE123D2
RE123D3
VPB157
MW-2
MW-3
VPB110R
MW-111-4
GM-18S
GM-18I
GM-18D
VPB144
VPB39
GM-39D
GM-39D2
GM-74I
GM-74D
GM-74D2
GM-74D3
WELL 19
VPB110
GM-33D2
N-10631
VPB73
GM-73D
GM-73D2
GM-73D3
MW-3R
WELL 17
WELL 18
N-10600
GM-78S
GM-78I
GM-20I
GM-20D
GM-21S
GM-21I
GM-21D
VPB140
N-10633
GM-79I
GM-79D
N-10628
N-9921
RE126D1/2 0.47 ft
RE126D3 0.55 ft
VPB104
VPB160
RE126D1
RE126D2
RE126D3
GM-37D
GM-37D2
VPB141
RE107D3 3.16 ft
GM-75D2
N-10624
N-10627
RE107D1
RE107D2
RE107D3
N-10634
GM-71D2
RE108D1 0.73 ft
RE108D2 1.17 ft
GM-70D2
RE122D1 0.57 ft
RE122D2 0.75 ft
RE122D3 1.39 ft
VPB156
VPB121
VPB142
RE108D1
RE108D2
RE122D1
RE122D2
RE122D3
GM-35D2
MW-116-5
RE104D1 -0.06 ft
RE104D2/3 1.48 ft
GM-36D2
GM-36D
VPB138
RE104D1
RE104D2
RE104D3
VPB117
MW-117-5 4.13 ft
MW-117-5
N-10821
RW3-MW3
RW3-MW4
BWD-691
BWD-69
VPB5
RE103D1/2 1.69 ft
RE103D3 2.15 ft
VPB137
RE103D1
RE103D2
RE103D3
BWD 6-2 33.5 ft
RW3-MW1
RW3-MW2
RW-3
RW2-MW1
GM-34D
GM-34D2
BWD-8941
BWD-3876
GM-38D
GM-38D2
RW1-MW1
RW1-MW2
VPB48
VPB38
BWD 6-2
RW-1
VPB118
VPB47
RE105D1 0.75 ft
RE105D2 3.16 ft
MW-118-5
VPB40
BWD-8004
RE120D1/2 0.93 ft
RE120D3 1.22 ft
RE105D1
RE105D2
VPB139
VPB122
VPB159
VPB154
RE120D1
RE120D2
RE120D3
RE137
VPB165
RE131D1
RE131D2
RE131D3
VPB76
VPB129
TT101D
TT101D1
TT101D2
VPB155
RE121D1
RE121D2
VPB158
VPB150
VPB148
RE114D1
RE114D2
RE114D3
VPB46
VPB149
VPB44
BPOW4-2R
BPOW4-1R
LWD-5303
VPB131
VPB50
VPB130
VPB128
BPOW3-3

1 ft

0 412.5 825 1,650 Feet

N

State Hwy 135

Bethpage
Levittown
Plainedge

Broadway
Powell Ave
Central Ave
Hempstead Tpke
N Wantagh Ave
Hicksville Rd
Stewart Ave
Union Ave
Miller Pl
Seamans Neck Rd
Boundary Ave

SHALLOW WELL
INTERMEDIATE WELL
DEEP WELL

Legend

- Monitoring Well
- Vertical Profile Boring
- Water Supply Well
- Extraction Well
- 1-ft Drawdown Areas, approximate

NAVFAC

SHALLOW, INTERMEDIATE, AND DEEP ZONE DRAWDOWN
WEEK #3, T = 1000 MINUTES
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: EV	DATE: 10/3/2016
APPROVED BY: —	DATE: —
FIGURE NO.: 6-6	REV: 0

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GM-17SR
GM-17I
GM-17D
WELL 1
HN-41S
GM-19S
GM-19I
MW-5
MW-6
MW-4
GM-15S
GM-15I
GM-15D
MW-2GF
MW-2
GM-18S
GM-18I
GM-18D
VPB144
RE123D1
RE123D2
RE123D3
VPB157
MW-3
VPB110R
MW-111-4
VPB39
GM-39D
GM-39D2
RE123
Week 3: 0.29 ft
GM-74I
GM-74D
GM-74D2
GM-74D3
WELL 19
VPB110
GM-33D2
N-10631
VPB73
GM-73D
GM-73D2
GM-73D3
MW-3R
WELL 17
WELL 18
N-10600
GM-78S
GM-78I
GM-20I
GM-20D
GM-21S
GM-21I
GM-21D
VPB140
N-10633
GM-79I
GM-79D
N-10628
N-9921
VPB104
VPB160
RE126D1
RE126D2
RE126D3
GM-37D
GM-37D2
VPB141
GM-75D2
N-10624
N-10627
N-10634
RE107D1
RE107D2
RE107D3
GM-71D2
GM-70D2
RE122
Week 1: 0.81 ft
Week 3: 0.82 ft
VPB156
RE122D1
RE122D2
RE122D3
VPB121
VPB142
RE108D1
RE108D2
RE104
Week 1: 1.95 ft
Week 3: 1.54 ft
MW-116-5
GM-35D2
GM-36D2
GM-36D
VPB138
RE104D1
RE104D2
RE104D3
VPB117
MW-117-5
N-10821
RW3-MW3
RW3-MW4
BWD-6915
BWD-69
VPB5
VPB137
RE103D1
RE103D2
RE103D3
RW3-MW1
RW3-MW2
RW-3
RW2-MW1
GM-34D
GM-34D2
BWD-8941
BWD-3876
GM-38D
GM-38D2
RW1-MW1
RW1-MW2
VPB48
VPB38
RW-1
RE105
Week 1: 2.4 ft
Week 3: 2.4 ft
VPB118
VPB47
MW-118-5
VPB40
BWD-8004
RE105D1
RE105D2
VPB139
VPB122
VPB159
VPB154
RE120D1
RE120D2
RE120D3
RE137
VPB165
RE131D1
RE131D2
RE131D3
VPB76
VPB129
TT101D
TT101D1
TT101D2
VPB155
RE121D1
RE121D2
VPB158
VPB150
VPB148
RE114D1
RE114D2
RE114D3
VPB46
VPB149
VPB44
VPB162
BPOW4-2R
BPOW4-1R
LWD-5303
VPB131
VPB50
VPB130
VPB128
BPOW3-3
BPOW2-1
BPOW2-2
BPOW2-3

Bethpage
Levittown
Plainedge

N
State Hwy 135
Broadway
Powell Ave
Central Ave
Hempstead Tpke
N Wantagh Ave
Hicksville Rd
Stewart Ave
Union Ave
Miller Pl
Seamans Neck Rd
Boundary Ave

0 412.5 825 1,650 Feet

Legend
- Monitoring Well
- Vertical Profile Boring
- Water Supply Well
- Extraction Well

NAVFAC

VERTICAL HEAD DIFFERENCE, SHALLOW TO DEEP ZONE,
WEEK #1 & WEEK #3
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: EV	DATE: 9/29/2016
APPROVED BY: —	DATE: —
FIGURE NO.: 6-7	REV: 0

F:\Projects\Navy\Bethpage WXE08\7.0 Deliverables\7.2 CADD\GIS_files\Bethpage\MAP DOCS\MXD\MISC\PilotTest-BWD\2016 09 RptF6-8 VH ID.mxd

GM-17SR
GM-17I
GM-17D
WELL 1
HN-41S
GM-19S
GM-19I
MW-5
MW-6
MW-4
GM-15S
GM-15I
GM-15D
MW-2GF
MW-2
GM-18S
GM-18I
GM-18D
VPB144
MW-3
VPB110R
MW-111-4
RE123D1
RE123D2
RE123D3
VPB157
RE123
Week 3: 0.24 ft
GM-74I
GM-74D
GM-74D2
GM-74D3
WELL 19
VPB110
VPB39
GM-39D
GM-39D2
GM-33D2
VPB73
GM-73D
GM-73D2
GM-73D3
WELL 18
N-10631
MW-3R
WELL 17
N-10600
GM-78S
GM-78I
GM-20I
GM-20D
GM-21S
GM-21I
GM-21D
VPB140
N-10633
GM-79I
GM-79D
N-10628
N-9921
VPB104
VPB160
RE126D1
RE126D2
RE126D3
GM-37D
GM-37D2
VPB141
GM-75D2
N-10624
N-10627
N-10634
RE107D1
RE107D2
RE107D3
GM-71D2
GM-70D2
RE122
Week 1: 0.62 ft
Week 3: 0.64 ft
VPB156
VPB121
VPB142
RE108D1
RE108D2
RE122D1
RE122D2
RE122D3
GM-35D2
MW-116-5
GM-36D2
GM-36D
VPB117
VPB138
RE104D1
RE104D2
RE104D3
N-10821
MW-117-5
RW3-MW3
RW3-MW4
BWD-691
BWD-69
VPB5
RE103
Week 1: 0.37 ft
Week 3: 0.46 ft
VPB137
RE103D1
RE103D2
RE103D3
RW3-MW1
RW3-MW2
RW-3
RW2-MW1
GM-34D
GM-34D2
BWD-8941
BWD-3876
GM-38D
GM-38D2
RW1-MW1
RW1-MW2
VPB48
VPB38
RW-1
VPB118
VPB47
MW-118-5
VPB40
BWD-8004
RE120
Week 1: 0.25 ft
Week 3: 0.29 ft
RE105D1
RE105D2
VPB139
VPB122
VPB159
VPB154
RE120D1
RE120D2
RE120D3
RE137
VPB165
RE131D1
RE131D2
RE131D3
VPB76
VPB129
TT101D
TT101D1
TT101D2
VPB155
RE121D1
RE121D2
VPB158
VPB150
VPB148
RE114D1
RE114D2
RE114D3
VPB46
VPB149
VPB44
BPOW4-2R
VPB162
BPOW4-1R
LWD-5303
VPB131
VPB50
VPB130
VPB128
BPOW3-3
0 412.5 825 1,650 Feet

N

State Hwy 135

Broadway
Powell Ave
Broadway
Central Ave
N Wantagh Ave
Hicksville Rd
Stewart Ave
Hempstead Tpke
Union Ave
Miller Pl
Wantagh Ave
Seamans Neck Rd
Boundary Ave

Bethpage
Levittown
Plainedge

Legend

- Monitoring Well
- Vertical Profile Boring
- Water Supply Well
- Extraction Well

NAVFAC

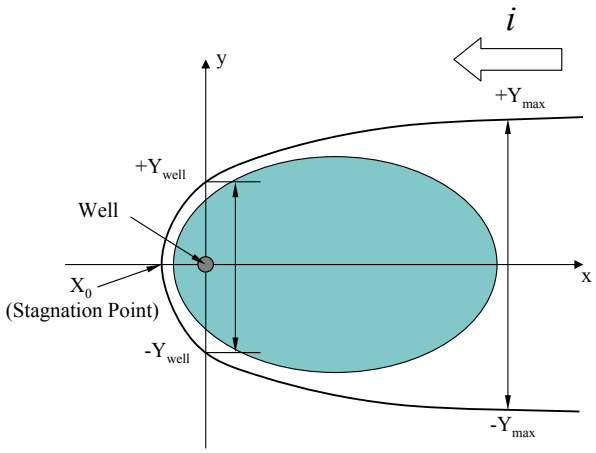
VERTICAL HEAD DIFFERENCE, INTERMEDIATE TO DEEP ZONE,
WEEK #1 & WEEK #3
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: EV	DATE: 9/29/2016
APPROVED BY: —	DATE: —
FIGURE NO.: 6-8	REV: 0

Capture Zone Width Calculation, One Extraction Well

Assumptions:

- homogeneous, isotropic, confined aquifer of infinite extent
- uniform aquifer thickness
- fully penetrating extraction well(s)
- uniform regional horizontal hydraulic gradient
- steady-state flow
- negligible vertical gradient
- no net recharge, or net recharge is accounted for in regional hydraulic gradient
- no other sources of water introduced to aquifer due to extraction (e.g., from rivers or leakage from above or below)



$$x = \frac{-y}{\tan\left(\frac{2\pi Ti}{Q}y\right)} \quad -or- \quad y = \pm\left(\frac{Q}{2Ti}\right) - \left(\frac{Q}{2\pi Ti}\right)\tan^{-1}\left(\frac{y}{x}\right)$$

$$X_0 = -Q/2\pi Ti \quad ; \quad Y_{\max} = \pm Q/2Ti \quad ; \quad Y_{well} = \pm Q/4Ti$$

(must use consistent units, such as "ft" for distance and "day" for time)

Where:

Q	=	extraction rate
T	=	transmissivity, $K \cdot b$
K	=	hydraulic conductivity
b	=	saturated thickness
i	=	regional (i.e., pre-remedy-pumping) hydraulic gradient
X_0	=	distance from the well to the downgradient end of the capture zone along the central line of the flow direction
Y_{max}	=	maximum capture zone width from the central line of the plume
Y_{well}	=	capture zone width at the location of well from the central line of the plume

The above equation is used to calculate the outline of the capture zone. Solving the equation for $x = 0$ allows one to calculate the distance between the dividing streamlines at the line of wells ($2 \cdot Y_{well}$) and solving the equation for $x = \infty$ allows one to calculate the distance between the dividing streamlines far upstream from the wells ($2 \cdot Y_{max}$). One can also calculate the distance from the well to the stagnation point (X_0) that marks the downgradient end of the capture zone by solving for x at $y = 0$. For any value of y between 0 and Y_{max}, one can calculate the corresponding x value, allowing the outline of the capture zone to be calculated.

Figure 14. Capture zone width calculation, one extraction well.

The extraction rate "Q" in the estimated flow rate calculation incorporates a "factor" to account for other potential contributions of water to the extraction location, such as water from a nearby creek or water from an overlying or underlying unit. There is no scientific rule for assigning a value for the "factor", although common practice is to assign a value between 1.5 and 2.0. Note that the variability in hydraulic conductivity at many sites is as great or greater than the potential variability in this "factor". It is good practice to perform the estimated flow rate calculation with several different values assumed for the "factor" (e.g., 1.0,

F:\Projects\Navy\Bethpage WXE08\7.0 Deliverables\7.2 CADD\GIS_files\Bethpage\MAP DOCS\MXD\MISC\PilotTest-BWD\2016 09 RptTF6-10 Plume 700.mxd

N

GM-13D
MW-68S
MW-68D
MW-67S
MW-67D
GM-16SR
GM-16I
HN-40I
HN-40S
N-10597
MW-109-3
MW-58D
MW-58D1
MW-58D2
MW-3-1
WELL 3
MW-1GF
GM-32S
HN-41N
HN-41S
GM-17SR
GM-17I
GM-17D
WELL 1
GM-19S
GM-19I
MW-5
MW-6
MW-4
GM-15S
GM-15I
GM-15D
MW-2GF
MW-2
GM-18S
GM-18I
GM-18D
VPB144
MW-3
VPB110R
MW-111-4
RE123D1
RE123D2
RE123D3
VPB157
VPB39
GM-39D
GM-39D2
GM-74I
GM-74D
GM-74D2
GM-74D3
WELL 19
VPB110
GM-33D2
VPB73
GM-73D
GM-73D2
GM-73D3
N-10631
MW-3R
WELL 17
WELL 18
N-10600
GM-78S
GM-78I
GM-20I
GM-20D
GM-21S
GM-21I
GM-21D
VPB140
N-10633
GM-79I
GM-79D
N-10628
N-9921
VPB104
VPB160
RE126D1
RE126D2
RE126D3
VPB141
GM-75D2
N-10624
N-10627
GM-37D
GM-37D2
RE107D1
RE107D2
RE107D3
N-10634
GM-71D2
GM-70D2
VPB156
RE122D1
RE122D2
RE122D3
VPB121
VPB142
RE108D1
RE108D2
GM-35D2
MW-116-5
GM-36D2
GM-36D
VPB138
RE104D1
RE104D2
RE104D3
VPB117
MW-117-5
N-10821
BWD-6915
BWD-6916
VPB51
RW3-MW3
RW3-MW4
RW1-MW3
RW2-MW1
RW3-MW1
RW3-MW2
RW-3
GM-38D
GM-38D2
RW1-MW1
RW1-MW2
RW-1
VPB123
GM-34D
GM-34D2
BWD 6-2
BWD-8941
BWD-3876
VPB48
VPB38
VPB118
VPB47
MW-118-5
500
VPB137
RE103D1
RE103D2
RE103D3
VPB40
BWD-8004
RE105D1
RE105D2
VPB139
VPB122
VPB159
VPB154
RE120D1
RE120D2
RE120D3
RE137
Stagnation Point
VPB165
RE131D1
RE131D2
RE131D3
1000
VPB76
VPB129
TT101D
TT101D1
TT101D2
500
RE121D1
RE121D2
VPB158
VPB150
VPB148
RE114D1
RE114D2
RE114D3
VPB46
VPB149
VPB44
BPOW4-2R
VPB162
BPOW4-1R
LWD-5303
VPB131
VPB50
BPOW2-1
BPOW2-2
BPOW2-3
VPB130
VPB128
BPOW3-3
BPOW3-4
SFWD-6150
VPB126
BPOW3-1
BPOW3-2
VPB125
VPB132
BPOW5-1
BPOW5-2

0 412.5 825 1,650 Feet

Broadway
Powell Ave
State Hwy 135
Plainview Rd
Central Ave
Stewart Ave
Hempstead Tpke
Union Ave
Hicksville Rd
N Wantagh Ave
Seamans Neck Rd
Miller Pl
Boundary Ave

Bethpage
Plainedge
Levittown

Legend

- Monitoring Well
- Vertical Profile Boring
- Water Supply Well
- Extraction Well
- TCE Contours ug/L
- Week #1 Observed Capture Zone
- Week #3 Observed Capture Zone
- Analytical Capture Zone, estimated
- Background Gradient Flow Line

NAVFAC

2016 >700 FEET TCE PLUME AND DEEP CAPTURE ZONE

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: EV	DATE: 10/5/2016
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FIGURE NO.: 6-10	REV: 0

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GM-17SR
GM-17I
GM-17D
WELL 1
MW-2GF
GM-18S
GM-18I
GM-18D
VPB144
VPB39
GM-39D
GM-39D2
GM-33D2
N-10631
MW-3R
WELL 17
N-10600
VPB140
GM-78S
GM-78I
GM-20I
GM-20D
RE123D1
RE123D2
RE123D3
VPB157
VPB73
GM-73D
GM-73D2
GM-73D3
WELL 18
GM-21S
GM-21I
GM-21D
N-10633
N-9921
VPB141
GM-75D2
N-10624
N-10627
RE107D1
RE107D2
RE107D3
VPB160
RE126D1
RE126D2
RE126D3
N-10634
VPB156
RE122D1
RE122D2
RE122D3
VPB121
VPB142
RE108D1
RE108D2
GM-35D2
GM-19S
GM-19I
MW-5
MW-6
MW-4
GM-15S
GM-15I
GM-15D
MW-2
MW-3
VPB110R
GM-74I
GM-74D
GM-74D2
GM-74D3
WELL 19
VPB110
MW-111-4
HN-41S
GM-79I
GM-79D
N-10628
VPB104
VPB143
GM-37D
GM-37D2
GM-71D2
GM-70D2
MW-116-5
GM-36D2
GM-36D
VPB138
RE104D1
RE104D2
RE104D3
VPB117
MW-117-5
N-10821
RW3-MW3
RW3-MW4
BWD-6915
BWD-69
VPB5
RW2-MW1
RW3-MW1
RW3-MW2
RW-3
GM-38D
GM-38D2
RW1-MW1
RW1-MW2
RW-1
VPB48
VPB38
VPB118
MW-118-5
VPB47
VPB40
BWD-8004
VPB137
RE103D1
RE103D2
RE103D3
GM-34D
GM-34D2
BWD 6-2
BWD-8941
BWD-3876
Stagnation Point
VPB168
RE105D1
RE105D2
VPB139
VPB122
VPB159
VPB154
RE120D1
RE120D2
RE120D3
RE137
VPB171
VPB165
RE131D1
RE131D2
RE131D3
VPB76
VPB129
TT101D
TT101D1
TT101D2
1000
500
500
VPB155
RE121D1
RE121D2
VPB166
VPB158
VPB150
VPB148
RE114D1
RE114D2
RE114D3
VPB46
BPOW4-2R
BPOW4-1R
LWD-5303
VPB149
VPB131
VPB50
VPB128
BPOW3-3
VPB130
BPOW2
BPOW2
BPOW2
N
State Hwy 135
Powell Ave
Broadway
Central Ave
Hempstead Tpke
N Wantagh Ave
Hicksville Rd
Stewart Ave
Miller Pl
Wantagh Ave
Seamans Neck Rd
Bethpage
Levittown
Plainedge

0 412.5 825 1,650 Feet

Legend

- Monitoring Well
- Vertical Profile Boring
- Water Supply Well
- Extraction Well
- Analytical Capture Zone, estimated
- Background Gradient Flow Line
- TCE Contours ug/L

NAVFAC

2016 >600 FEET TCE PLUME AND SHALLOW/INTERMEDIATE CAPTURE ZONE

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: EV	DATE: 10/5/2016
APPROVED BY: —	DATE: —
FIGURE NO.: 6-11	REV: 0

F:\Projects\Navy\Bethpage WXE0817.0 Deliverables\7.2 CADD\GIS_files\Bethpage\MAP DOCS\MXD\MISC\PilotTest-BWD\2016 09 RptTF6-12 Plume 500.mxd

MW-58D
MW-58D1
MW-58D2
MW-3-1
WELL 3
MW-1GF
GM-32S
GM-17SR
GM-17I
GM-17D
WELL 1
MW-109-3
HN-41N
HN-41S
GM-19S
GM-19I
MW-5
MW-6
GM-15S
GM-15I
GM-15D
MW-4
MW-2GF
MW-2
GM-18S
GM-18I
GM-18D
VPB144
RE123D1
RE123D2
RE123D3
VPB157
MW-3
VPB110R
MW-111-4
GM-74I
GM-74D
GM-74D2
GM-74D3
WELL 19
VPB110
GM-39D
GM-39D2
GM-33D2
VPB73
GM-73D
GM-73D2
GM-73D3
N-10631
MW-3R
WELL 17
WELL 18
N-10600
GM-78S
GM-78I
GM-20I
GM-20D
GM-21S
GM-21I
GM-21D
VPB140
N-10633
GM-79I
GM-79D
N-10628
N-9921
VPB104
GM-37D
GM-37D2
VPB141
GM-75D2
N-10624
N-10627
RE107D1
RE107D2
RE107D3
VPB160
RE126D1
RE126D2
RE126D3
N-10634
GM-71D2
GM-70D2
VPB156
RE122D1
RE122D2
RE122D3
VPB121
VPB142
RE108D1
RE108D2
GM-35D2
MW-116-5
GM-36D2
GM-36D
VPB138
RE104D1
RE104D2
RE104D3
VPB117
MW-117-5
N-10821
BWD-6915
RW3-MW3
RW3-MW4
BWD-691
VPB51
VPB137
RE103D1
RE103D2
RE103D3
RW3-MW1
RW3-MW2
RW-3
RW2-MW1
GM-34D
GM-34D2
BWD 6-2
BWD-8941
BWD-3876
GM-38D
GM-38D2
RW1-MW1
RW1-MW2
VPB48
VPB38
RW-1
Stagnation Point
VPB118
VPB47
MW-118-5
VPB40
BWD-8004
RE105D1
RE105D2
VPB139
VPB122
VPB159
VPB154
RE120D1
RE120D2
RE120D3
RE137
VPB165
RE131D1
RE131D2
RE131D3
VPB76
VPB129
TT101D
TT101D1
TT101D2
VPB155
RE121D1
RE121D2
VPB158
VPB150
VPB148
RE114D1
RE114D2
RE114D3
VPB46
VPB149
BPOW4-2R
LWD-5303
500
1000
N
State Hwy 135
Broadway
Powell Ave
Central Ave
Hempstead Tpke
Union Ave
Stewart Ave
Hicksville Rd
N Wantagh Ave
Wantagh Ave
Miller Pl
Seamans Neck Rd
Bethpage
Plainedge
Levittown
0 412.5 825 1,650 Feet

Legend

- Monitoring Well
- Vertical Profile Boring
- Water Supply Well
- Extraction Well
- Analytical Capture Zone, estimated
- Background Gradient Flow Line
- TCE Contours ug/L

2016 >500 FEET TCE PLUME AND SHALLOW/INTERMEDIATE CAPTURE ZONE

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: EV	DATE: 10/5/2016
APPROVED BY: —	DATE: —
FIGURE NO.: 6-12	REV: 0

TABLES

Table 3-1. Well Construction and Location Details
NWIRP, Bethpage, NY

Well*	Depth Interval	Easting, ft	Northing, ft	Distance to BWD 6-2, ft	MP elevation	Ground elevation	Mid-screen elevation	Depth to top of screen	Depth to bottom of screen	Screen Length
BWD 6-1	*Shallow*	*1126784*	*206200*	*0*	--	*92*	*-263.00*	*330*	*380*	*50*
BWD 6-2	*Deep*	*1126673*	*206174*	*0*	--	*92*	*-643.00*	*700*	*770*	*70*
BWD 5-1	*Deep*	*1129164*	*205008*	*2750*	--	--	--	*600*	*740*	*140*
BWD 4-1	*Shallow*	*1129579*	*2070776*	*3040*	--	--	--	*540*	*603*	*63*
BWD 4-2	*Shallow*	*1129640*	*206891*	*3045*	--	--	--	*556*	*606*	*50*
RE105D1	Shallow	1126664	205073	1101	87.23	87.62	-452.38	530	550	20
RE104D1		1127746	207037	1377	89.80	90.53	-269.47	350	370	20
RE108D1		1125500	207665	1897	95.38	95.68	-444.32	530	550	20
RE122D1		1124982	207818	2359	97.42	97.74	-432.26	520	540	20
RE126D2		1125644	208584	2625	101.74	101.39	-463.61	555	575	20
RE126D1		1125643	208554	2595	101.65	101.03	-408.97	500	520	20
RE123D1		1124871	209894	4134	105.49	105.93	-384.07	480	500	20
RE103D2	Intermediate	1125160	206693	1599	92.73	93.63	-569.38	653	673	20
RE103D1		1125112	206695	1646	93.00	93.80	-538.71	625	640	15
RE108D2		1125484	207663	1906	95.43	95.72	-544.28	630	650	20
RE120D1		1125061	204590	2260	85.58	86.06	-553.94	630	650	20
RE120D2		1125060	204577	2270	85.54	86.03	-613.97	690	710	20
RE122D2		1124979	207789	2340	97.35	97.70	-502.30	590	610	20
RE126D3		1125664	208568	2600	101.66	101.1	-548.90	640	660	20
RE107D3		1123760	208495	3725	99.96	100.61	-554.39	645	665	20
RE123D2		1124886	209887	4121	106.11	106.32	-538.68	635	655	20
MW117-5	Deep	1127141	206924	884	93.15	94.80	-652.20	737	757	20
RE105D2		1126652	205064	1110	87.18	87.59	-652.42	730	750	20
RE104D3		1127696	206994	1310	90.20	90.87	-679.13	760	780	20
RE104D2		1127709	207000	1325	90.12	90.79	-629.21	710	730	20
RE103D3		1125145	206693	1614	92.76	93.74	-628.76	715	730	15
RE120D3		1125062	204618	2240	85.70	86.14	-663.86	740	760	20
RE122D3		1124981	207775	2329	97.27	97.62	-627.38	715	735	20
RE123D3		1124860	209912	4155	105.92	106.15	-718.85	815	835	20

*Wells sorted by distance to 6-2 for each interval (shallow, intermediate, deep); elevations are feet, amsl; depths are feet below ground surface.

Table 3-2. Pilot Test Pumping Time Line
NWIRP, Bethpage, NY

Well	20-Mar	21-Mar	22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	29-Mar	30-Mar	31-Mar	1-Apr	2-Apr	3-Apr	4-Apr	5-Apr	6-Apr	7-Apr	8-Apr	9-Apr	10-Apr	11-Apr	12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr	28-Apr	29-Apr	30-Apr	1-May
BWD 6-1						0:30			23:59	23:59	23:59	23:59	12:01							0:30			23:59	23:59	23:59	23:59	11:00							0:30							0:30		3:00
BWD 6-2		17:30	23:59	23:59	23:59	10:45							0:30			18:00	23:59	23:59	23:59	12:00							0:30			23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	12:00	3:00	
BWD 4-1																3:00																											
BWD 4-2	1:51						19:57	19:02					7:17	13:58	12:42	3:04				7:05	15:19	14:46					16:46	17:16	16:22	2:56	4:41	6:28	9:38	7:24	3:07	9:30	7:06	4:26	3:59	5:51	13:56	20:46	18:09
BWD 5-1	16:33	3:45		1:00	1:41		2:45	5:15					2:00	2:00	3:46		1:00			1:30	2:00	2:00						6:15	9:28	1:55							1:20		2:00	1:30	5:00	7:21	7:21
GM38-RW-1	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:45	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59	23:59
GM38-RW-3			1:07																																								
ONCT 3 wells	0%	0%	0%	13%	4%	0%	0%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	8%	8%	2%	3%	0%	0%	0%	0%	13%	0%	0%	0%	0%	0%	0%	19%	37%	67%	67%	30%	0%	1%	5%	10%	6%	na
Daily Rainfall, in	0	0.22	0	0	0	0	0	0	0.48	0	0	0	0.04	0.26	0.14	0.41	0	0	0	0	0.13	0	0	0.18	0	0	0	0	0	0	0	0	0	0.41	0	0	0.17	0	0	0.01	0	0.15
Test Intervals =	Week #1						Week #2							Week #3							Week #4							Week #5 & 6															

Well BWD 6-2 pumping cycles 23:59 24-hr pumping 1:00 Less than 24-hr pumping Daily pumping time shown in Hours:minutes

ONCT well pump downtime shown as percentage of daily hours for 3 wells combined.

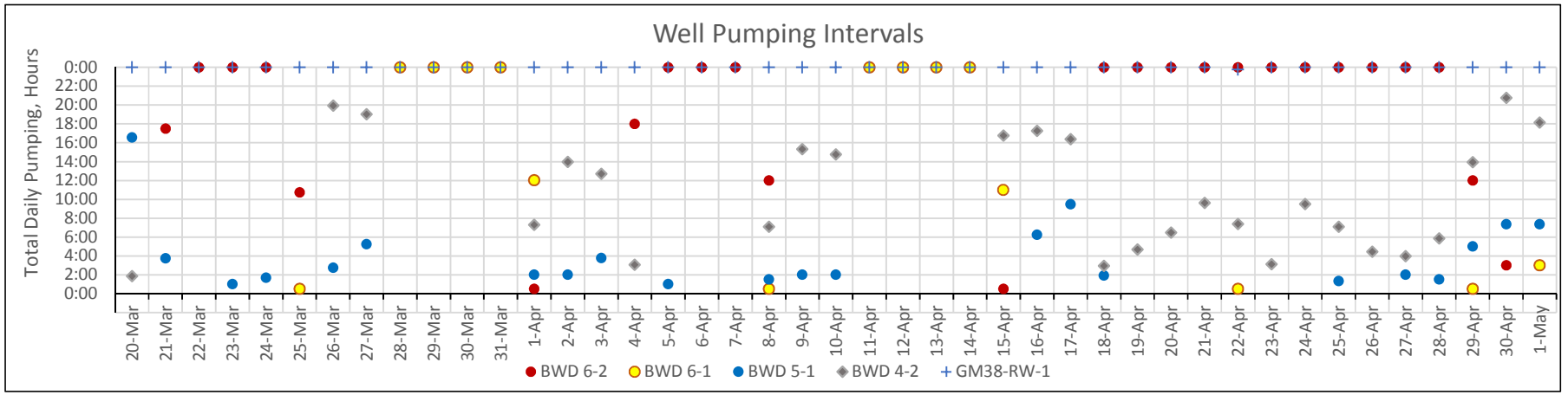


Table 5-1. Aquifer Parameters
NWIRP, Bethpage, NY

Well Depths	Week #1 (t = 0 @ 5:30 am 3.21.16)					
	T	S	1/B	Kz/Kr	K	Comments b=470', leaky aquifer (Deep = 170'; Interm = 120'; Shallow = 180')
Deep Zone	55,960	0.001934	0.0002705	0.0003	119	first 1000 minutes; 104D2 inactive
Interm Zone	40,090	0.0006262	9.573E-05	0.002	85	first 1000 minutes
Shallow Zone	36,480	0.0007337	0.0001652	0.0058	78	first 1000 minutes
Zone Ave	**44,448**	**0.0011**	**0.0002**	**0.003**	**95**	composite aquifer

Well Depths	Week #3 (t = 0 @ 0:00 am 4.4.16)					
	T	S		Kz/Kr	K	Comments b=470', leaky aquifer (Deep = 170'; Interm = 120'; Shallow = 180')
Deep Zone	56,880	0.001632	0.0002699	0.0005	121	first 1000 minutes; 104D2, 123D3 inactive
Interm Zone	42,150	0.0002493	0.0001151	0.003	90	first 1000 minutes; 107D3, 123D2 inactive
Shallow Zone	37,170	0.000639	0.0003296	0.0111	79	first 1000 minutes; 104D1, 123D1 inactive
Zone Ave	**45,571**	**0.0009**	**0.0003**	**0.005**	**97**	composite aquifer

Zone Ave Values Wks #1 & #3	Week #1 and #3 Averages					
	T	S	1/B	Kz/Kr	K	Comments b=470', leaky aquifer (Deep = 170'; Interm = 120'; Shallow = 180')
Deep Zone	56,420	0.0018	0.0003	0.0004	120	deep zone = 170' thick based on well screens and Raritan Clay
Interm Zone	41,120	0.0004	0.0001	0.002	87	interm zone = 120' thick based on well screens
Shallow Zone	36,825	0.0007	0.0002	0.0084	78	shallow zone = 470' minus deep & shallow = 180'
Zone Ave	**45,009**	**0.0010**	**0.0002**	**0.004**	**96**	**composite aquifer**

Notes:

T - transmissivity, ft2/day

S - storativity, dimensionless

1/B - leakage factor, dimensionless

Kz/Kr - ratio of vertical to radial (horizontal) hydraulic conductivity

K - horizontal hydraulic conductivity, ft/day

Zone averages for composite aquifer based on thickness weighted average of all three zones.

Table 5-2. BWD Well Test Data Summary
NWIRP, Bethpage, NY

Well 6-2 test data from BWD:

TEST DATE	6/21/73	4/13/04	2/9/05	3/17/09	10/5/11	10/4/13	11/12/14	1/8/16
FLOW RATE, Q (GPM)	1425	1225	1220	1400	1410	1235	1354	1190
PUMPING LEVEL (FT)	94	86	86	90	95	93	91	89
STATIC WATER LEVEL.....	33	49	49	44	48	48	48	48
DRAWDOWN, s (ft)	61	37	37	46	47	45	43	41
SPECIFIC CAPACITY (Q/s)	23.4	33.1	33.0	30.4	30.0	27.4	31.5	29.0
Mean Specific Capacity =	**29.7**							
Standard Deviation. =	**3.2**							
Coefficient of Variation =	**0.108**							

Drawdown Estimate for Well BWD 6-2 during Wk #1 and Wk #3 pumping:

AVE. PUMPING RATE, Q (gpm)	1153		
SPECIFIC CAPACITY (Q/s)[1]	29.7		
WELL DRAWDOWN, s (ft)	38.8		
WELL EFFICIENTY, %	100%	80%	70%
AQUIFER DRAWDOWN, s (ft)	38.8	31.1	27.2

[1] Use mean specific capacity based on historical pumping rates.

Table 6-1. Water Levels, Week #1 and Week #3
Shallow, Intermediate, and Deep Aquifer Zones
NWIRP, Bethpage, NY

Well	Week #1			Week #3		
	Water Level t = 0 mins	Water Level t = 1000 mins	Drawdown t = 1000 mins	Water Level t = 0 mins	Water Level t = 1000 mins	Drawdown t = 1000 mins
	Shallow Zone			Shallow Zone		
BWD 6-2	na	na	na	na	na	na
RE105-D1	50.34	49.18	1.16	49.88	49.12	0.75
RE104-D1	54.30	53.95	0.36	53.88	53.94	-0.06
RE108-D1	56.14	55.13	1.01	55.85	55.12	0.73
RE122-D1	55.43	54.61	0.82	55.28	54.71	0.57
RE126-D2	na	na	na	55.28	54.78	0.50
RE126-D1	na	na	na	55.60	55.16	0.44
RE126D1/2*	na	na	na	55.44	54.97	0.47
RE123-D1	na	na	na	57.78	57.71	0.08
	Intermediate Zone			Intermediate Zone		
BWD 6-2	na	na	na	na	na	na
RE103-D2	53.48	51.42	2.06	53.21	51.46	1.75
RE103-D1	na	na	na	53.23	51.59	1.64
RE103-D1/2*	na	na	na	53.22	51.53	1.69
RE108-D2	54.71	53.24	1.47	54.45	53.28	1.17
RE120-D1	49.68	48.46	1.22	49.35	48.46	0.89
RE120-D2	49.84	48.52	1.31	49.50	48.53	0.97
RE120D1/2*	49.76	48.49	1.27	49.43	48.49	0.93
RE122-D2	55.11	54.10	1.01	54.92	54.17	0.75
RE126-D3	na	na	na	55.30	54.75	0.55
RE107-D3	na	na	na	60.01	56.85	3.16
RE123-D2	na	na	na	57.05	56.93	0.13
	Deep Zone			Deep Zone		
BWD 6-2	51.40	17.9	33.50	50.90	17.40	33.50
MW117-5	52.46	47.76	4.70	51.88	47.75	4.13
RE105-D2	49.67	46.11	3.56	49.17	46.01	3.16
RE104-D3	51.63	48.96	2.67	50.87	48.84	2.03
RE104-D2	52.12	50.17	1.95	51.02	50.07	0.94
RE104-D2/3*	51.88	49.57	2.31	50.94	49.46	1.48
RE103-D3	53.27	50.84	2.44	53.01	50.86	2.15
RE120-D3	49.48	47.96	1.52	49.18	47.96	1.22
RE122-D3	54.45	52.82	1.63	54.23	52.84	1.39
RE123-D3	57.46	56.86	0.60	57.31	56.94	0.37

"na" indicates data not available.

* indicates average water level for two wells in same aquifer zone

Deep Zone water levels for well BWD 6-2 at t = 0 minutes were interploated from potentiometric surface contours (see Figures 6-1 and 6-2); water levels for t = 1000 minutes estimated using Leaky Aqfuier model in AQTESOLV (see Attachment C).

Table 6-2. Drawdown and Pumping Water Levels, Week #1
NWIRP, Bethpage, NY

Drawdown Plot Input Data

Obs. Pt.	#1	#2	#3	#4	#5	#6	#7	#8	#9	Well 6-2	#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20	#21	#22	#23	#24	#25	#26
Distance, ft	-3000	-2500	-2000	-1000	-750	-500	-250	-100	-10	0	10	100	250	500	650	750	1000	1250	1400	1550	1800	2000	2500	3000	3500	4000	4500
BWL, ft	55.9	55.15	54.40	52.9	52.53	52.15	51.78	51.55	51.42	51.40	51.39	51.25	51.03	50.65	50.43	50.28	49.90	49.53	49.30	49.08	48.70	48.40	47.65	46.90	46.15	45.40	44.65
Ddn, ft	1	1.25	1.76	3.60	4.50	6.00	8.58	12.27	21.91	34.1	21.91	12.27	8.58	6.00	5.10	4.50	3.60	2.90	2.66	2.39	2.00	1.76	1.25	1.00	0.75	0.60	0.45
PWL, ft	54.9	53.90	52.64	49.30	48.03	46.15	43.20	39.28	29.51	17.3	29.48	38.98	42.45	44.65	45.33	45.78	46.30	46.63	46.64	46.69	**46.70**	46.64	46.40	45.90	45.40	44.80	44.20

Gradient = 0.0015 background gradient for t = 0 mins based on flowline through Well 6-2 (see Figure 6-1)

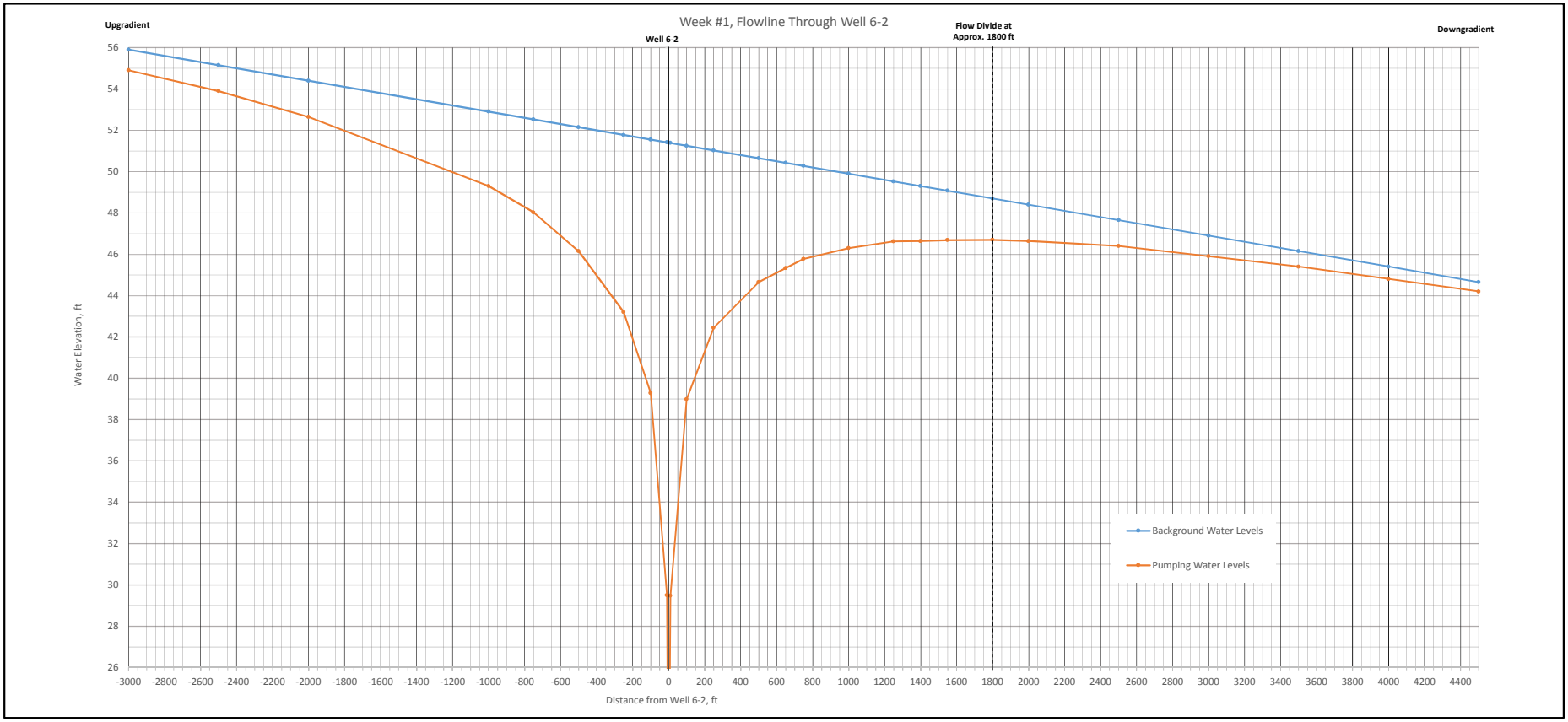
BWL - Background water level for t = 0 mins clculated using background gradient and distance to Observation Point (Obs pt.) from pumping well 6-2

Ddn - Drawdown due to Week #1 pumping at well 6-2; taken from t = 1000 mins distance-drawdown plolt generated using Hantush-Jacob (1955)/Hantush (1962) Leaky Aquifer Model in AQTESOLV.

PWL - Pumping water level is BWL minus Ddn at each observation point.

Bold red values represent water levels and drawdown at well BWD 6-2.

Bold values represent stagnation point downgradient from well BWD 6-2.



Drawdown Plot Data Used to Support t = 1000 minutes Potentiometric Surface Contours

Elevation, ft	54	53	52	51	50	49	48	47	46	44	42	17.3	42	44	46	**46.7**	46
Distance, ft	-2550	-2150	-1800	-1500	-1200	-940	-750	-620	-480	-340	-200	0	230	430	870	**1800**	2900

Values read from PWL plot and fall on ground flow line through well BWD 6-2.

Bold red values represent Water Elevation during pumping at well BWD 6-2 for t = 1000 minutes.

Bold values represent downgradient stagnation point from well BWD 6-2.

Negative distance indicates upgradinet from well BWD 6-2; positive is downgradient.

Table 6-3. Drawdown and Pumping Water Levels, Week #3
NWIRP, Bethpage, NY

Drawdown Plot Input Data

Obs pt.	#1	#2	#3	#4	#5	#6	#7	#8	#9	Well 6-2	#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20	#21	#22	#23	#24	#25	#26
Distance, ft	-3000	-2500	-2000	-1000	-750	-500	-250	-100	-10	0	10	100	250	500	650	750	1000	1250	1400	1550	1700	2000	2500	3000	3500	4000	4500
BWL, ft	55.7	54.90	54.10	52.5	52.10	51.70	51.30	51.06	50.92	50.90	50.88	50.74	50.50	50.10	49.86	49.70	49.30	48.90	48.66	48.42	48.18	47.70	46.90	46.10	45.30	44.50	43.70
Ddn, ft	0.87	1.15	1.55	3.30	4.50	6.00	8.58	11.70	20.80	33.1	20.80	11.70	8.58	6.00	5.10	4.50	3.30	2.67	2.40	2.14	1.92	1.55	1.15	0.87	0.66	0.51	0.39
PWL, ft	54.83	53.75	52.55	49.20	47.60	45.70	42.72	39.36	30.12	17.8	30.08	39.04	41.92	44.10	44.76	45.20	46.00	46.23	46.26	**46.28**	46.26	46.15	45.75	45.23	44.64	43.99	43.31

Gradient = 0.0016 background gradient for t = 0 mins based on flowline through Well 6-2 (see Figure 6-2)

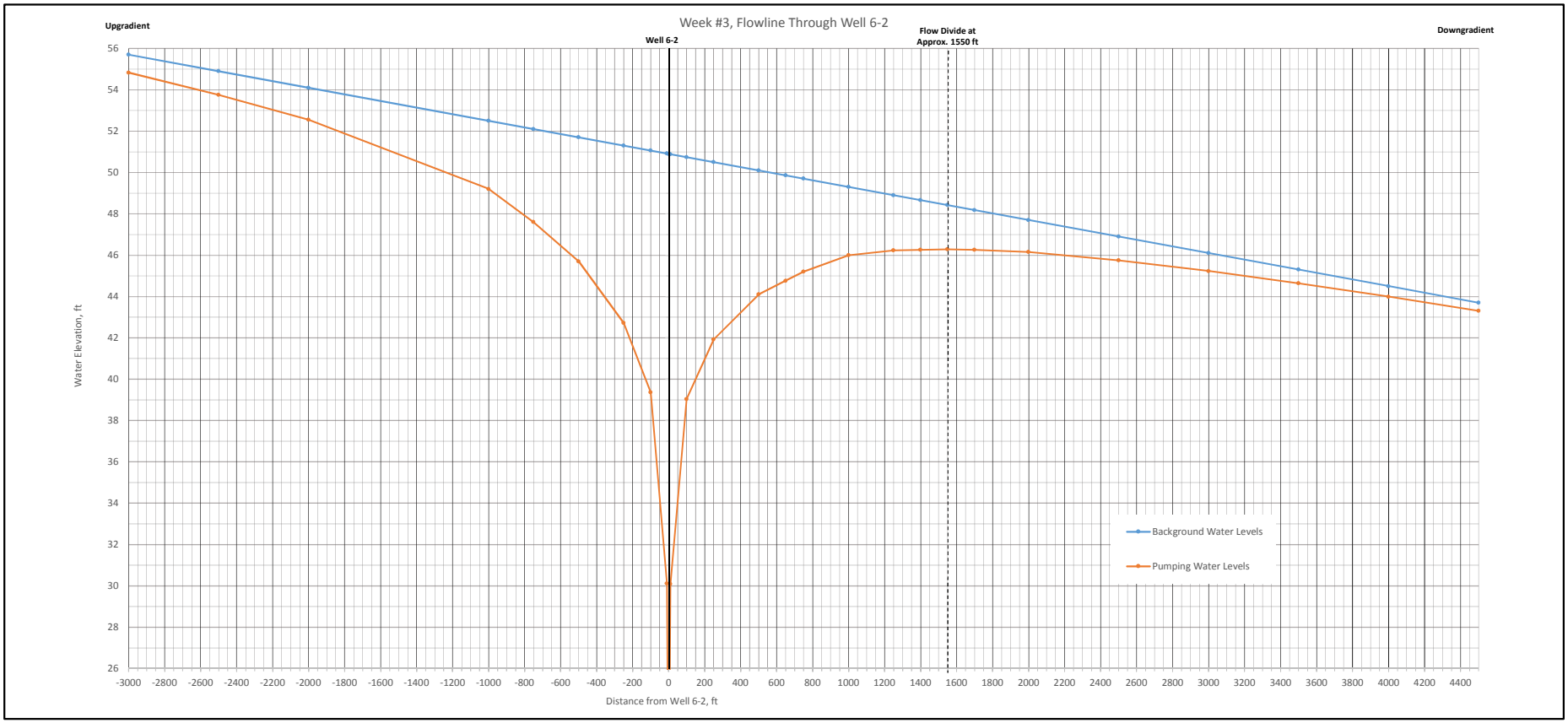
BWL - Background water level for t = 0 mins clculated using background gradient and distance to Observation Point (Obs pt.) from pumping well 6-2

Ddn - Drawdown due to Week #1 pumping at well 6-2; taken from t = 1000 mins distance-drawdown plolt generated using Hantush-Jacob (1955)/Hantush (1962) Leaky Aquifer Model in AQTESOLV.

PWL - Pumping water level is BWL minus Ddn at each observation point.

Bold red values represent water levels and drawdown at well BWD 6-2.

Bold values represent stagnation point downgradient from well BWD 6-2.



Drawdown Plot Data Used to Support t = 1000 minutes Potentiometric Surface Contours

Elevation, ft	54	53	52	51	50	49	48	47	46	44	42	17.8	42	44	46	**46.28**	46
Distance, ft	-2600	-2200	-1830	-1540	-1240	-960	-770	-620	-480	-330	-210	0	230	430	1000	**1550**	2160

Values read from PWL plot and fall on ground flow line through well BWD 6-2.

Bold red values represent Water Elevation during pumping at well BWD 6-2 for t = 1000 minutes.

Bold values represent downgradient stagnation point from well BWD 6-2.

Negative distance indicates upgradinet from well BWD 6-2; positive is downgradient.

Table 6-4. Observed and Analyatical Capture Zone Summary
NWIRP, Bethpage, NY

Observed Capture Zone (Based on Water Levels)							
Deep Zone	**i[1]**	**Q, gpm[2]**	**Q, ft3/d**	**CZ, dwn[3]**	**Cz, well[4]**	**CZ, 3700[5]**	**CZ, max[6]**
Week 1	0.0015	1151	221,583	1,800	4,500	5,000	na
Week 3	0.0016	1154	222,160	1,550	4,400	4,900	na

[1] Gradient, i, from potentiometric surface before pumping began (see Figures 6-1 and 6-2).

[2] Week #1 and Week #3 pumping rate for well BWD 6-2.

[3] CZ, dwn = downgradient extent of capture zone at pumping well, see point A on Figures 6-3 and 6-4; distance based on calculated pumping water levels.

[4] CZ, well = total capture zone width at pumping well; estimated by placement of dividing flow line on pumping potentiometric surface (see Figures 6-3 and 6-4).

[5] CZ, 3700 = total capture zone width 3700 ft upgradient of pumping well; estimated from potentiometric surface (see Figures 6-3 and 6-4).

[6] CZ, max = total maximum capture zone width far upgradient of pumping well; could not be estimated from pumping potentiometric surface (see Figures 6-3 and 6-4).

Analytical Capture Zone										
Zone	**Thickness b, ft[1]**	**K[2] ft/day**	**T = kb**	**i[3]**	**Q basis[4]**	**Q, gpm[4]**	**Q, ft3/d**	**CZ, dwn[5]**	**Cz, well[6]**	**CZ, max[7]**
Deep	70	120	8,400	0.00155	nominal	1,153	221,968	2,715	8,524	17,048
					67%	773	148,719	1,819	5,711	11,422
					50%	577	110,984	1,357	4,262	8,524
Combined Shallow and Intermediate	300	83	24,750	0.00155	25%	285	54,937	228	716	1,432

[1] Thickness for deep zone based on screen length for well BWD 6-2; thickness for shallow/interm zone is aquifer lying above well BWD 6-2.

[2] Horizontal hydraulic conductivity, K, based on bulk aquifer property from pumping test analyses (see Table 5-1).

[3] Gradient, i, is Week 1 and Week 3 average deep potentiometric surface before pumping began (see Figures 6-1 and 6-2).

[4] Q basis nominal flow for deep aquifer zone is average Week #1 & Week #3 flow at well 6-2 (1153 gpm), or specified percentage of nominal flow. Q basis for shallow/intermediate zone is 75 percent of remaining 33 percent flow not coming from deep zone.

[5] CZ, dwn = $(Q/2\pi Ti)$, downgradient extent of capture zone parallel to flow direction at pumping well.

[6] CZ, well = $(2)(Q/4Ti)$, total capture zone width perpendicular to flow direction at pumping well.

[7] CZ, max = $(2)(Q/2Ti)$, total maximum capture zone width far upgradient of pumping well.

Table 6-5. Calculation of Capture Zone Width Up-gradient of Pumping Well
NWIRP, Bethpage, NY

Calculation of up-gradeient CZ width as a function of distance along flow line through well BWD 6-2: Deep Aquifer Zone

T =	8,400	ft/day	**Deep zone**
Q =	148719	ft3/day	well 6-2
i =	0.00155		background ave. for Wk 1 & Wk 3

Ymax = Q/2Ti = 5711 max up-gradinet CZ width (EPA, 2008)

$$x = \frac{-y}{\tan[(2\pi Ti/Q)(y)]}$$ (EPA, 2008)

if ±y =	2857	3300	3500	3800	4000	4138	4500	5000
x up-grad =	0	820	1,292	2,168	2,907	3,516	5,709	12,075

Note: multiply "y" by 2 to get total capture zone width.

Calculation of up-gradeient CZ width as a function of distance along flow line through well BWD 6-2: Shallow/Intermediatea Aquifer Zone

T =	24,750	ft/day	**Shallow/Intermediate zone**
Q =	54937	ft3/day	well 6-2
i =	0.00155		background ave. for Wk 1 & Wk 3

Ymax = Q/2Ti = 716 max up-gradinet CZ width (EPA, 2008)

$$x = \frac{-y}{\tan[(2\pi Ti/Q)(y)]}$$ (EPA, 2008)

if ±y =	358	400	450	500	550	600	680	710
x up-grad =	0	74	192	358	615	1,072	4,225	25,339

Note: multiply "y" by 2 to get total capture zone width.

Table 7-1. BWD Plant 6 Water Sample Results Summary
NWIRP, Bethpage, NY

Week #1				
Chemicals Detected (Sampled 3/25/16)	**Well 6-1**	**Well 6-2**	**Treated Water**	**NYS limit**
1,4-Dioxane	12	9.1	8.4	--
Carbon Tetrachloride	<0.50	1.75	<0.50	5
Chloroform	<0.50	1.39	<0.50	--
cis-1,2-Dichloroethene	<0.50	2.43	<0.50	5
Tetratchloroethene	3.54	1.99	<0.50	5
Trichloroethene	***22.8***	***1280***	<0.50	5
Week #3				
Chemicals Detected (Sampled 4/8/16)	**Well 6-1**	**Well 6-2**	**Treated Water**	**NYS limit**
1,4-Dioxane	9.6	7.3	7.4	--
1,1,2-Trichloroethane	<0.50	0.59	<0.50	5
1,1-Dichloroethane	<0.50	1.33	<0.50	5
Carbon Tetrachloride	<0.50	1.31	<0.50	5
Chloroform	<0.50	1.06	<0.50	--
cis-1,2-Dichloroethene	<0.50	2.29	<0.50	5
Tetratchloroethene	3.37	1.83	<0.50	5
Trichloroethene	***29***	***1,280***	<0.50	5
Week #5				
Chemicals Detected (Sampled 4/22/16)	**Well 6-1**	**Well 6-2**	**Treated Water**	**NYS limit**
1,4-Dioxane	11	8.5	8.8	--
1,1,1-Trichloroethane	<0.50	0.53	<0.50	5
1,1,2-Trichloroethane	<0.50	0.63	<0.50	5
1,1-Dichloroethane	<0.50	1.44	<0.50	5
Carbon Tetrachloride	<0.50	1.55	<0.50	5
Chloroform	<0.50	1.26	<0.50	--
cis-1,2-Dichloroethene	<0.50	2.52	<0.50	5
Tetratchloroethene	3.88	2.06	<0.50	5
Trichloroethene	***34.2***	***947***	0.59	5
Week #6				
Chemicals Detected (Sampled 4/29/16)	**Well 6-1**	**Well 6-2**	**Treated Water**	**NYS limit**
1,4-Dioxane	12	8.6	8.6	--
1,1,2-Trichloroethane	<0.50	0.63	<0.50	5
1,1-Dichloroethane	<0.50	1.41	<0.50	5
Carbon Tetrachloride	<0.50	1.53	<0.50	5
Chloroform	<0.50	1.1	<0.50	--
cis-1,2-Dichloroethene	<0.50	2.21	<0.50	5
Tetratchloroethene	3.13	2.00	<0.50	5
Trichloroethene	***22.1***	***1,440***	0.72	5

All units µg/L, except as noted; na - not analyzed Week #6

Exceed NYS Regulatory Limits

Table 7-2. Ambient Air Samle Results Summary
NWIRP, Bethpage, NY

Detected Chemicals [1]	3/24/2016				4/19/2016						Background Value [2]	Acceptable Ambient Concentration [3]
	On-Site Air		Off-Site Air		Upwind		On-Site Air		Off-Site Air			
	ug/m3		ug/m3		ug/m3		ug/m3		ug/m3		ug/m3	ug/m3
BENZENE	0.54		0.57		0.25	J	0.21	J	0.29	J	1.9	
TOLUENE	0.79		0.87		0.53		0.72		1.1		11	
ETHYLBENZENE	0.11	J	0.14	J	0.087	J	0.082	J	0.074	J	0.8	
M- AND P-XYLENE	0.63	J	0.69	J	0.56	J	0.45	J	0.48	J	0.8	
O-XYLENE	0.12	J	0.15	J	0.11	J	0.087	J	0.11	J	0.6	
ISOPROPYLBENZENE							0.054	J			0.2	
XYLENES, TOTAL	1.3	J	1.4	J	1.2	J	0.92	J	1	J		1900
ACETONE	8.1		7.6		5		7.8		6.6		16	
4-METHYL-2-PENTANONE	0.094	J	0.07	J					0.11	J	0.8	
2-BUTANONE	0.88		0.85		0.47	J	0.77		1.1		6.2	
CYCLOHEXANE	0.089	J	0.093	J								114000
1,2-DICHLOROETHANE	ND		0.073	J	0.073	J			0.085	J	0.1	
1,2,4-TRICHLOROBENZENE	0.37	UJ	ND								0.8	
TETRACHLOROETHENE	0.22	J	0.2	J	0.18	J	0.19	J	0.16	J	0.6	
1,3-DICHLOROBENZENE	0.3	UJ	ND								0.3	
CARBON TETRACHLORIDE	**0.5**	J	**0.5**	J	**0.47**	J	**0.51**	J	**0.51**	J	0.4	
CHLOROFORM	0.16	J	0.13	J			0.12	J	0.098	J	0.2	
BROMOMETHANE	0.07	J	0.082	J							0.4	
CHLOROMETHANE	1.3		1.4		1.2		1.2		1.2		1.3	1710
METHYLENE CHLORIDE	0.35	UJ	0.35	UJ	0.45	J	**1.5**		**1.2**		0.8	
TRICHLOROFLUOROMETHANE	1.5		1.5		1.3		1.3		1.3		1.7	
DICHLORODIFLUOROMETHANE	2.7		2.7		2.5		2.4		2.5		2.8	1900
1,1,2-TRICHLORO-1,2,2-TRICHFLUOROETHANE	0.73	J	0.62	J	0.6	J	0.71	J	0.61	J	0.9	
TRICHLOROETHENE	**20**		**3.5**				**34**		**8**		0.2	32.4

Notes:

[1] Constituents observed at detectable levels; bold indicates exceeds background or ambient concentration.

[2] NYSDOH 2003 Study of volatile organic chemicals in air of fuel oil heated homes -outdoor air (mean values)

[3] Calculated risk-based concentration (USEPA, 2005, 2015)

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ATTACHMENT A

Well Hydrographs

Barometric Pressure vs. Water level Plots

Water Level Data file (on CD)

Figure A-1. Pre-Pilot Test Hydrographs, Deep Wells

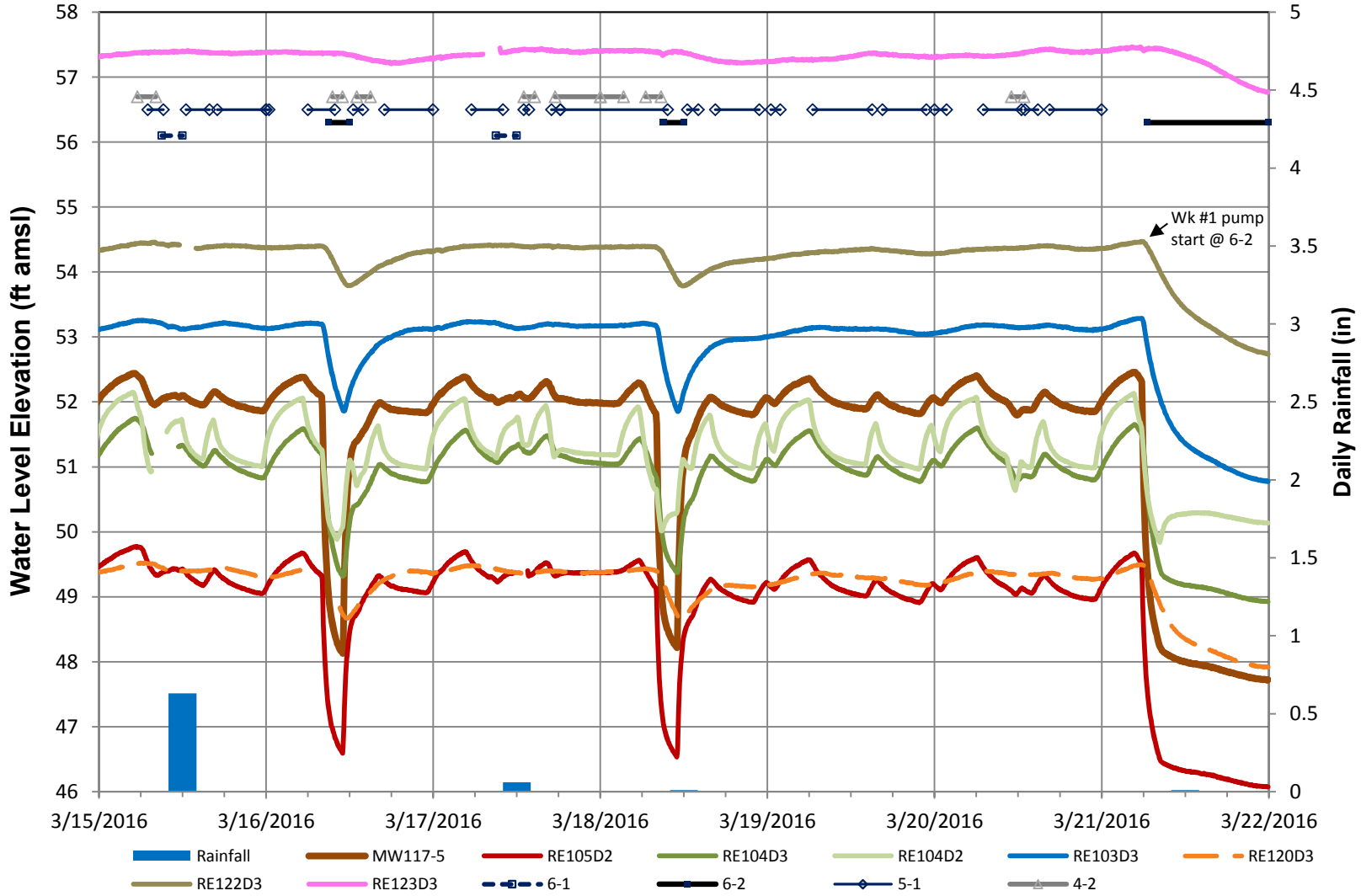


Figure A-2. Pre-Pilot Test Hydrographs, Intermediate Wells

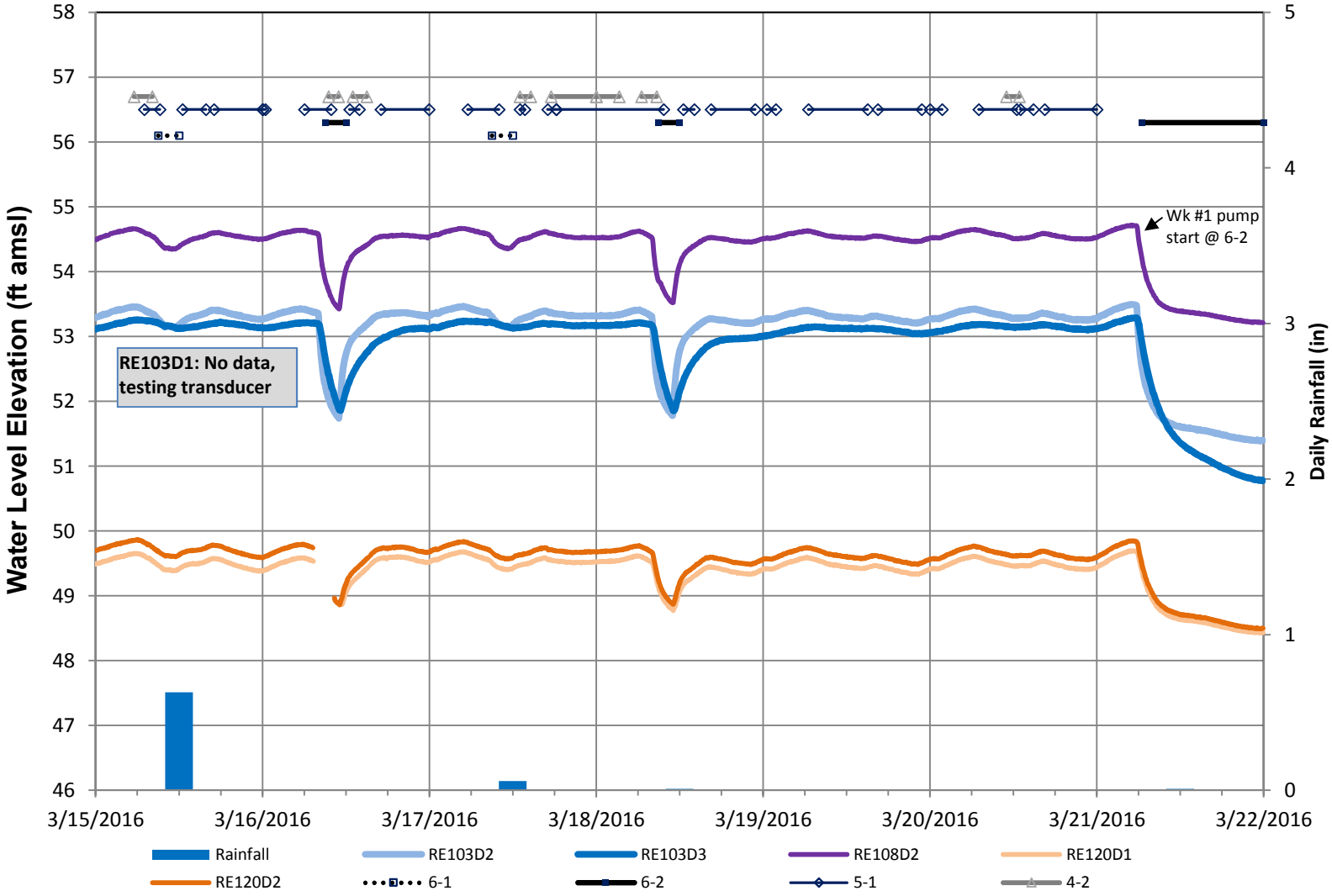
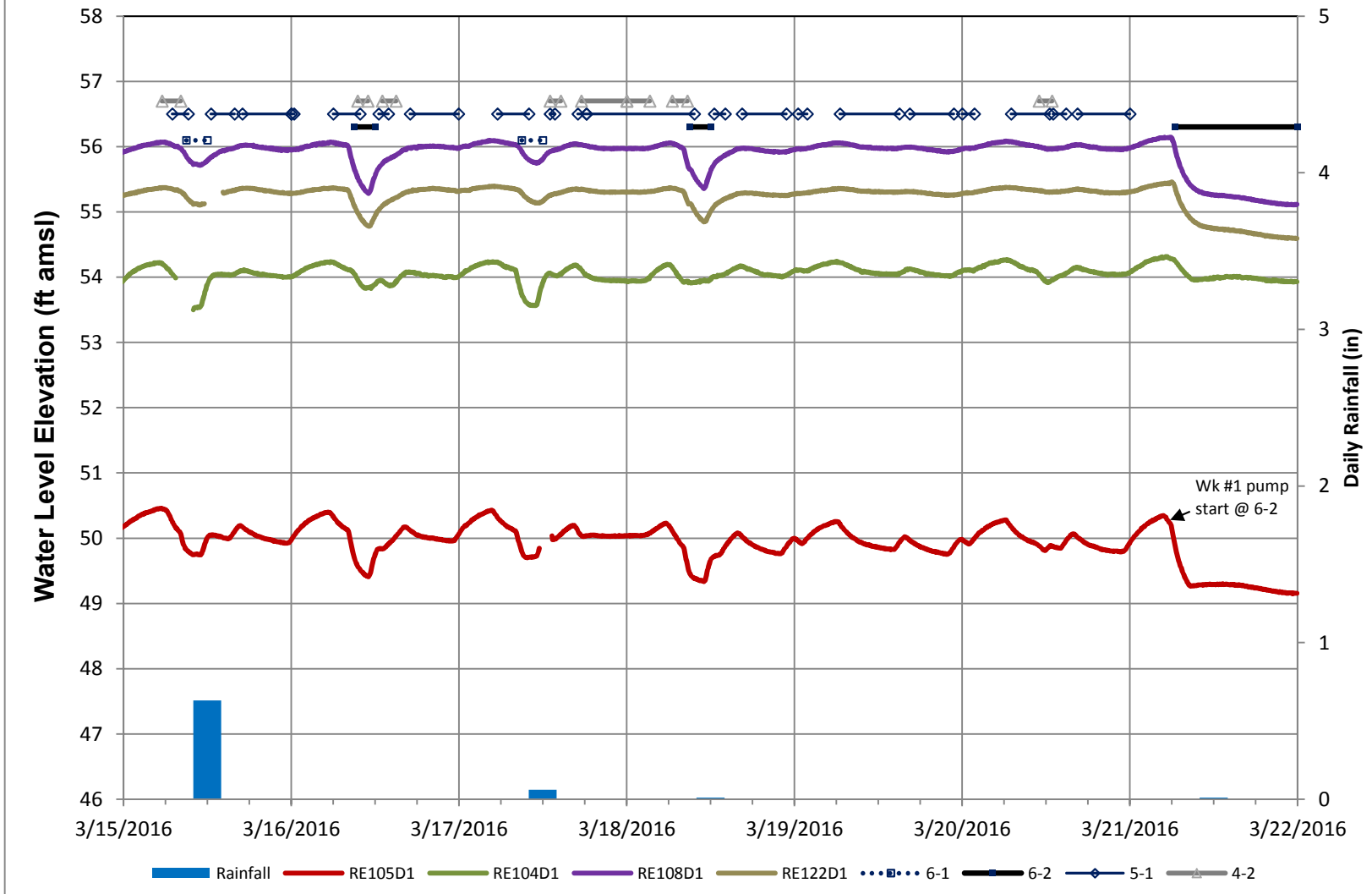


Figure A-3. Pre-Pilot Test Hydrographs, Shallow Wells



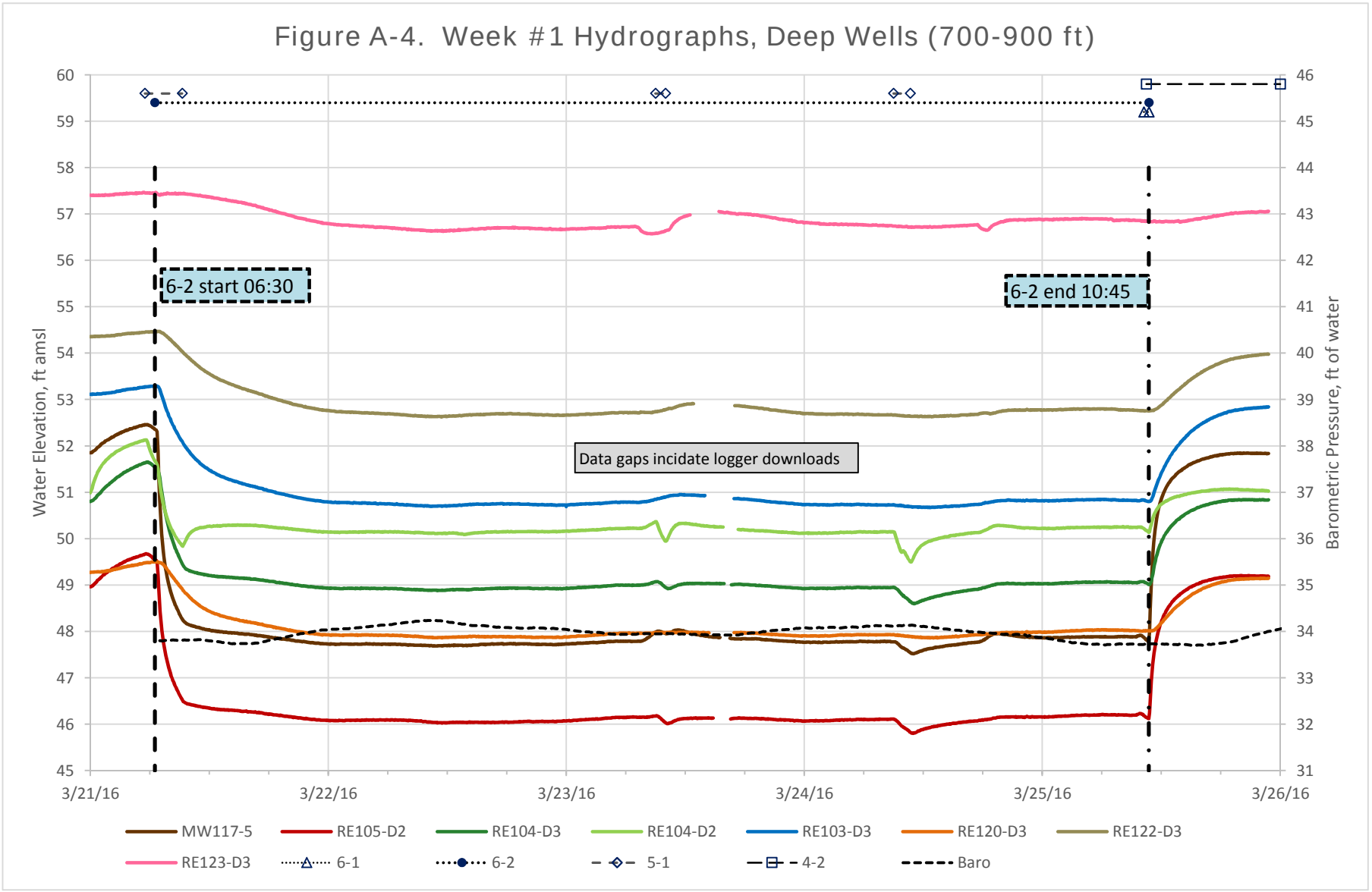


Figure A-4. Week #1 Hydrographs, Deep Wells (700-900 ft)
Water Elevation, ft amsl
Barometric Pressure, ft of water
60
59
58
57
56
55
54
53
52
51
50
49
48
47
46
45
46
45
44
43
42
41
40
39
38
37
36
35
34
33
32
31
3/21/16
3/22/16
3/23/16
3/24/16
3/25/16
3/26/16
6-2 start 06:30
6-2 end 10:45
Data gaps incidate logger downloads
MW117-5
RE105-D2
RE104-D3
RE104-D2
RE103-D3
RE120-D3
RE122-D3
RE123-D3
6-1
6-2
5-1
4-2
Baro

Figure A-5. Week #1 Hydrographs, Intermediate Wells (600-700 ft)

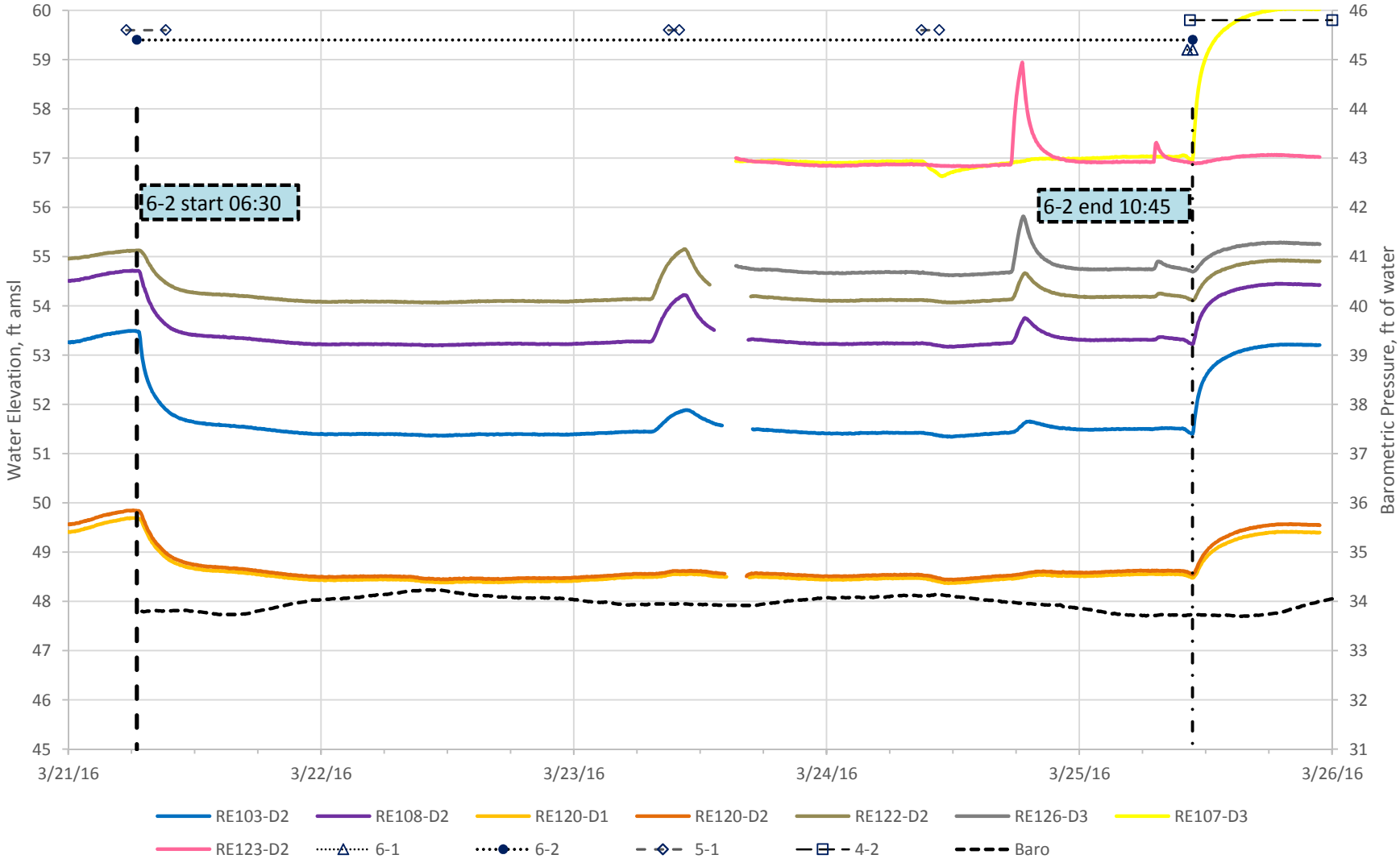


Figure A-6. Week #1 Hydrographs, Shallow Wells (300-600 ft)

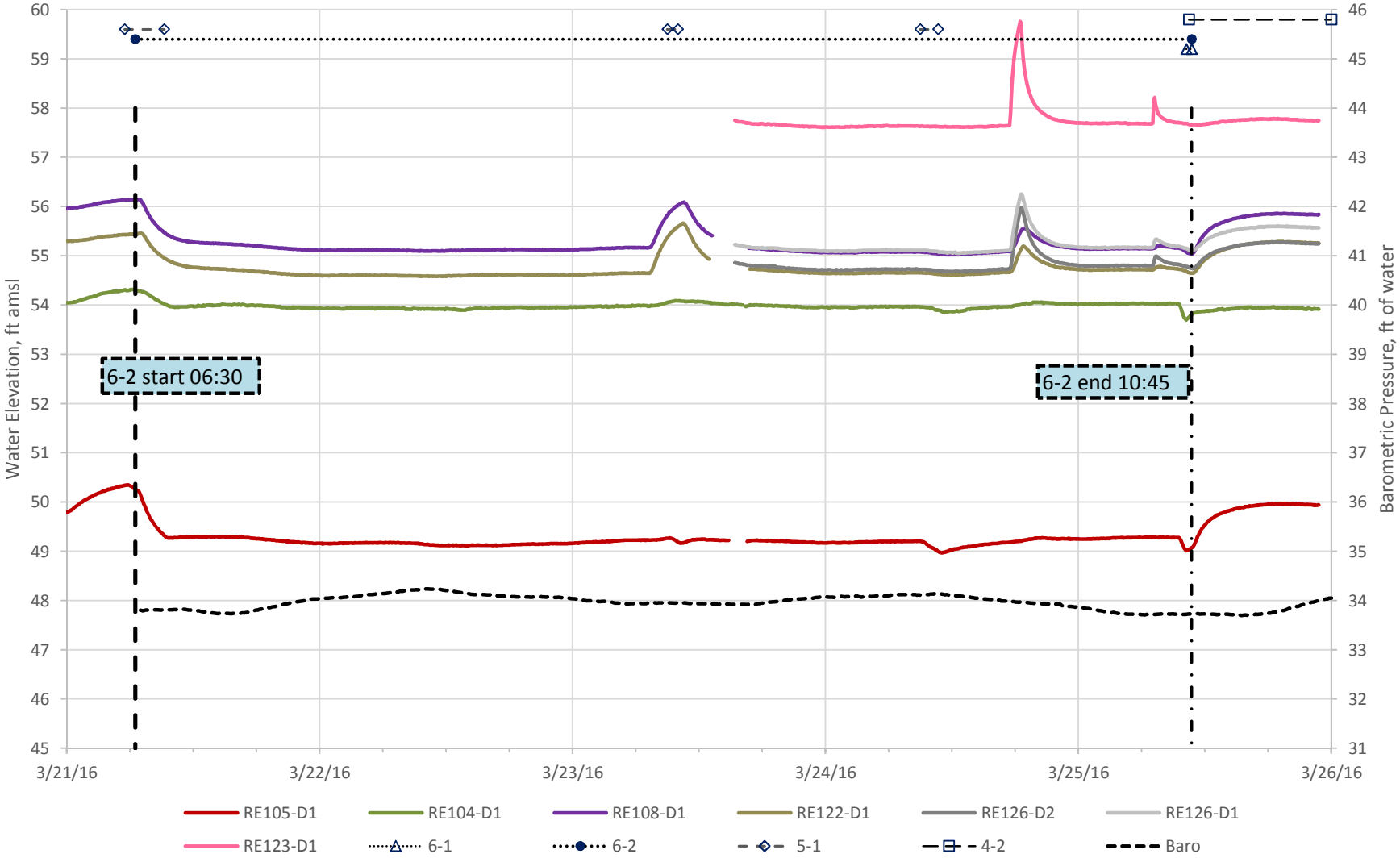


Figure A-7. Week #3 Hydrographs, Deep Wells (700-900 ft)

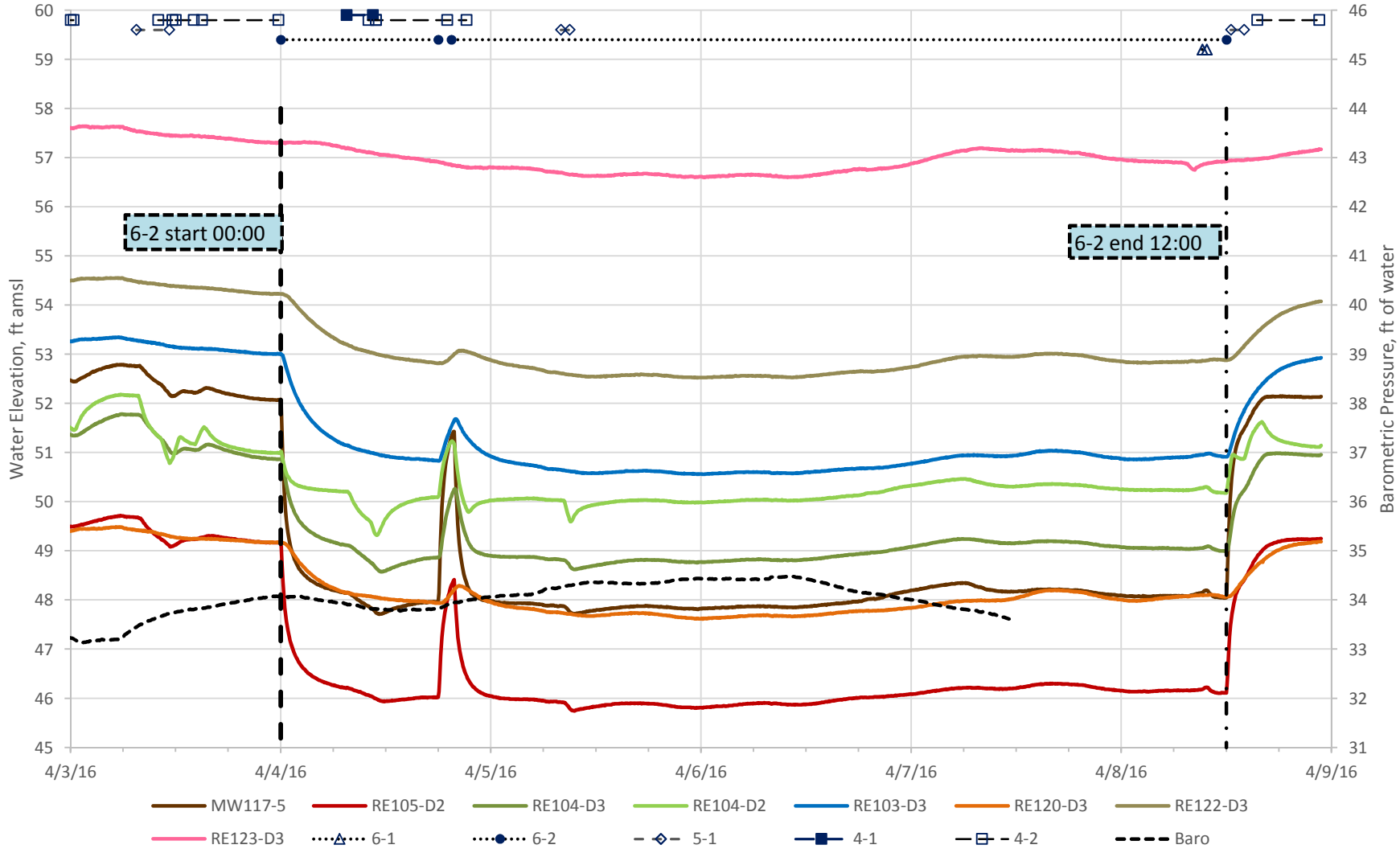
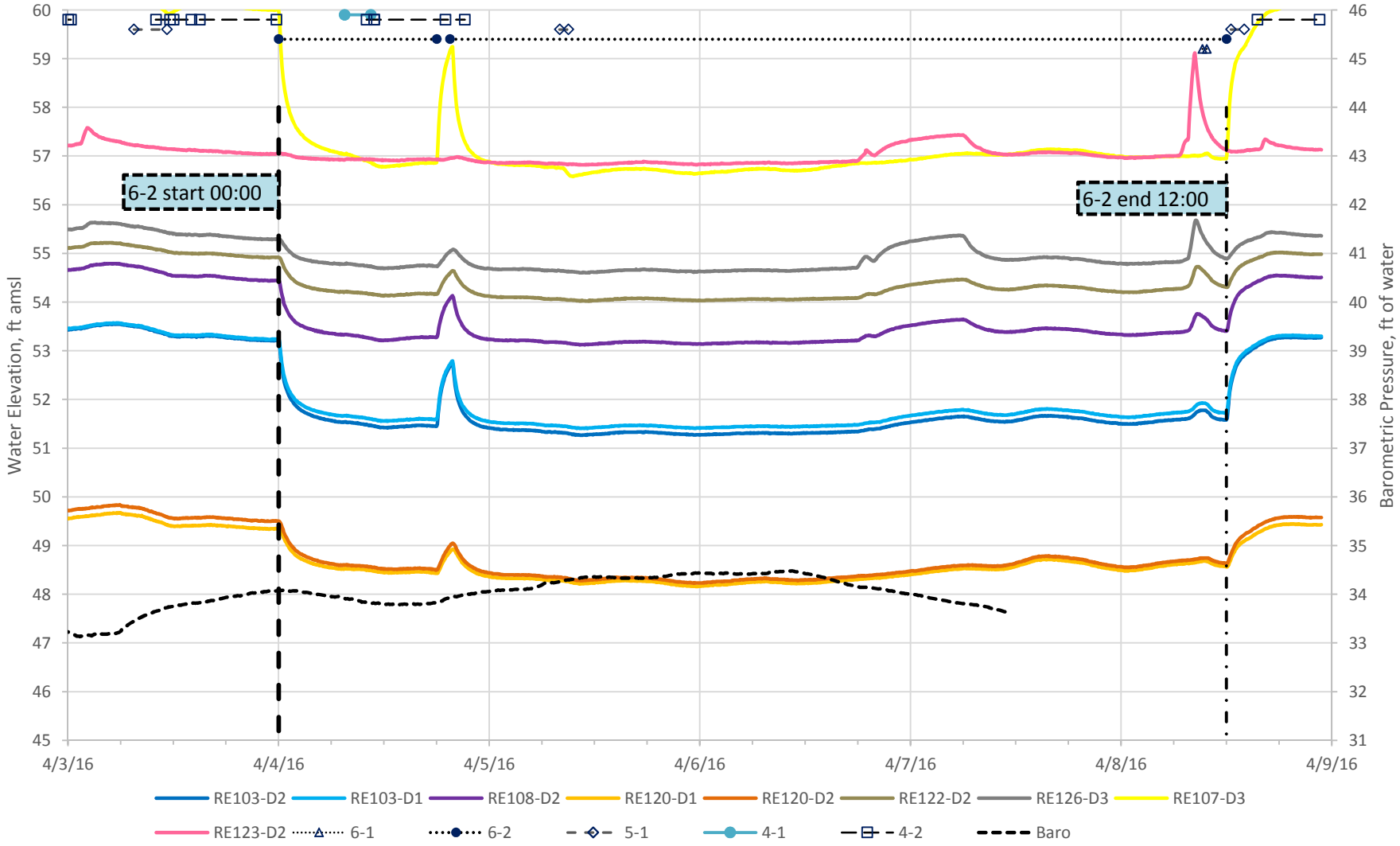


Figure A-8. Week #3 Hydrographs, Intermediate Wells (600-700 ft)



Figue A-9. Week #3 Hydrographs, Shallow Wells (300-600 ft)

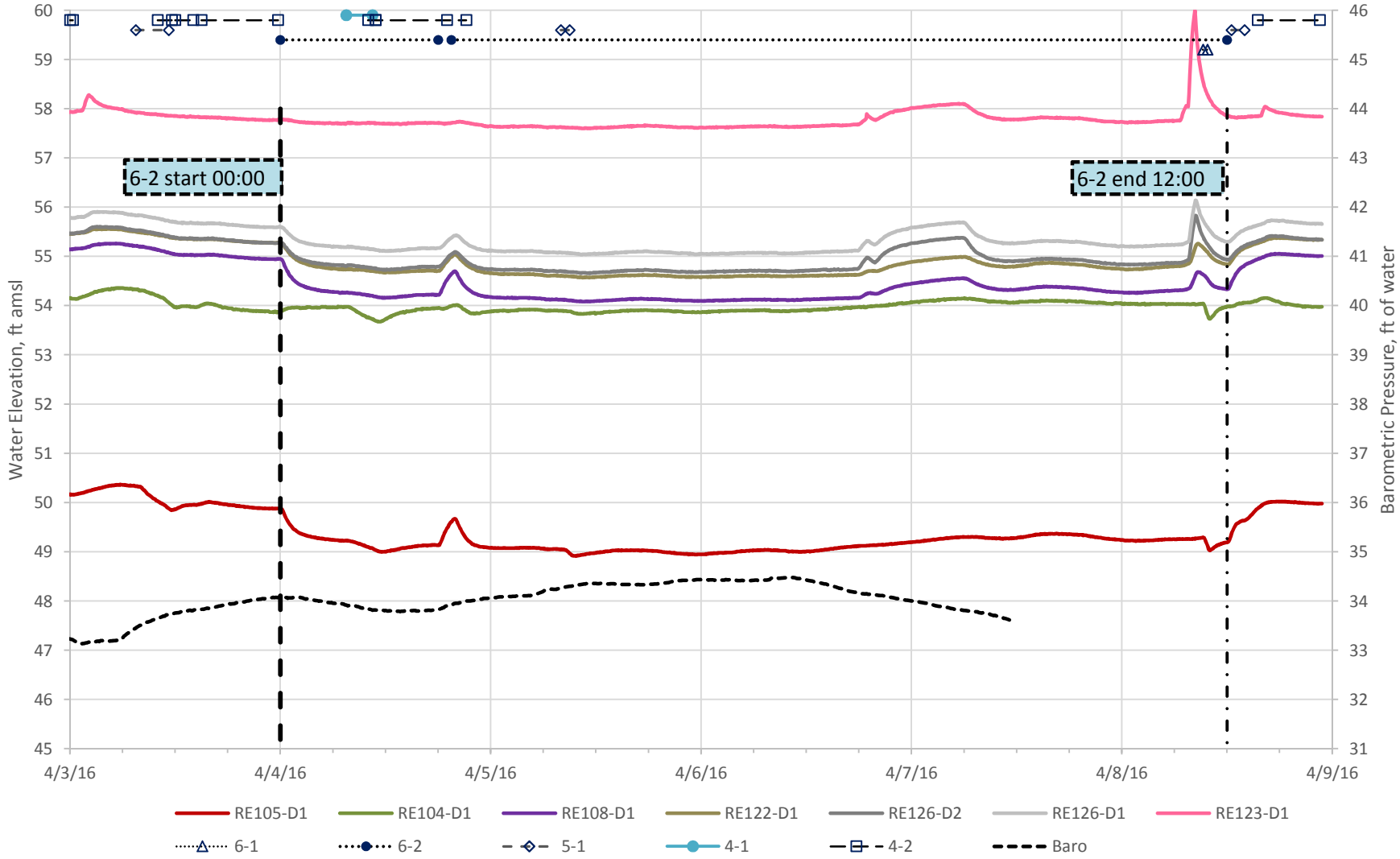


Figure A-10. Weeks #5 and #6 Hydrographs, Deep Wells

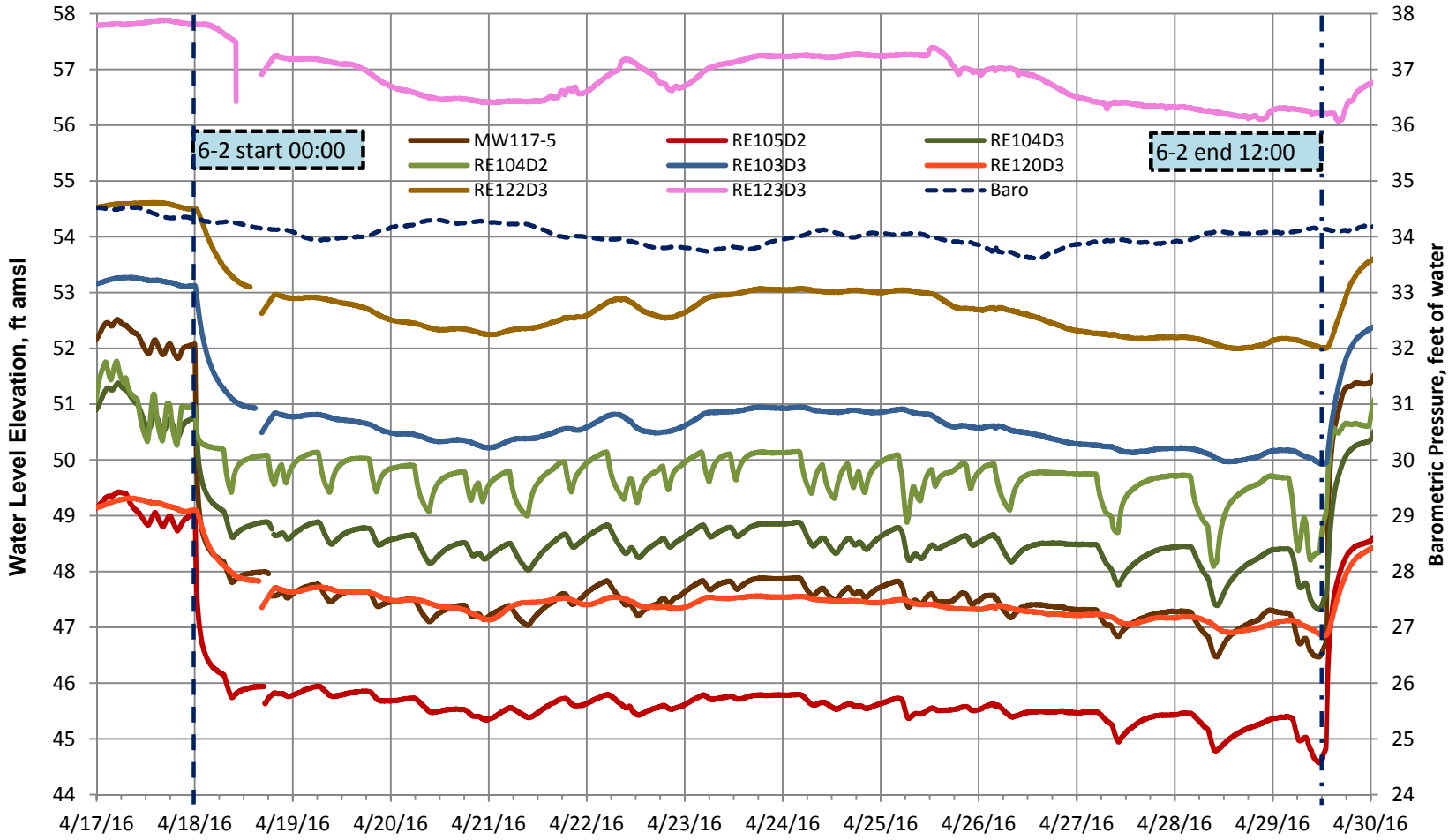


Figure A-11. Weeks #5 and #6 Hydrographs, Intermediate Wells

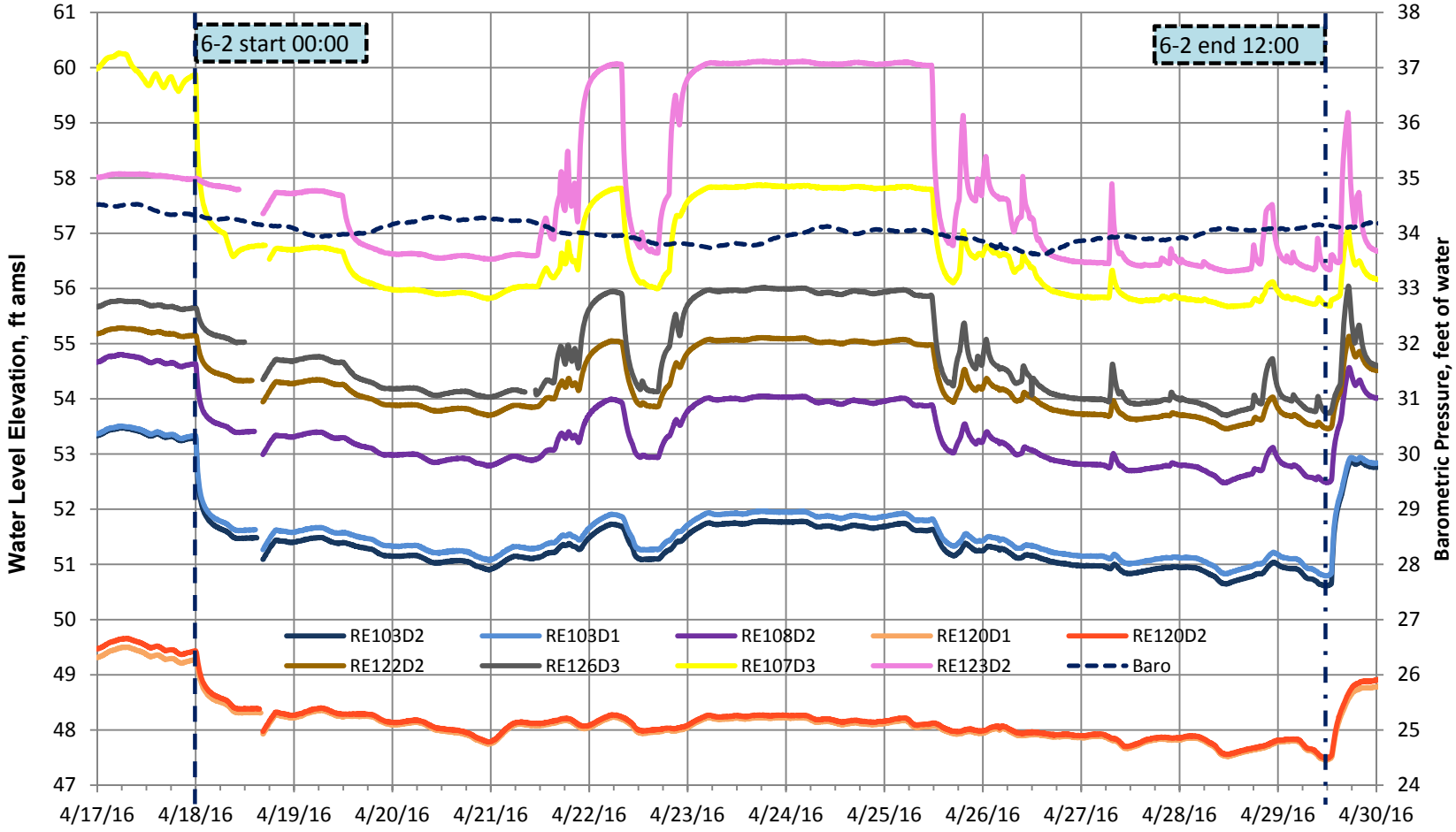


Figure A-12. Weeks #5 and #6 Hydrographs, Shallow Wells

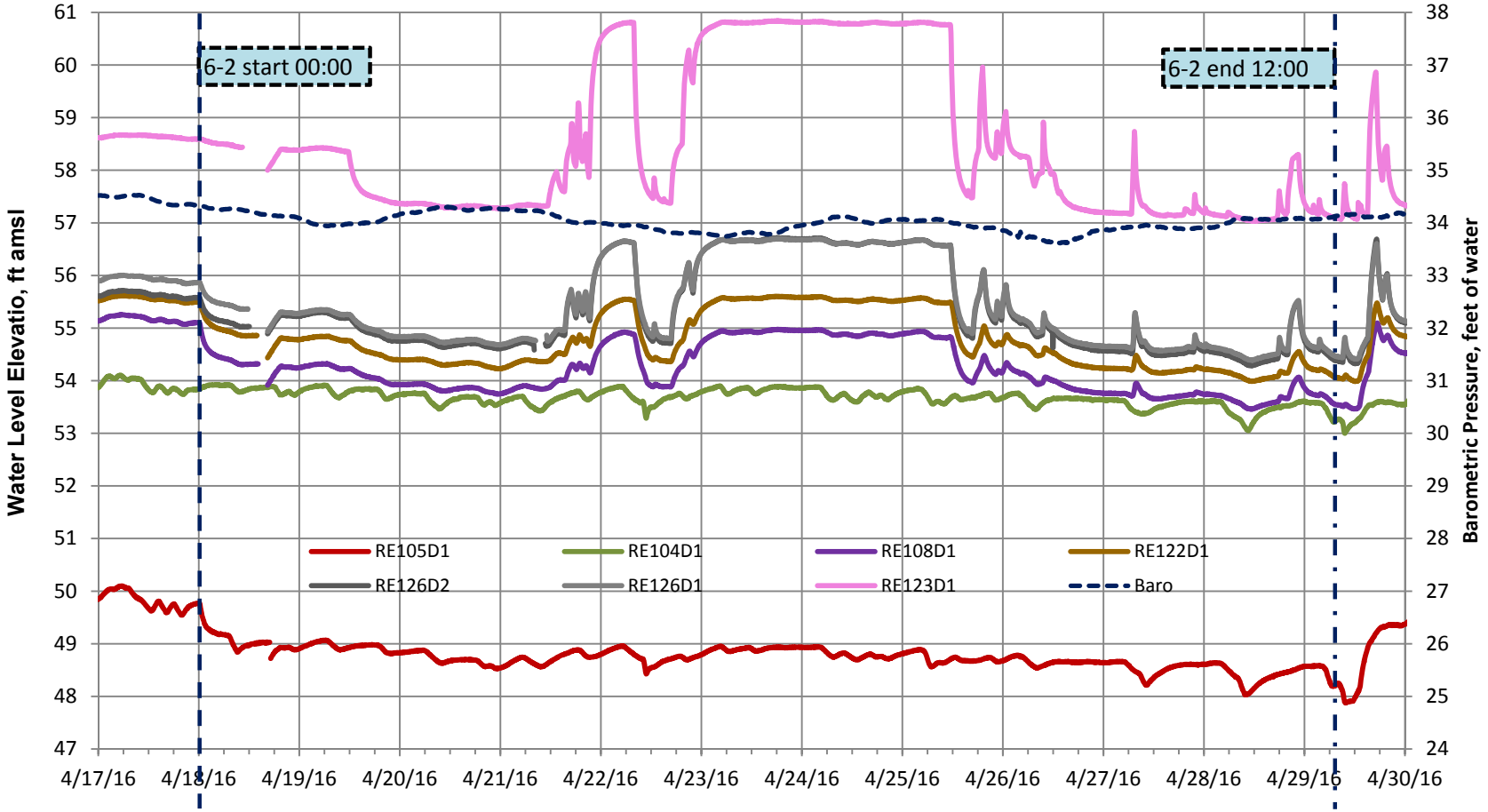


Figure A-13. Week #1 Hydrographs & Barometric Pressure
Deep Wells

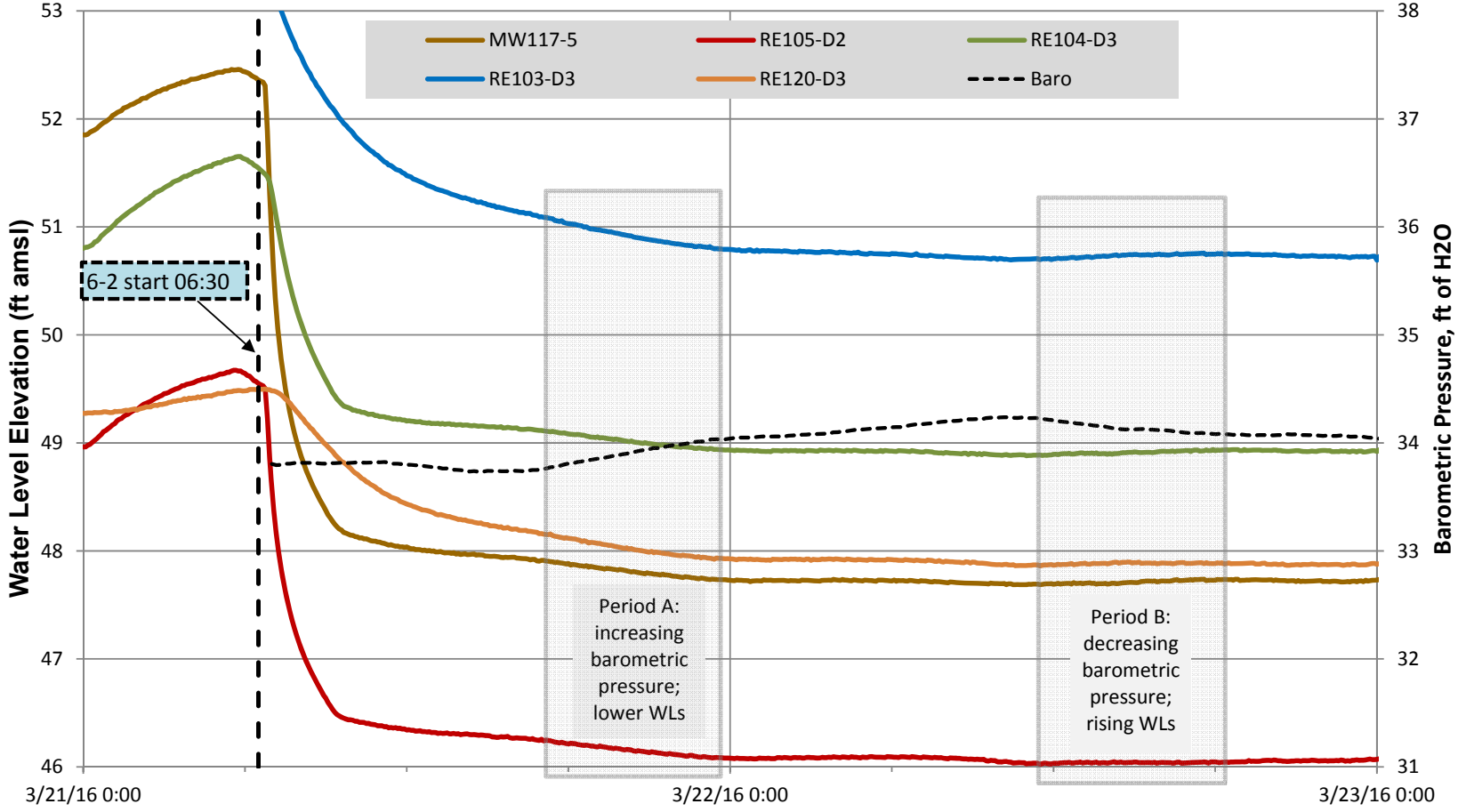


Figure A-14. Week #3 Hydrographs & Barometric Pressure
Deep Wells

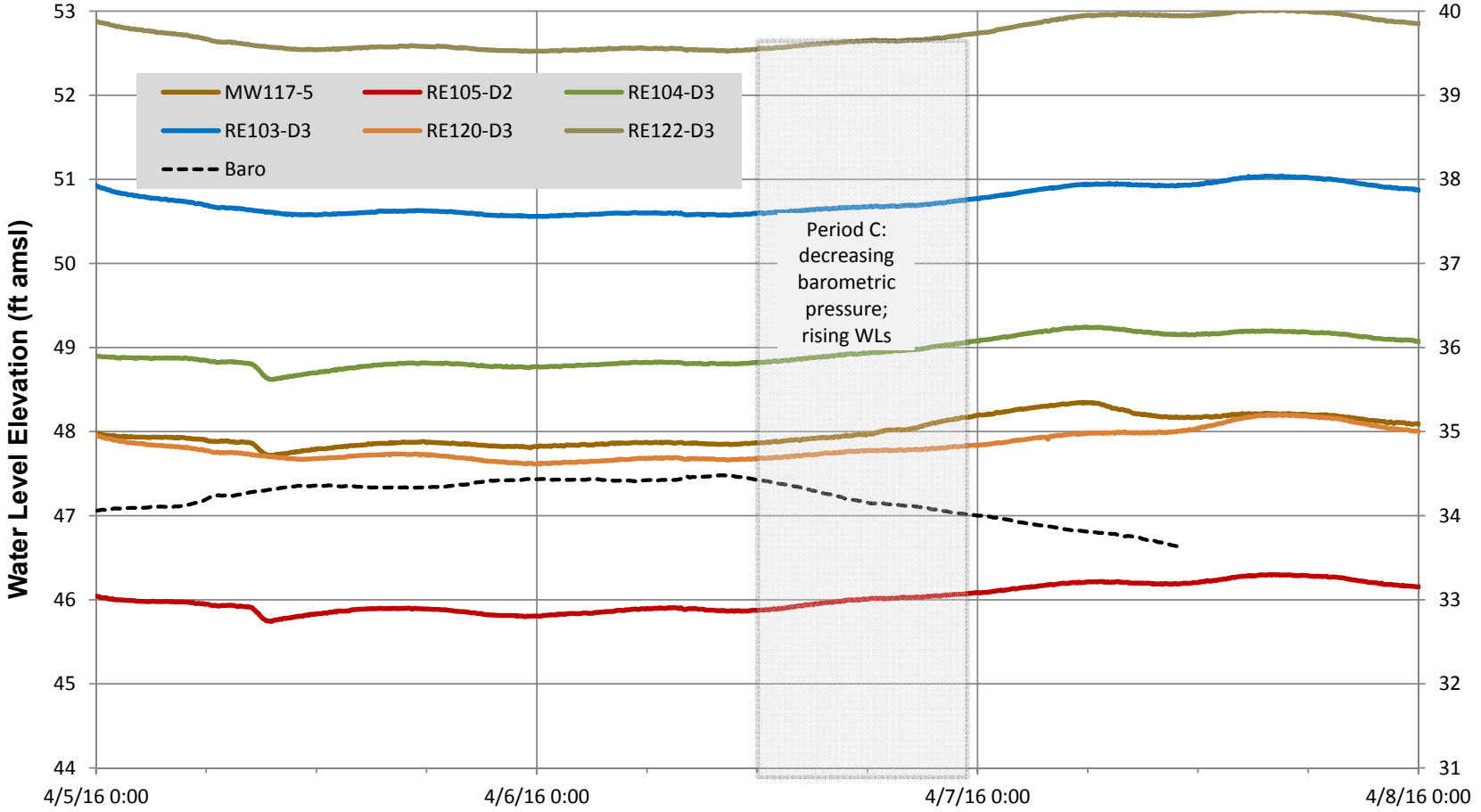


Figure A-15. Period A - Change in Barometric Pressure vs Change in WLs

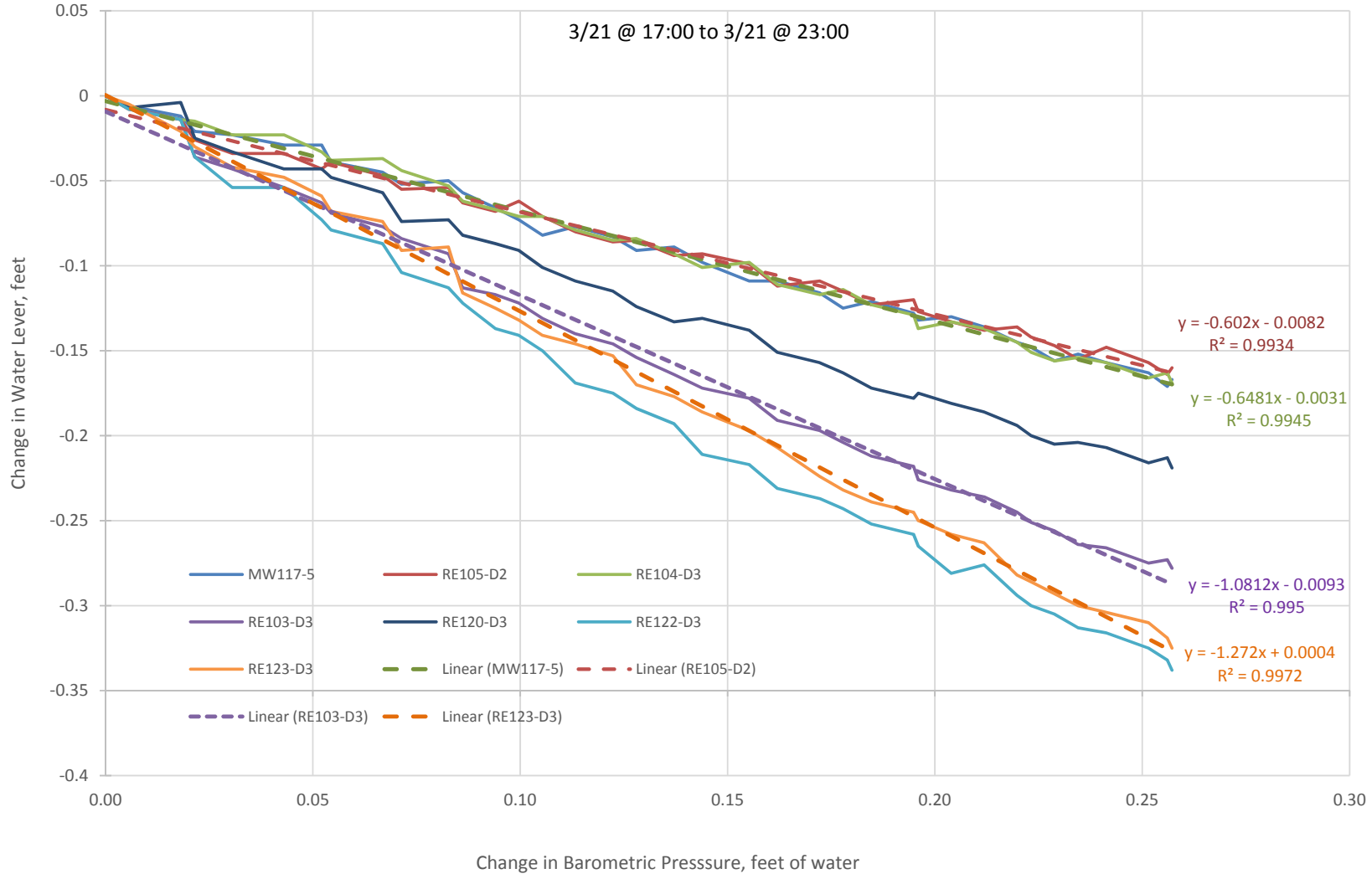


Figure A-16. Period B - Change in Barometric Pressure vs Change in WLs

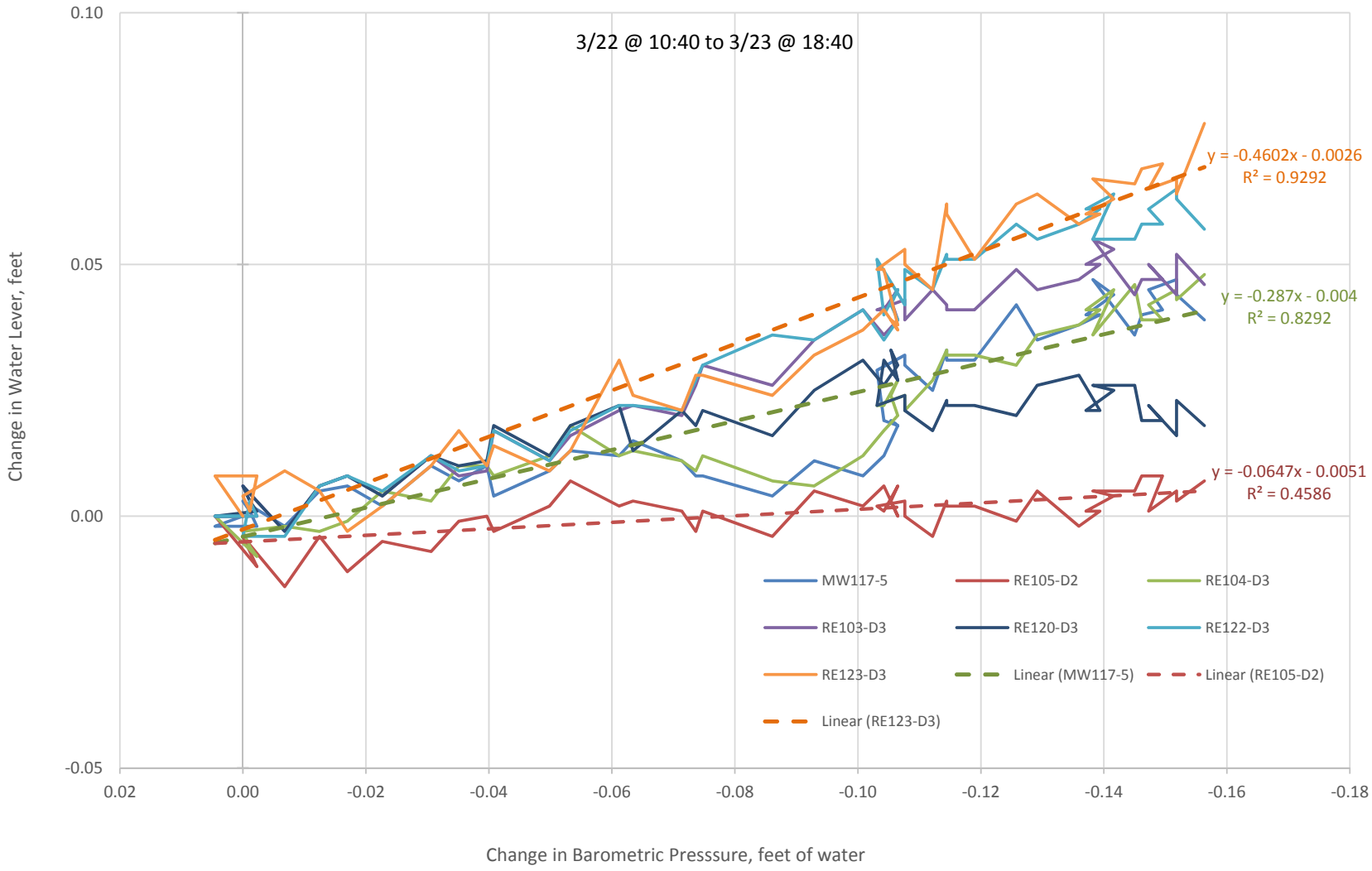
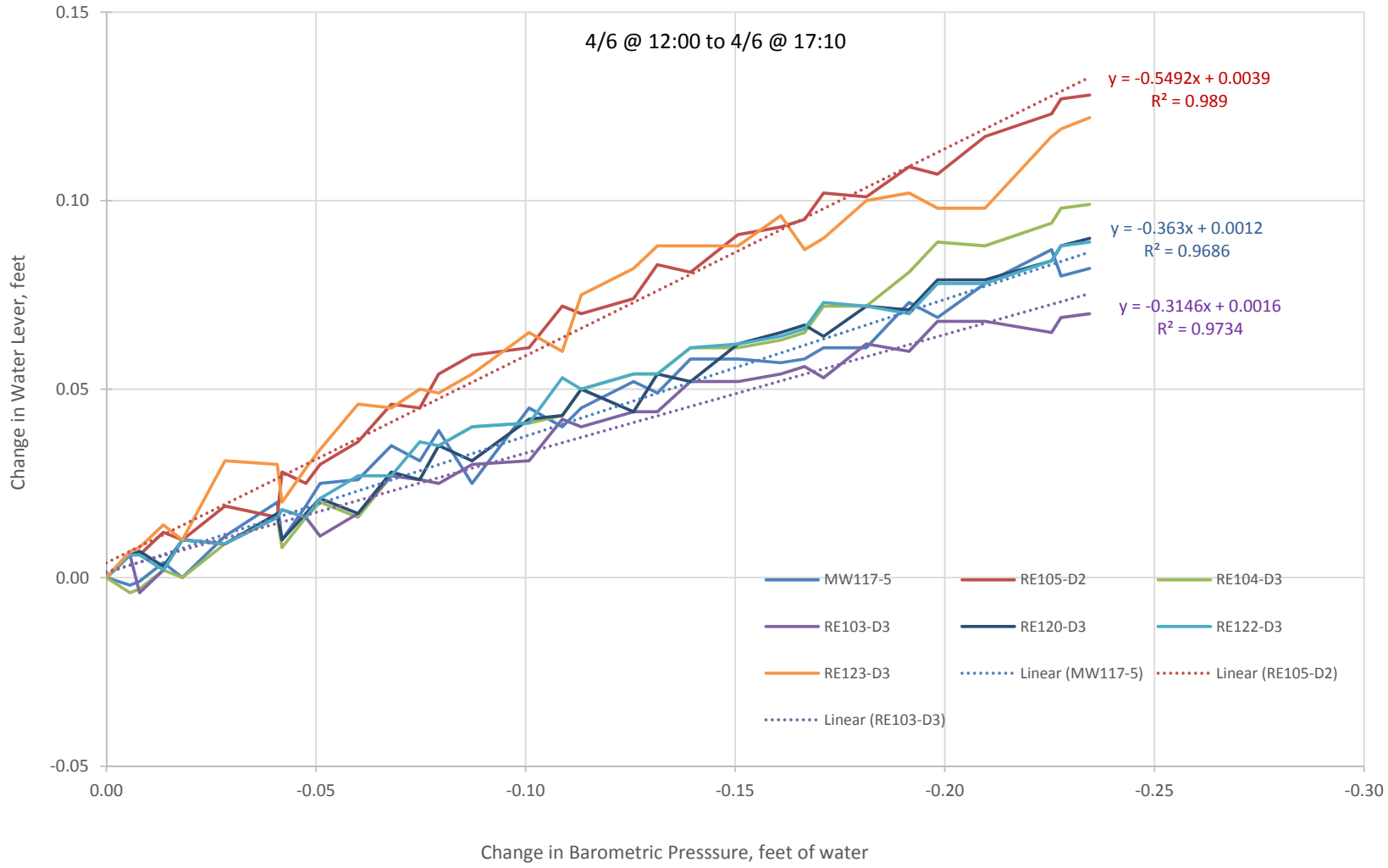


Figure A-17. Period C - Change in Barometric Pressure vs Change in WLs



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ATTACHMENT B

Pumping Well Records and

Environmental Sequence Stratigraphy (ESS) Memorandum

Well 6-1 Pumping Log

Date	Time on	Time Off	Hours Run	Flow Rate (gpm)	Interval Pumpage (K Gal)	Daily Pumpage (K Gal)	Comments
3/1/2016	11:00	14:00	3:00	1217	219.06	219.06	
3/3/2016	9:00	12:00	3:00	1215	218.70	218.70	
3/5/2016	9:00	12:00	3:00	1216	218.88	218.88	
3/7/2016	9:00	12:00	3:00	1219	219.42	219.42	
3/9/2016	9:00	12:00	3:00	1217	219.06		
3/9/2016	14:30	16:21	1:51	1228	136.31	355.37	
3/11/2016	9:00	12:00	3:00	1217	219.06	219.06	
3/13/2016	9:00	12:00	3:00	1217	219.06	219.06	
3/15/2016	9:00	12:00	3:00	1216	218.88	218.88	
3/17/2016	9:00	12:00	3:00	1222	219.96	219.96	
			Pilot Started				
3/25/2016	**10:15**	**10:45**	**0:30**	**1222**	**36.66**	**219.96**	**Sampling**
3/28/2016	**0:00**	**23:59**	**23:59**	**1212**	**1744.07**	**1744.07**	
3/29/2016	**0:00**	**23:59**	**23:59**	**1208**	**1738.31**	**1738.31**	
3/30/2016	**0:00**	**23:59**	**23:59**	**1209**	**1739.75**	**1739.75**	
3/31/2016	**0:00**	**23:59**	**23:59**	**1205**	**1734.00**	**1734.00**	
4/1/2016	**0:00**	**12:01**	**12:01**	**1207**	**870.25**	**870.25**	**Sampling**
			0:00				
4/8/2016	**9:15**	**9:45**	**0:30**	**1230**	**36.90**	**36.90**	**Sampling**
			0:00				
4/11/2016	**0:00**	**23:59**	**23:59**	**1211**	**1742.63**	**1742.63**	
4/12/2016	**0:00**	**23:59**	**23:59**	**1210**	**1741.19**	**1741.19**	
4/13/2016	**0:00**	**23:59**	**23:59**	**1208**	**1738.31**	**1738.31**	
4/14/2015	**0:00**	**23:59**	**23:59**	**1210**	**1741.19**	**1741.19**	
4/15/2016	**0:00**	**11:00**	**11:00**	**1207**	**796.62**	**796.62**	
			0:00				
4/22/2016	**10:00**	**10:30**	**0:30**	**1230**	**36.90**	**36.90**	**Sampling**
			0:00				
4/29/2016	**8:30**	**9:00**	**0:30**	**1225**	**36.75**	**36.75**	**Sampling**
5/1/2016	10:00	13:00	3:00	1213	218.34	218.34	

Well 6-2 Pumping Log

Date	Time on	Time Off	Hours Run	Flow Rate (gpm)	Interval Pumpage (K Gal)	Daily Pumpage (K Gal)	Comments
3/2/2016	9:00	12:00	3:00	1157	208.26	208.26	
3/4/2016	9:00	12:00	3:00	1158	208.44	208.44	
3/6/2016	9:00	12:00	3:00	1157	208.26	208.26	
3/8/2016	9:00	12:00	3:00	1158	208.44	208.44	
3/10/2016	9:00	12:00	3:00	1154	207.72	207.72	
3/12/2016	9:00	12:00	3:00	1155	207.90	207.90	
3/14/2016	9:00	12:00	3:00	1160	208.80	208.80	
3/16/2016	9:00	12:00	3:00	1150	207.00	207.00	
3/18/2016	9:00	12:00	3:00	1161	208.98	208.98	
			Pilot Started				
3/21/2016	6:30	24:00:00	17:30	1152	1209.60	1209.60	
3/22/2016	0:01	24:00:00	23:59	1151	1656.29	1656.29	
3/23/2016	0:01	24:00:00	23:59	1152	1657.73	1657.73	
3/24/2016	0:01	24:00:00	23:59	1148	1651.97	1651.97	
3/25/2016	0:00	10:45	10:45	1154	744.33	744.33	Sampling
4/1/2016	11:00	11:30	0:30	1154	34.62	34.62	Routine
4/4/2016	0:00	18:00	18:00	1153	1245.24		
4/4/2016	19:30	24:00:00	4:30	1156	312.12	1557.36	
4/5/2016	0:00	23:59:00	23:59	1156	1663.48	1663.48	
4/6/2016	0:00	23:59	23:59	1153	1659.17	1659.17	
4/7/2016	0:00	23:59	23:59	1154	1660.61	1660.61	
4/8/2016	0:00	12:00	12:00	1153	830.16	830.16	Sampling
			0:00				
4/15/2016	10:00	10:30	0:30	1155	34.65	34.65	Sampling
			0:00				
4/18/2016	0:00	23:59	23:59	1149	1653.41	1653.41	
4/19/2016	0:00	23:59	23:59	1152	1657.73	1657.73	
4/20/2016	0:00	23:59	23:59	1151	1656.29	1656.29	
4/21/2016	0:00	23:59	23:59	1152	1657.73	1657.73	
4/22/2016	0:00	23:59	23:59	1148	1651.97	1651.97	Sampling
4/23/2016	0:00	23:59	23:59	1151	1656.29	1656.29	
4/24/2016	0:00	23:59	23:59	1150	1654.85	1654.85	
4/25/2016	0:00	23:59	23:59	1146	1649.09	1649.09	
4/26/2016	0:00	23:59	23:59	1145	1647.66	1647.66	
4/27/2016	0:00	23:59	23:59	1153	1659.17	1659.17	
4/28/2019	0:00	23:59	23:59	1154	1660.61	1660.61	
4/29/2016	0:00	12:00	12:00	1149	827.28	827.28	Sampling
4/30/2016	10:00	13:00	3:00	1155	207.90	207.90	
5/2/2016	10:00	13:00	3:00	1150	207.00	207.00	

Well 4-1 Pumping Log

Date	Time on	Time Off	Hours Run	Flow Rate (gpm)	Interval Pumpage (K Gal)	Daily Pumpage (K Gal)	Comments
11/2/2015	8:00	9:00	1:00	0	0.00		*SAMPLING TO WASTE*
12/3/2015	7:30	9:30	2:00	0	0.00		*SAMPLING TO WASTE*
12/7/2015	1:00	3:45	2:45	0	0.00		
1/3/2016	8:00	12:00	4:00	0	0.00	0.00	
1/4/2016	7:30	9:30	2:00	0	0.00		*SAMPLING TO WASTE*
2/1/2016	8:30	9:30	1:00	0	0.00		*SAMPLING TO WASTE*
3/1/2016	8:00	9:10	1:10	0	0.00		*SAMPLING TO WASTE*
4/4/2016	7:30	10:30	3:00	0	0.00		*SAMPLING TO WASTE*
5/2/2016	6:30	9:30	3:00	0	0.00	0.00	*SAMPLING TO WASTE*

Well 4-2 Pumping Log

Date	Time on	Time Off	Hours Run	Flow Rate (gpm)	Interval Pumpage (K Gal)	Daily Pumpage (K Gal)	Comments	Hr/day
3/1/2016	0:00	2:00	2:00	1190	142.80			
3/1/2016	5:30	10:22	4:52	1178	343.98			
3/1/2016	16:00	24:00:00	8:00	1191	571.68	1058.46		
3/2/2016	0:00	2:26	2:26	1194	174.32			
3/2/2016	6:00	9:10	3:10	1195	227.05			
3/2/2016	13:00	14:32	1:32	1195	109.94			
3/2/2016	16:00	16:51	0:51	1199	61.15			
3/2/2016	19:30	24:00:00	4:30	1199	323.73	896.19		
3/3/2016	0:00	0:11	0:11	1194	13.13			
3/3/2016	5:00	9:09	4:09	1193	297.06			
3/3/2016	12:30	14:17	1:47	1196	127.97			
3/3/2016	16:00	24:00:00	8:00	1192	572.16	1010.32		
3/4/2016	0:00	0:45	0:45	1194	53.73			
3/4/2016	5:30	8:46	3:16	1190	233.24			
3/4/2016	13:00	14:29	1:29	1196	106.44			
3/4/2016	16:00	24:00:00	8:00	1191	571.68	965.09		
3/5/2016	0:00	0:30	0:30	1194	35.82			
3/5/2016	6:00	7:42	1:42	1193	121.69			
3/5/2016	9:30	11:41	2:11	1194	156.41			
3/5/2016	12:30	13:18	0:48	1179	56.59	370.51		
3/7/2016	9:00	10:24	1:24	1201	100.88			
3/7/2016	12:30	14:18	1:48	1200	129.60			
3/7/2016	16:00	24:00:00	8:00	1200	576.00	806.48		
3/8/2016	0:00	2:00	2:00	1194	143.28			
3/8/2016	5:30	6:39	1:09	1196	82.52			
3/8/2016	11:00	24:00:00	13:00	1191	928.98	1154.78		
3/9/2016	5:00	8:59	3:59	1192	284.89			
3/9/2016	12:30	15:35	3:05	1195	221.08			
3/9/2016	17:00	24:00:00	7:00	1194	501.48	1007.44		
3/10/2016	0:00	2:48	2:48	1190	199.92			
3/10/2016	6:00	9:21	3:21	1192	239.59			
3/10/2016	12:30	14:19	1:49	1194	130.15			
3/10/2016	16:00	23:44	7:44	1195	554.48	1124.14		
3/11/2016	5:30	8:44	3:14	1191	231.05			
3/11/2016	13:00	14:19	1:19	1196	94.48			
3/11/2016	16:00	22:38	6:38	1196	476.01			
3/11/2016	23:30	24:00:00	0:30	1195	35.85	837.40		
3/12/2016	0:00	1:18	1:18	1194	93.13			
3/12/2016	6:30	8:02	1:32	1195	109.94			
3/12/2016	10:00	11:41	1:41	1193	120.49			
3/12/2016	12:00	15:21	3:21	1190	239.19			
3/12/2016	16:00	22:47	6:47	1192	485.14	1047.90		
3/13/2016	0:30	1:48	1:18	1195	93.21			
3/13/2016	11:00	16:49	5:49	1195	417.06			
3/13/2016	17:00	24:00:00	7:00	1194	501.48	1011.75		
3/14/2016	6:00	8:19	2:19	1196	166.24			
3/14/2016	13:00	15:04	2:04	1184	146.82			

Well 4-2 Pumping Log

Date	Time on	Time Off	Hours Run	Flow Rate (gpm)	Interval Pumpage (K Gal)	Daily Pumpage (K Gal)	Comments	Hr/day
3/14/2016	17:00	23:55	6:55	1200	498.00	811.06		
3/15/2016	5:30	8:10	2:40	1198	191.68	191.68		
3/16/2016	9:30	10:57	1:27	1196	104.05			
3/16/2016	13:00	14:59	1:59	1192	141.85	245.90		
3/17/2016	13:00	14:33	1:33	1207	112.25			
3/17/2016	17:30	24:00:00	6:30	1194	465.66	577.91		
3/18/2016	0:00	3:18	3:18	1194	236.41			
3/18/2016	6:30	8:41	2:11	1199	157.07	393.48		
3/20/2016	11:00	12:51	1:51	1195	132.65	132.645		
			Pilot Started					
3/25/2016	10:30	24:00:00	13:30	1198	970.38	970.38		
3/26/2016	0:00	0:27	0:27	1200	32.40			
3/26/2016	2:00	3:30	1:30	1209	108.81			
3/26/2016	6:00	24:00:00	18:00	1190	1285.20	1426.41		19:57
3/27/2016	0:00	1:02	1:02	1190	73.78			
3/27/2016	2:30	4:00	1:30	1195	107.55			
3/27/2016	6:00	8:00	2:00	1199	143.88			
3/27/2016	9:30	24:00:00	14:30	1194	1038.78	1363.99		19:02
4/1/2016	16:00	21:17	5:17	1216	385.47			
4/1/2016	22:00	24:00:00	2:00	1205	144.60	530.07		7:17
4/2/2016	0:00	0:08	0:08	1205	9.64			
4/2/2016	7:30	14:10	6:40	1196	478.40			
4/2/2016	15:30	21:10	5:40	1191	404.94			
4/2/2016	22:30	24:00:00	1:30	1196	107.64	1000.62		13:58
4/3/2016	0:00	0:19	0:19	1196	22.72			
4/3/2016	10:00	11:36	1:36	1197	114.91			
4/3/2016	12:00	14:03	2:03	1199	147.48			
4/3/2016	15:00	23:44	8:44	1198	627.75	912.87		12:42
4/4/2016	**10:00**	**10:52**	**0:52**	**1239**	**64.43**		**Sampling**	
4/4/2016	19:00	21:12	2:12	1201	158.53	222.96		3:04
4/8/2016	15:30	22:35	7:05	1220	518.50	518.5		
4/9/2016	1:00	2:31	1:31	1223	111.29			
4/9/2016	7:00	13:19	6:19	1216	460.86			
4/9/2016	15:30	21:00	5:30	1215	400.95			
4/9/2016	22:00	23:59	1:59	1216	144.70	1117.81		15:19
4/10/2016	6:30	13:08	6:38	1198	476.80			
4/10/2016	15:30	23:38	8:08	1206	588.53	1065.33		14:46
4/15/2016	11:30	13:17	1:47	1219	130.43			
4/15/2016	14:00	22:39	8:39	1221	633.70	764.13		16:46
4/16/2016	0:00	1:25	1:25	1249	106.17			
4/16/2016	4:00	5:59	1:59	1223	145.54			
4/16/2016	7:00	8:23	1:23	1249	103.67			
4/16/2016	9:30	12:11	2:41	1217	195.94			
4/16/2016	13:00	18:17	5:17	1218	386.11			
4/16/2016	19:00	23:31	4:31	1211	328.18	1265.59		17:16
4/17/2016	2:00	3:18	1:18	1226	95.63			
4/17/2016	4:30	6:33	2:03	1220	150.06			

Well 4-2 Pumping Log

Date	Time on	Time Off	Hours Run	Flow Rate (gpm)	Interval Pumpage (K Gal)	Daily Pumpage (K Gal)	Comments	Hr/day
4/17/2016	9:30	12:44	3:14	1215	235.71			
4/17/2016	13:30	16:21	2:51	1213	207.42			
4/17/2016	16:30	19:56	3:26	1218	250.91			
4/17/2016	20:30	24:00:00	3:30	1212	254.52	1194.25		16:22
4/18/2016	17:30	19:17	1:47	1225	131.08			
4/18/2016	21:00	22:09	1:09	1225	84.52	215.60		2:56
4/19/2016	6:00	8:53	2:53	1217	210.54			
4/19/2016	18:30	20:18	1:48	1225	132.30	342.84		4:41
4/20/2016	5:30	9:12	3:42	1217	270.17			
4/20/2016	18:00	19:28	1:28	1222	107.54			
4/20/2016	21:00	22:18	1:18	1236	96.41	474.12		6:28
4/21/2016	4:30	9:18	4:48	1218	350.78			
4/21/2016	18:00	20:03	2:03	1238	152.27	503.06		9:38
4/22/2016	4:30	8:56	4:26	1221	324.79			
4/22/2016	11:00	12:10	1:10	1220	85.40			
4/22/2016	18:00	19:48	1:48	1222	131.98	542.16		7:24
4/23/2016	4:00	5:48	1:48	1222	131.98			
4/23/2016	11:00	12:19	1:19	1221	96.46	228.44		3:07
4/24/2016	4:00	6:55	2:55	1224	214.20			
4/24/2016	9:30	12:33	3:03	1221	223.44			
4/24/2016	15:30	17:08	1:38	1222	119.76			
4/24/2016	18:00	19:54	1:54	1222	139.31	696.71		9:30
4/25/2016	4:00	6:42	2:42	1227	198.77			
4/25/2016	7:30	9:31	2:01	1228	148.59			
4/25/2016	12:00	13:06	1:06	1311	86.53			
4/25/2016	20:30	21:47	1:17	1280	98.56	532.45		7:06
4/26/2016	3:00	7:26	4:26	1223	325.32	325.318		
4/27/2016	4:30	8:29	3:59	1221	291.82	291.819		
4/28/2016	3:30	8:46	5:16	1189	375.72			
4/28/2016	9:30	10:05	0:35	1189	41.62	417.34		5:51
4/29/2016	3:30	6:30	3:00	1218	219.24			
4/29/2016	7:00	9:00	2:00	1215	145.80			
4/29/2016	14:30	23:26	8:56	1220	653.92	1018.96		13:56
4/30/2016	0:30	7:45	7:15	1219	530.27			
4/30/2016	8:00	10:21	2:21	1218	171.74			
4/30/2016	11:30	12:59	1:29	1216	108.22			
4/30/2016	14:00	16:42	2:42	1215	196.83			
4/30/2016	17:00	23:59	6:59	1220	511.18	1518.24		20:46
5/1/2016	0:00	0:30	0:30	1219	36.57			
5/1/2016	1:30	7:49	6:19	1218	461.62			
5/1/2016	10:30	11:20	0:50	1217	60.85			
5/1/2016	13:30	24:00:00	10:30	1220	768.60	1327.64		18:09
5/2/2016	1:00	11:35	10:35	1212	769.62			
5/2/2016	15:00	24:00:00	9:00	1216	656.64	1426.26		8:03

Well 5-1 Pumping Log

Date	Time on	Time Off	Hours Run	Flow Rate (gpm)	Interval Pumpage (K Gal)	Daily Pumpage (K Gal)	Comments	Hr/day
10/27/2015	19:02	22:30	3:28	1192	247.94	247.94		
3/1/2016	9:00	11:15	2:15	1188	160.38	160.38		
3/2/2016	7:00	9:16	2:16	1192	162.11	162.11		
3/3/2016	7:00	9:15	2:15	1196	161.46	161.46		
3/4/2016	7:00	9:21	2:21	1196	168.64	168.64		
3/5/2016	7:00	9:15	2:15	1197	161.60			
3/5/2016	15:30	18:00	2:30	1198	179.70	341.30		
3/6/2016	7:00	9:15	2:15	1201	162.14	162.14		
3/7/2016	7:00	9:15	2:15	1202	162.27	162.27		
3/8/2016	6:00	9:15	3:15	1201	234.20	234.20		
3/9/2001	7:00	9:15	2:15	1197	161.60	161.60		
3/10/2016	7:00	9:15	2:15	1196	161.46	161.46		
3/11/2016	7:00	9:15	2:15	1198	161.73	161.73		
3/12/2016	7:00	9:16	2:16	1196	162.66	162.66		
3/13/2016	7:00	9:15	2:15	1202	162.27	162.27		
3/14/2016	7:00	9:15	2:15	1196	161.46	161.46		
3/15/2016	7:00	9:15	2:15	1194	161.19			
3/15/2016	12:30	15:52	3:22	1195	241.39			
3/15/2016	17:00	24:00:00	7:00	1200	504.00	906.58		
3/16/2016	0:00	0:25	0:25	1200	30.00			
3/16/2016	6:00	9:51	3:51	1198	276.74			
3/16/2016	12:30	13:54	1:24	1200	100.80			
3/16/2016	17:00	23:57	6:57	1198	499.57	907.10		
3/17/2016	5:30	10:00	4:30	1197	323.19			
3/17/2016	13:00	13:43	0:43	1206	51.86			
3/17/2016	17:00	18:15	1:15	1207	90.52	465.57		
3/18/2016	6:00	9:41	3:41	1201	265.42			
3/18/2016	12:30	14:05	1:35	1204	114.38			
3/18/2016	16:30	22:50	6:20	1202	456.76	836.56		
3/19/2016	0:30	1:50	1:20	1204	96.32			
3/19/2016	6:30	15:02	8:32	1202	615.42			
3/19/2016	16:30	22:49	6:19	1198	454.04	1165.79		16:11
3/20/2016	0:00	1:44	1:44	1204	125.22			
3/20/2016	7:00	12:29	5:29	1204	396.12			
3/20/2016	13:00	14:51	1:51	1203	133.53			
3/20/2016	16:30	23:59	7:29	1204	540.60	1195.46		16:33
			Pilot Started					
3/21/2016	5:30	9:15	3:45	1203	270.68	270.68		
3/23/2016	9:00	10:00	1:00	1205	72.30	72.30		
3/24/2016	9:00	10:41	1:41	1203	121.50	121.50		
3/26/2016	9:30	12:15	2:45	1198	197.67	197.67		
3/27/2016	7:00	10:42	3:42	1201	266.62			
3/27/2016	11:30	13:03	1:33	1198	111.41	378.04		5:15
4/1/2016	12:00	14:00	2:00	1201	144.12	144.12		
4/2/2016	12:00	14:00	2:00	1199	143.88	143.88		
4/3/2016	7:30	11:16	3:46	1201	271.43	271.43		
4/5/2016	**8:00**	**9:00**	**1:00**	**1208**	**72.48**	**72.48**	**Sampling**	
4/8/2016	12:30	14:00	1:30	1203	108.27	108.27		

Well 5-1 Pumping Log

Date	Time on	Time Off	Hours Run	Flow Rate (gpm)	Interval Pumpage (K Gal)	Daily Pumpage (K Gal)	Comments	Hr/day
4/9/2016	12:00	14:00	2:00	1197	143.64	143.64		
4/10/2016	12:00	14:00	2:00	1194	143.28	143.28		
4/16/2016	7:00	11:50	4:50	1200	348.00			
4/16/2016	16:30	17:55	1:25	1198	101.83	449.83		6:15
4/17/2016	7:00	12:24	5:24	1198	388.15			
4/17/2016	14:00	15:59	1:59	1194	142.09			
4/17/2016	17:30	19:35	2:05	1196	149.50	679.74		9:28
4/18/2016	7:00	8:55	1:55	1199	137.89	137.89		
4/25/2016	5:00	6:20	1:20	1199	95.92	95.92		
4/27/2016	8:00	10:00	2:00	1189	142.68	142.68		
4/28/2016	8:00	9:30	1:30	1188	106.92	106.92		
4/29/2016	4:30	6:08	1:38	1187	116.33			
4/29/2016	8:00	11:22	3:22	1191	240.58	356.91		5:00
4/30/2016	4:00	7:17	3:17	1191	234.63			
4/30/2016	8:00	10:00	2:00	1194	143.28			
4/30/2016	14:13	16:17	2:04	1193	147.93	525.84		7:21
5/1/2016	3:00	7:23	4:23	1193	313.76			
5/1/2016	8:00	10:58	2:58	1191	212.00	525.76		7:21
5/2/2016	4:30	8:11	3:41	1195	264.10	264.10		

Arcadis Pumping Log

Date	RW-1 Flowrate (gpm) - average flowrate, calculated	RW-1 Flowrate (gpm) - instantantaneous flowrate, as recorded	**RW-1** Total Flow (gal), as recorded	RW-3 Flowrate (gpm) - average flowrate, calculated	RW-3 Flowrate (gpm) - instantantaneous flowrate, as recorded	**RW-3** Total Flow (gal), as recorded	Discharge Flowrate (gpm) - average flowrate, calculated	Discharge Flowrate (gpm) - instantan-taneous flowrate, as recorded	**Discharge** Total Flow (gal), as recorded		**NOTES**
Mar-16 (3/1/16-4/1/16)											
3/2/16 3:15 PM	936	975	23081496	0		5634117	968	1204	29506131		
3/7/16 3:00 PM	973	968	23151383	0		5634117	997	1183	29577791		
3/8/16 3:15 PM	963	967	23165390	7	200	5634224	993	1215	29592240		3/8 -ran RW-3 for ~1 hr at ~200 gpm (reduced flow of RW-1 to 800 gpm while RW-3 operating).
3/15/16 3:15 PM	977	981	23263891	0		5634224	1002	1187	29693252		(RW-3 on from ~0700-0800)
3/22/16 3:20 PM	975	999	23362199	1	200	5634358	1035	1182	29797664		3/22 - ran RW-3 for 1 hr and sampled (reduced flow of RW-1 to 800 gpm while RW-3 operating). Bumped up flow rate on RW-1 up slightly after.
3/29/16 8:30 AM	998	989	23458669	0		5634358	984	1154	29892805		(RW-3 on from 1222-1332)
3/30/16 3:00 PM	1008	981	23477114	0		5634358	1030	1140	29911660		
4/1/16 12:00 AM	1473	1004	23506273	0		5634358	1506	1148	29941482		
Monthly Effective Flowrate (gpm)	**982**	**RW-1 Monthly Total Flow (gal) =**	**43,852,500**	**0.5**	**RW-3 Monthly Total Flow (gal) =**	**24,100**	**1007**	**Discharge Monthly Total Flow (gal) =**	**44,942,850**		
Monthly Average Flowrate (gpm)	982			201			1007				Total Downtime (Sytem = RW1) in Mar = 0 hrs
Apr-16 (4/1/16-5/1/16)											
4/4/16 3:40 PM	814	995	23549097	0		5634358	833	1156	29985295		
4/6/16 3:00 PM	995	1003	23577364	0		5634358	1019	1187	30014230		
4/7/16 2:00 PM	1006	1001	23591244	0		5634358	1028	1164	30028423		
4/12/16 2:00 PM	994	998	23662795	0		5634358	1016	1142	30101594		
4/19/16 3:00 PM	994	995	23763576	0		5634358	1017	1135	30204731		
4/20/16 2:30 PM	997	991	23777633	0		5634358	1017	1158	30219077		4/20 - Resolution collects RW-1 sample
4/21/16 2:00 PM	989	997	23791574	0		5634358	1026	1134	30233545		
4/22/16 12:45 PM	1003	992	23805265	0		5634358	1012	1134	30247360		4/22 - alarm call out ~1658 - log in remotely, RW-1 offline, restart remotely no issues - downtime ~15 min?
4/25/16 2:30 PM	988	994	23848965	0		5634358	1010	1134	30292069		4/23 - alarm call out at ~0425, arrive on site at 0650, system operating normally - assume nominal downtime for power interruption?
4/29/16 1:00 PM	998	989	23905574	0		5634358	1021	1157	30349950		
5/1/16 12:00 AM	994		23926438	0		5634358	1016		30371291		
Monthly Effective Flowrate (gpm)	**973**	**RW-1 Monthly Total Flow (gal) =**	**42,016,518**	**0.0**	**RW-3 Monthly Total Flow (gal) =**	**0**	**995**	**Discharge Monthly Total Flow (gal) =**	**42,980,880**		
Monthly Average Flowrate (gpm)	973			0			996				Total Downtime (Sytem = RW1) in April = 0.5 hrs

Table 1. ONCT Average Daily Well Flow Rates for April through June 2016, Operable Unit 2, Northrop Grumman, Bethpage, NY.

	Average Daily Flow Rate[1]				
	Well 1	**Well 3R**	**Well 17**	**Well 18**	**Well 19**
Design flow (gpm)	**700**	**800**	**1000**	**600**	**700**
Date					
04/01/16	823	939	1059 [2]	1010 [2]	735
04/02/16	855 [3]	977 [3]	1060 [2]	1010 [2]	735
04/03/16	798	902	1060 [2]	1010 [2]	735
04/04/16	858	978	1059 [2]	1010 [2]	721
04/05/16	858	978	1060 [2]	1010 [2]	720
04/06/16	858	979	1059 [2]	1010 [2]	721
04/07/16	858	978	1057 [3]	1025 [3]	720 [3]
04/08/16	855 [3]	976 [3]	1056 [3]	1025 [3]	720 [3]
04/09/16	855 [3]	977 [3]	1056 [3]	1025 [3]	719 [3]
04/10/16	855 [3]	977 [3]	1057 [3]	1025 [3]	720 [3]
04/11/16	862 [3]	977 [3]	1053 [3]	1020 [3]	730 [3]
04/12/16	859	979	1053 [3]	1022	733
04/13/16	591	687	538	1020	732
04/14/16	645	741	931	915	644
04/15/16	76	126	1057	1022	733
04/16/16	0	0	1057	1022	733
04/17/16	0	0	1053	1018	730
04/18/16	0	0	1056	1021	733
04/19/16	455	519	1059	1023	734
04/20/16	856	975	1053	1018	731
04/21/16	669	895	916	866	751
04/22/16	592	978	718	469	893
04/23/16	0 [4]	976	0 [4]	0	1000
04/24/16	0 [4]	975	0 [4]	0	1001
04/25/16	565	772	927	593	892
04/26/16	482	726	1053	1016	800
04/27/16	858	980	1029	1006	765
04/28/16	854	974	1056	1021	803
04/29/16	856	976	967	939	736
04/30/16	858	980	1057	1020	803
05/01/16	857	977	1055	1021	800
05/02/16	856	978	1055	1019	800
05/03/16	860	981	1055	1021	800
05/04/16	844	969	1053	1018	799
05/05/16	855	978	1056	1021	801
05/06/16	858	978	833	852	630
05/07/16	856	977	0	0	0
05/08/16	858	979	13	272	10
05/09/16	857	978	791	851	600
05/10/16	855	977	629	748	485
05/11/16	840	958	810	827	633
05/12/16	858	978	1057	1021	802
05/13/16	858	980	1057	1023	803
05/14/16	857	977	1057	1021	802
05/15/16	858	978	1055	1019	800
05/16/16	858 [3]	976 [3]	1057	1021	803
05/17/16	855	975	1055	1021	800
05/18/16	853	973	1050	1014	796
05/19/16	861	982	1057	1022	802

Notes on last page

Table 1. ONCT Average Daily Well Flow Rates for April through June 2016, Operable Unit 2, Northrop Grumman, Bethpage, NY.

	Average Daily Flow Rate[1]				
	Well 1	**Well 3R**	**Well 17**	**Well 18**	**Well 19**
Design flow (gpm)	**700**	**800**	**1000**	**600**	**700**
Date					
05/20/16	855	975	1055	1019	800
05/21/16	856	977	1055	1021	801
05/22/16	856	976	1056	1021	801
05/23/16	855	975	1055	1019	800
05/24/16	866	980	1057	1023	803
05/25/16	856	976	1057	1021	802
05/26/16	855	975	1047	1013	793
05/27/16	858	979	1023	992	776
05/28/16	856	976	1053	1019	800
05/29/16	858	978	1059	1023	803
05/30/16	859	980	1059	1023	803
05/31/16	856	976	1055	1020	800
06/01/16	856	977	1056	1021	801
06/02/16	856	975	1054	1020	800
06/03/16	858	978	1057	1022	803
06/04/16	856	976	1055	1021	801
06/05/16	858	978	307	448	232
06/06/16	856	976	818	836	621
06/07/16	856	976	1055	1019	800
06/08/16	859	979	1059	1023	803
06/09/16	858	979	1057	1021	802
06/10/16	856	977	1044	426 [3]	335 [3]
06/11/16	855	975	1052	0	403 [3]
06/12/16	860	981	1060	0	804
06/13/16	858	979	1057	796	801
06/14/16	858	978	1035	1003	790
06/15/16	856	977	896	896	680
06/16/16	859	979	1057	1021	801
06/17/16	858	978	1039	1006	788
06/18/16	858	979	1057	1022	802
06/19/16	859	980	1059	1023	803
06/20/16	858	978	1051	1016	797
06/21/16	859	980	1057	1022	802
06/22/16	857	977	1055	1019	800
06/23/16	857	979	1057	1022	802
06/24/16	859	973	1057	1004	802
06/25/16	854	975	1057	1022	802
06/26/16	858	980	1054	1018	799
06/27/16	858	980	1057	1022	802
06/28/16	857	979	1056	1021	802
06/29/16	857	978	1055	1020	800
06/30/16	858	981	1057	1023	803

Notes:

1. Average daily flow rates calculated from Supervisory Computer And Data Acquisition System (SCADA) daily total flow volumes. Flow rates shown have been scaled (~3-5%) to account for difference observed in SCADA calculated totalized flow and field observed flow for days system was running full time.

2. Daily total flow not reported by SCADA for this location. Average daily flow rate estimated using SCADA well flow trend graph and scaled to field observed flow.

3. Average daily flow rate estimated using field observed flow rate and reconciled against well/treatment system analog recorder charts due to SCADA signal errors.

4. Signal error observed for associated location. System downtime reconciled against well/treatment system analog record charts.

Table 2. Select ONCT Well Downtimes for March 15 through April 2016, Operable Unit 2, Northrop Grumman, Bethpage, NY.

	Downtime Per Day[1]		
	Well 17 (Hours)	Well 18 (Hours)	Well 19 (Hours)
Date			
03/15/16	0	0	0
03/16/16	0	0	0
03/17/16	0	0	0
03/18/16	0.25	0.25	0.25
03/19/16	0	0	0
03/20/16	0	0	0
03/21/16	0	0	0
03/22/16	0	0	0
03/23/16	3	3	3
03/24/16	1	1	1
03/25/16	0	0	0
03/26/16	0	0	0
03/27/16	0	0	0
03/28/16	0.25	0.25	2
03/29/16	0	0	0
03/30/16	0	0	0
03/31/16	0	0	0
04/01/16	0	0	0
04/02/16	0	0	0
04/03/16	0	0	0
04/04/16	0	0	0
04/05/16	0	0	0
04/06/16	0	0	6
04/07/16	0	0	5.5
04/08/16	0.75	0.75	0
04/09/16	0.75	0.75	0.75
04/10/16	0	0	0
04/11/16	0	0	0
04/12/16	0	0	0
04/13/16	0	0	0
04/14/16	3	3	3
04/15/16	0	0	0
04/16/16	0	0	0
04/17/16	0	0	0
04/18/16	0	0	0
04/19/16	0	0	0
04/20/16	0	0	0
04/21/16	4.5	7	0
04/22/16	12	14.5	0
04/23/16	24	24	0
04/24/16	24	24	0
04/25/16	9	12.5	0
04/26/16	0	0	0
04/27/16	1	0.5	0.5
04/28/16	0	3.5	0
04/29/16	2	5	0
04/30/16	0	4	0

Note:

1. Downtimes determined using analog flow recorder charts for time periods shown. Well/treatment system recorder charts were interpreted and the sum of downtime for each location for the day shown is reported.

RESOLUTION CONSULTANTS

Environmental Sequence Stratigraphy (ESS) Memorandum

Environmental Sequence Stratigraphy Overview

Resolution Consultants reviewed the geologic data and regional literature at The Naval Weapons Industrial Reserve Plant at Bethpage, New York and developed four representative base-wide cross sections. This technical memorandum describes the findings of the investigation. The cross sections presented here provide geologic context for groundwater and analytical data and can be used as the framework upon which new and existing datasets (groundwater, analytical chemistry, geophysical data, etc.) can be analyzed to better understand groundwater flow-paths and contaminant transport and storage zones. As such, these sections are an integral component of an effective subsurface conceptual site model (CSM).

The cross sections were developed using Environmental Sequence Stratigraphy (ESS). The ESS approach examines subsurface data in the context of the depositional environments and petroleum industry best practices of sequence stratigraphy and facies models (see ESS Slide Deck – Appendix A). Shown for each data point included in the stratigraphic analysis are a vertical series of colored blocks which correspond to boring log lithology and a continuous data curve (in red or as a scan of a paper document, which corresponds to the gamma log). These colored blocks represent vertical grain size distribution and are the basis for the lithologic correlations between the data points.

The color coded blocks correspond to the graphic grainsize scale as shown in the cross-sections' keys. The width of the block increases with relative grainsize. Block color indicates the textural classification of the sediment (e.g., yellow for sand, green for silt, blue for clay) as written in the field notes of the core logging geologist (see the cross section keys for further definition).

Logs of natural gamma emissions are a common proxy for grainsize. They typically are used as a correlation aide because repetitive spatially extensive trends in grainsize are easily identified visually when curves are examined along a given section. In non-granitic aquifer material, the chemistry of minerals found in clays result in higher concentrations of gamma emitting anions as opposed to the quartz, heavy minerals, and lithic fragments that generally predominate the coarser size fractions. Thus, peaks in the gamma logs can be indicative of clay layers and in general as gamma count per second increases, the grainsize decreases.. Gamma logs should always be "calibrated" by comparing side by side with a lithologic log at representative locations. Good agreement between gamma logs and lithology logs were noted in the data points used for the ESS sections at Bethpage.

Geologic Cross Sections

The previously established general hydrostratigraphy at Bethpage consists of the basal Raritan confining unit, the Magothy aquifer, and the shallow glacial aquifer. The stratigraphy shown in the sections presented in this tech memo are consistent with this general model but additionally shows the Magothy to consist of basal zone gravel-rich channel fills (orange in sections); extensive, planar marine clays (thin units shown in grey and dark green); and silty sands of inter-distributary and delta front origins (shown in tan). Additionally, an erosional incision into the lower delta plain sediments is observed throughout the site (portrayed in sections as a wavy solid black line). Above this, the Magothy sediments are more likely estuarine "incised valley fill" as indicated by the more heterogeneous gamma ray character. In some locations, such as VPB-139 on section A-A', there appears to be clear lithologic control on contaminant distribution within the estuarine facies where the higher TCE and PCE concentrations occur in the coarser lithologic zones.

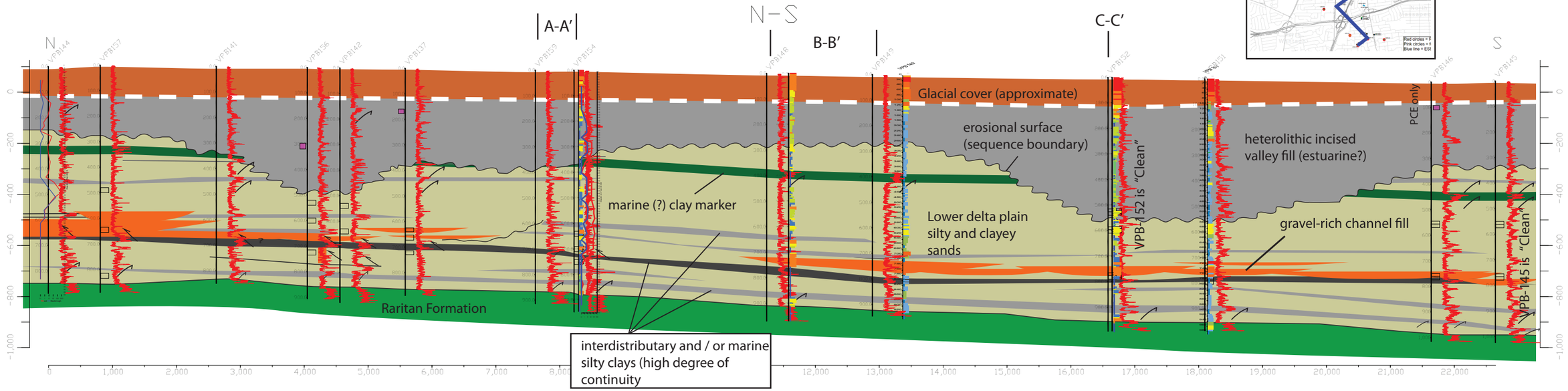
The depositional axis of the incised valley fill likely trends north-south/southeast. The incision is clearly indicated on all sections via the correlation of a prominent clay layer shown in sections in dark green. Where this clay is missing in the gamma logs, it is likely that it was eroded during a lowstand of sea level. Additionally, while relatively planar in their geometry, the major units dip gently south-south east. This is an important geologic characteristic to consider when comparing analytical results because hydrologic zones separated by thin confining layers within the Magothy may be accessed by screens of similar depth.

One of the most important concepts of the ESS approach is to develop and refine the CSM. This allows an understanding of the geology governing groundwater occurrence and movement, and provides an element for refining the approaches for assessment and remediation. The ESS results from this effort suggest that a modern analog (a modern geological setting that allows an understanding of the ancient environment) for the Magothy depositional environments is the Mackenzie River Delta, shown below:

Figures 1 through 4 show the ESS cross sections; the figure legends show the location of each cross section.

Figures

Environmental Sequence Stratigraphy cross section



Existing CSM cross section

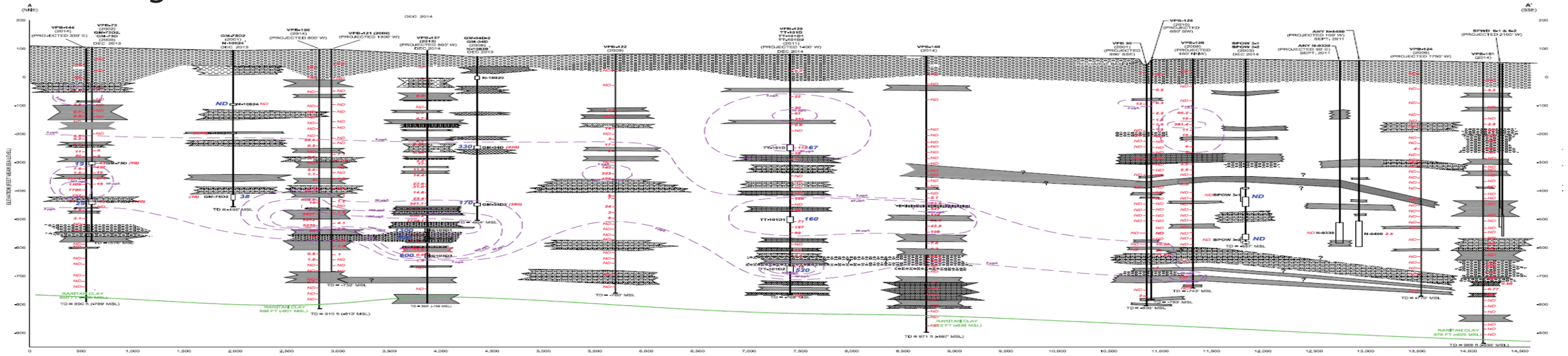


Figure 1. Cross Section N-S

A – A′

West

A

intersection with N-S

VPB-165 | VPB-159 | VPB-154 | VPB-139 | BWD 6-1 | BWD 6-2 | VPB-118 | VPB-46 | VPB-40 | VPB-77 | VPB-119

A′

East

Elevation (Ft.)

100 | 0 | -100 | -200 | -300 | -400 | -500 | -600 | -700 | -800

Apparent lithologic control on TCE and PCE concentrations

Potentially leaky zone in basal clay here

Raritan Formation

Glacial cover (approximate)

heterolithic incised valley fill (estuarine?)

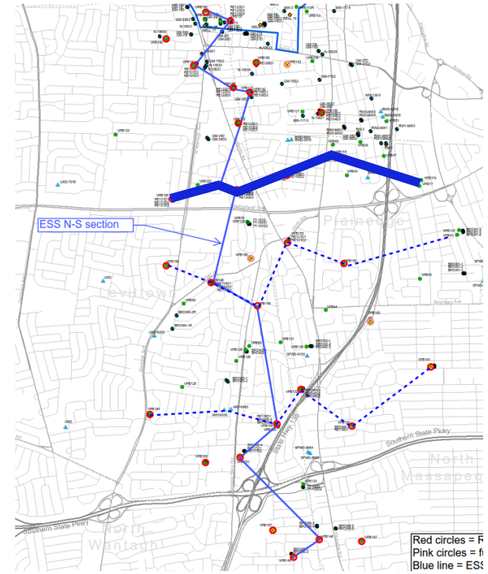
marine (?) clay marker

interdistributary and / or marine silty clays (high degree of continuity (darkest grey clay may serve as base to contaminant)

gravel-rich channel fill

0 | 1,000 | 2,000 | 3,000 | 4,000 | 5,000 | 6,000 | 7,000 | 8,000 | 9,000 | 10,000 | 11,000 | 12,000 | 13,000 | 14,000 | 15,000

Distance



GRAIN SIZE LOG INDEX*

* not all grainsize categories shown in the comprehensive key are present at the site.
Site sediments are predominatly fine (clays, sandy clays, silts,and fine to medium sand)

- Clay
- Clay with 10% Sand
- Clay with 20% Sand
- Clay with 30% Sand
- Clay with 40% Sand
- Clay with Fine Gravel
- Clay with Medium Gravel
- Clay with Coarse Gravel
- Silt
- Silt with 10% Sand
- Silt with 20% Sand
- Sandy Silt
- Silty Sand
- Clayey Sand
- Silty Sand (Fine Sand with 40% Fines)
- Clayey Sand (Fine Sand with 40% Fines)
- Silty Sand (Fine Sand with 30% Fines)
- Clayey Sand (Fine Sand with 30% Fines)
- Silty Sand (Fine Sand with 10-20% Fines)
- Clayey Sand (Fine Sand with 10-20% Fines)
- Gravelly Silt (Silt with Fine Gravel)
- Gravelly Silt (Silt with Medium Gravel)
- Gravelly Silt (Silt with Coarse Gravel)
- Fine Sand
- Silty Sand (Medium Sand with 50% Fines)
- Clayey Sand (Medium Sand with 50% Fines)
- Silty Sand (Medium Sand with 40% Fines)
- Clayey Sand (Medium Sand with 40% Fines)
- Silty Sand (Medium Sand with 30% Fines)
- Clayey Sand (Medium Sand with 30% Fines)
- Silty Sand (Medium Sand with 10-20% Fines)
- Clayey Sand (Medium Sand with 10-20% Fines)
- Fine Sand with Fine Gravel
- Fine Sand with Medium Gravel
- Fine Sand with Coarse Gravel
- Medium Sand
- Silty Sand (Coarse Sand with 50% Fines)
- Clayey Sand (Coarse Sand with 50% Fines)
- Silty Sand (Coarse Sand with 40% Fines)
- Clayey Sand (Coarse Sand with 40% Fines)
- Silty Sand (Coarse Sand with 30% Fines)
- Clayey Sand (Coarse Sand with 30% Fines)
- Silty Sand (Coarse Sand with 10-20% Fines)
- Clayey Sand (Coarse Sand with 10-20% Fines)
- Medium Sand with Fine Gravel
- Medium Sand with Medium Gravel
- Medium Sand with Coarse Gravel
- Coarse Sand
- Coarse Sand with Fine Gravel
- Coarse Sand with Medium Gravel
- Coarse Sand with Coarse Gravel
- Clayey/Silty Gravel (Fine gravel with clay/silt)
- Clayey/Silty Gravel (Medium gravel with clay/silt)
- Clayey/Silty Gravel (Coarse gravel with clay/silt)
- Sandy Gravel (Fine Gravel with Sand)
- Sandy Gravel (Medium Gravel with Sand)
- Sandy Gravel (Coarse Gravel with Sand)
- Fine Gravel
- Medium Gravel
- Coarse Gravel

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Cross Section A-A’

Project No.	Drawn By.	Date.	Figure
	CP/MS	August 2016	**Figure 2**

B – B′

B

West

B′

East

VPB-156 | VPB-148 | VPB-149 | VPB-155 | VPB-150 | VPB-45 | VPB-43 | VPB-127

intersection with N-S

Glacial cover (approximate)

heterolithic incised valley fill (estuarine?)

marine (?) clay marker

Lower delta plain silty and clayey sands

gravel-rich channel fill

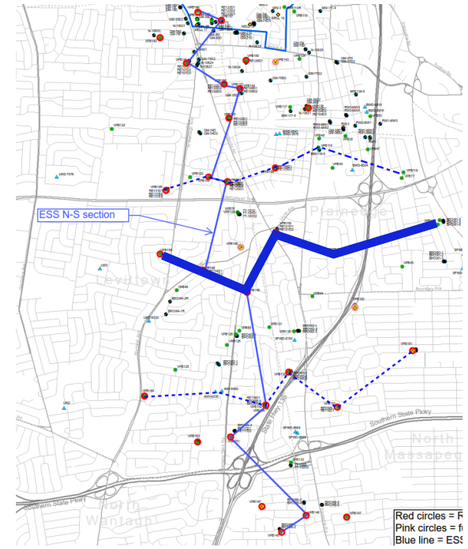
interdistributary and / or marine silty clays (high degree of continuity (darkest grey clay may serve as base to contaminant)

?

Raritan Formation

100 0 -100 -200 -300 -400 -500 -600 -700 -800

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000 11,000 12,000



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- Clay with 40% Sand
- Clay with Fine Gravel
- Clay with Medium Gravel
- Clay with Coarse Gravel
- Silt
- Silt with 10% Sand
- Silt with 20% Sand
- Sandy Silt
- Silty Sand
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- Silty Sand (Fine Sand with 40% Fines)
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- Gravelly Silt (Silt with Coarse Gravel)
- Fine Sand
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- Clayey Sand (Medium Sand with 50% Fines)
- Silty Sand (Medium Sand with 40% Fines)
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- Silty Sand (Medium Sand with 10-20% Fines)
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- Fine Sand with Fine Gravel
- Fine Sand with Medium Gravel
- Fine Sand with Coarse Gravel
- Medium Sand
- Silty Sand (Coarse Sand with 50% Fines)
- Clayey Sand (Coarse Sand with 50% Fines)
- Silty Sand (Coarse Sand with 40% Fines)
- Clayey Sand (Coarse Sand with 40% Fines)
- Silty Sand (Coarse Sand with 30% Fines)
- Clayey Sand (Coarse Sand with 30% Fines)
- Silty Sand (Coarse Sand with 10-20% Fines)
- Clayey Sand (Coarse Sand with 10-20% Fines)
- Medium Sand with Fine Gravel
- Medium Sand with Medium Gravel
- Medium Sand with Coarse Gravel
- Coarse Sand
- Coarse Sand with Fine Gravel
- Coarse Sand with Medium Gravel
- Coarse Sand with Coarse Gravel
- Clayey/Silty Gravel (Fine gravel with clay/silt)
- Clayey/Silty Gravel (Medium gravel with clay/silt)
- Clayey/Silty Gravel (Coarse gravel with clay/silt)
- Sandy Gravel (Fine Gravel with Sand)
- Sandy Gravel (Medium Gravel with Sand)
- Sandy Gravel (Coarse Gravel with Sand)
- Fine Gravel
- Medium Gravel
- Coarse Gravel

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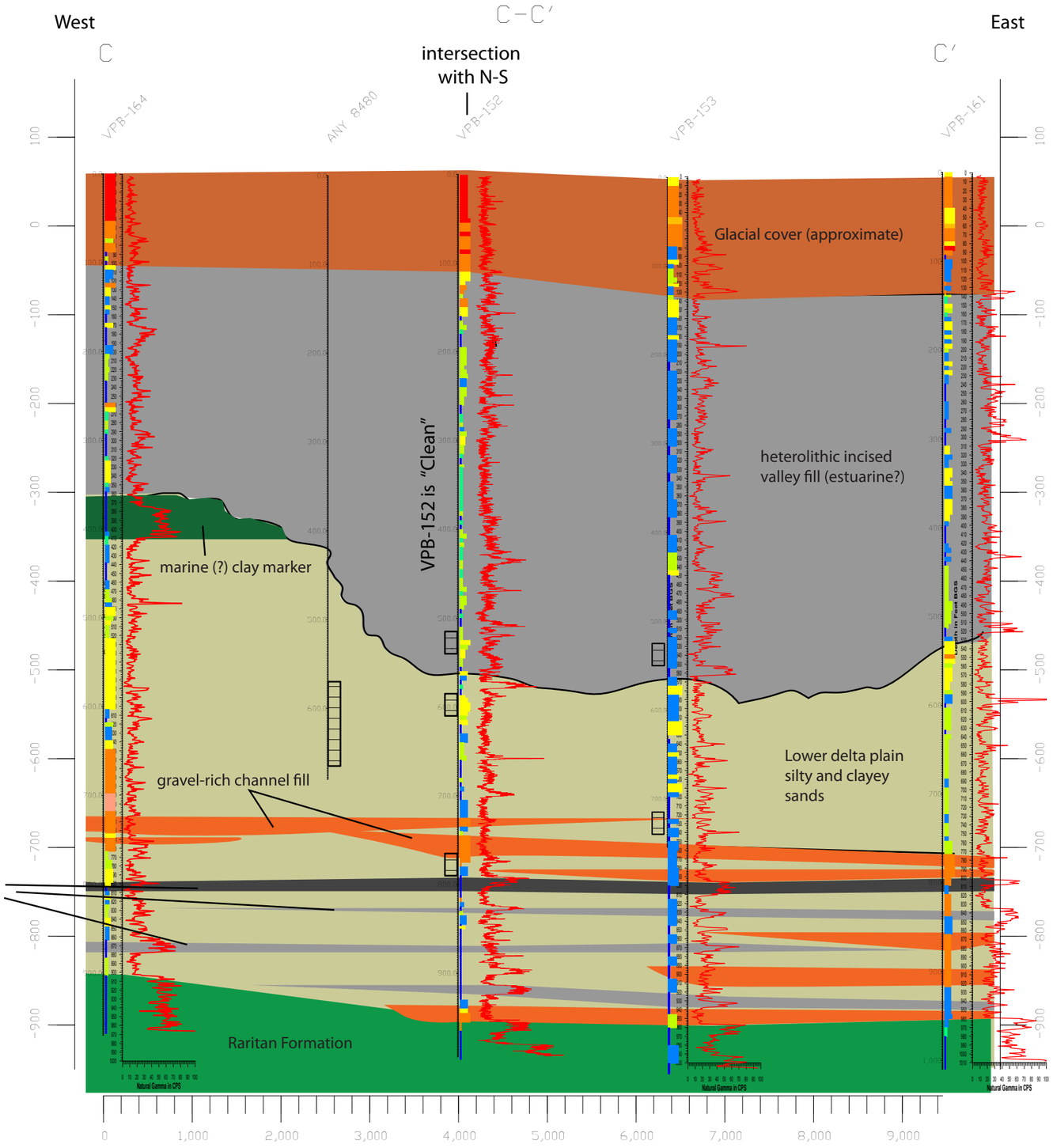
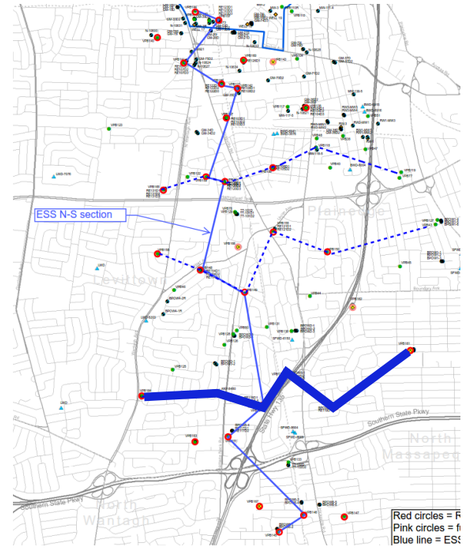
Cross Section
B-B’

Project No.	Drawn By.	Date.	Figure
	CP/MS	August 2016	**Figure 3**





GRAIN SIZE LOG INDEX*

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Site sediments are predominatly fine (clays, sandy clays, silts,and fine to medium sand)

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- Clay with 30% Sand
- Clay with 40% Sand
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- Clay with Medium Gravel
- Clay with Coarse Gravel
- Silt
- Silt with 10% Sand
- Silt with 20% Sand
- Sandy Silt
- Silty Sand
- Clayey Sand
- Silty Sand (Fine Sand with 40% Fines)
- Clayey Sand (Fine Sand with 40% Fines)
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- Clayey Sand (Fine Sand with 30% Fines)
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- Clayey Sand (Fine Sand with 10-20% Fines)
- Gravelly Silt (Silt with Fine Gravel)
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- Gravelly Silt (Silt with Coarse Gravel)
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- Silty Sand (Medium Sand with 50% Fines)
- Clayey Sand (Medium Sand with 50% Fines)
- Silty Sand (Medium Sand with 40% Fines)
- Clayey Sand (Medium Sand with 40% Fines)
- Silty Sand (Medium Sand with 30% Fines)
- Clayey Sand (Medium Sand with 30% Fines)
- Silty Sand (Medium Sand with 10-20% Fines)
- Clayey Sand (Medium Sand with 10-20% Fines)
- Fine Sand with Fine Gravel
- Fine Sand with Medium Gravel
- Fine Sand with Coarse Gravel
- Medium Sand
- Silty Sand (Coarse Sand with 50% Fines)
- Clayey Sand (Coarse Sand with 50% Fines)
- Silty Sand (Coarse Sand with 40% Fines)
- Clayey Sand (Coarse Sand with 40% Fines)
- Silty Sand (Coarse Sand with 30% Fines)
- Clayey Sand (Coarse Sand with 30% Fines)
- Silty Sand (Coarse Sand with 10-20% Fines)
- Clayey Sand (Coarse Sand with 10-20% Fines)
- Medium Sand with Fine Gravel
- Medium Sand with Medium Gravel
- Medium Sand with Coarse Gravel
- Coarse Sand
- Coarse Sand with Fine Gravel
- Coarse Sand with Medium Gravel
- Coarse Sand with Coarse Gravel
- Clayey/Silty Gravel (Fine gravel with clay/silt)
- Clayey/Silty Gravel (Medium gravel with clay/silt)
- Clayey/Silty Gravel (Coarse gravel with clay/silt)
- Sandy Gravel (Fine Gravel with Sand)
- Sandy Gravel (Medium Gravel with Sand)
- Sandy Gravel (Coarse Gravel with Sand)
- Fine Gravel
- Medium Gravel
- Coarse Gravel

AECOM
3950 Sparks Dr SE
Grand Rapids, MI 49546
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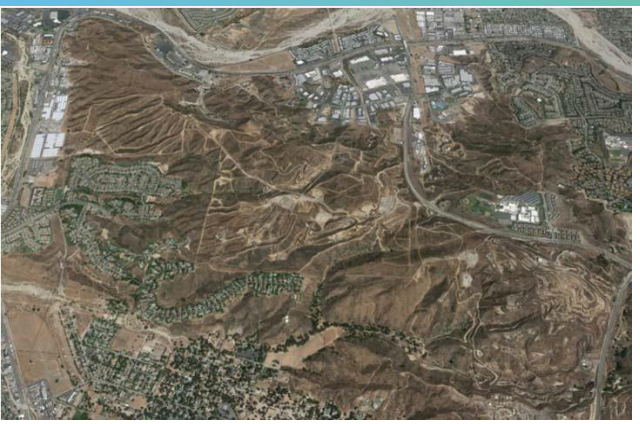
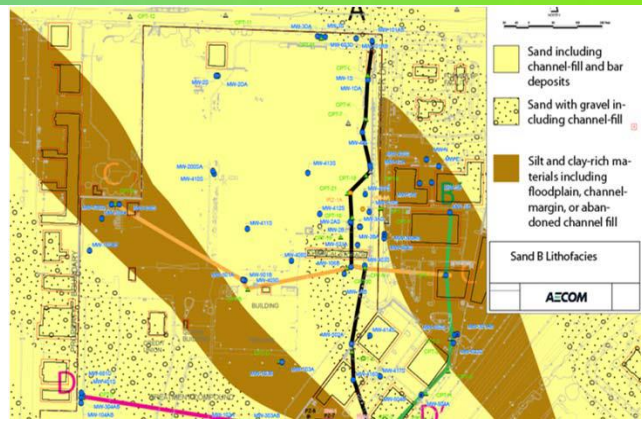
Cross Section C-C'

Project No.	Drawn By.	Date.	Figure
	CP/MS	August 2016	**Figure 4**

Appendix A
ESS Slide Deck

Bethpage NWIRP: Environmental Sequence Stratigraphy (ESS)



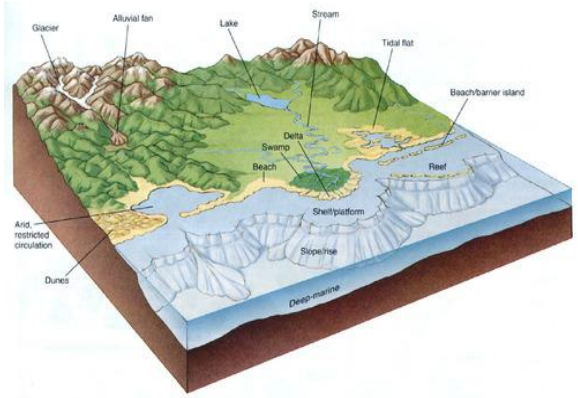


Preliminary observations and recommendations

Rick Cramer, MS, PG (Orange, CA)
Mike Shultz, PhD (Concord, CA)
Colin Plank, MS (Grand Rapids, MI)

AECOM

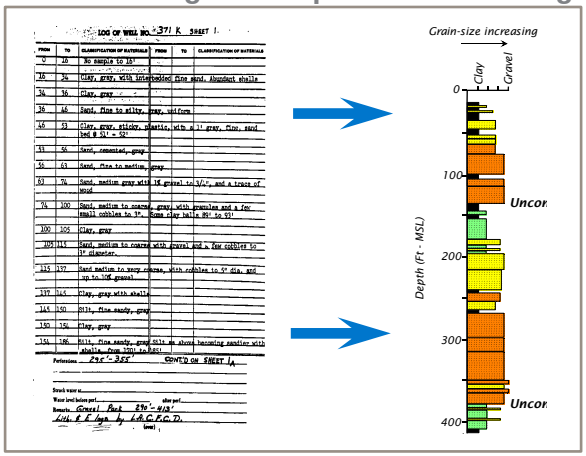
Environmental Sequence Stratigraphy (ESS) Process



1

Determine depositional environment which is the foundation to the ESS evaluation

Borehole Log to Graphic Grainsize Log

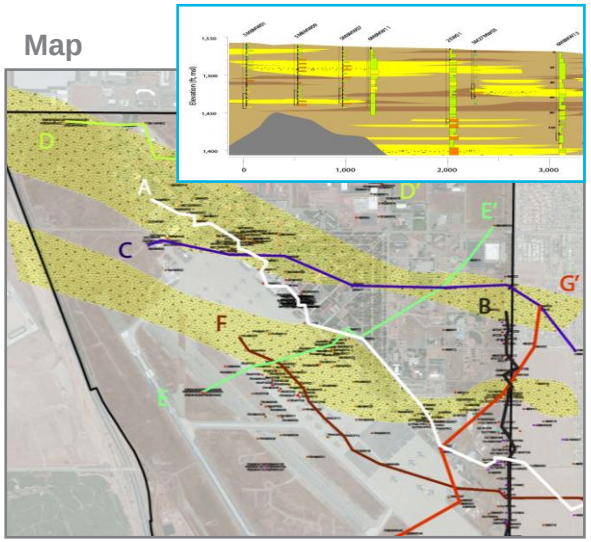


2

Leverage existing lithology data to identify vertical grain size trends and correlate between boreholes

Cross Section

Map

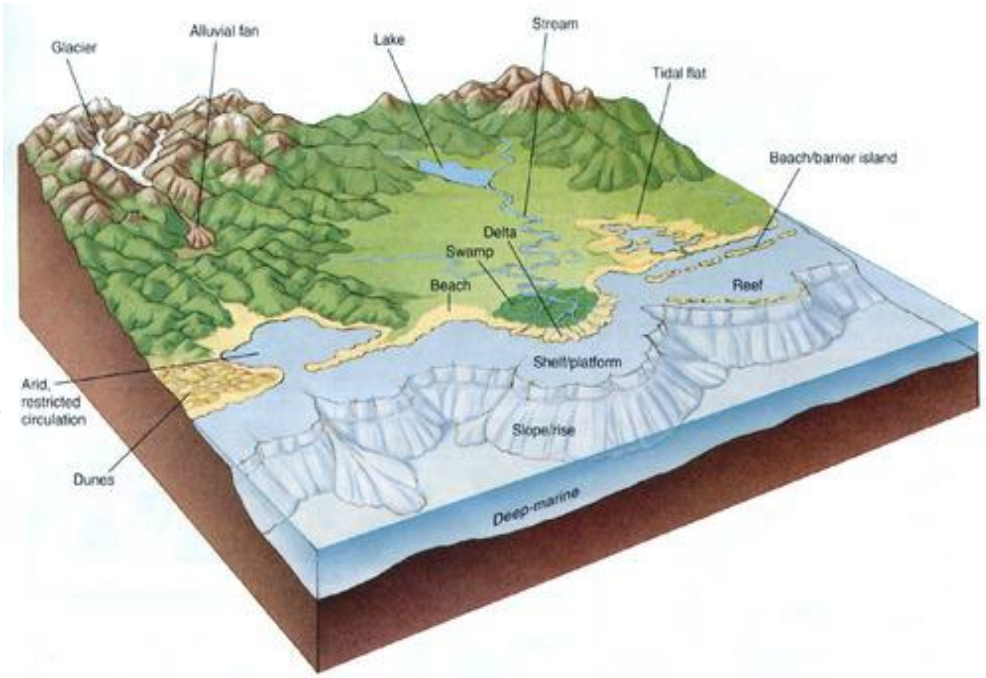


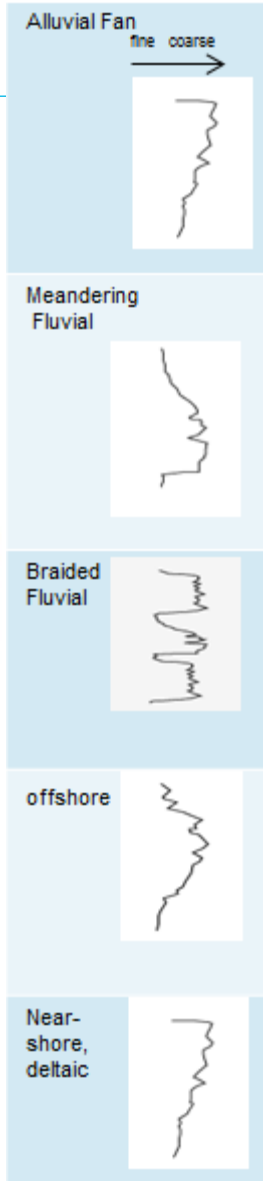
3

Map the permeability architecture to predict contaminant migration

ESS Vertical Grainsize Pattern Recognition

- *Patterns in grain size are the language of heterogeneity*
- *Sequence Stratigraphers are the translators*
- *Can correlate/predict heterogeneity at all scales*
- *There are grain size patterns buried within existing boring logs of every site*
- *Experience and background of the practitioner is a prerequisite*





AECOM

Depositional Environment and typical grain size profile	Major aquifer elements and their common dimensions	Major aquitard elements and their common dimensions	Impact on CSM	Required Data Resolution
Alluvial Fan fine coarse 	Proximal fan channels, mid-fan sheet sands, distal fringe sands X: 10^2 m – 10^4 m Y: 10^1 m – 10^3 m Z: 10^{-1} m – 10's m	Playa lake deposits or paleosol formations commonly vertically separate fans. Debris-flow deposits also commonly clay-rich X: 10^2 m – 10^3 m Y: 10^2 m – 10^3 m Z: 10^{-1} m – 10's m	Laterally extensive playa lake deposits can missed by traditional sampling methods due to their thin nature, but can vertically compartmentalize aquifers. Fans have a primary stratigraphic dip basinward at 1-6 degrees, and are laterally offset stacked ("shingled").	High in vertical sense, medium to low in horizontal sense
Meandering Fluvial 	Channel axial fill, point bar, crevasse splays X: 1 m – 10's m Y: 10^2 m – 10^3 m Z: 10^{-1} m – 10 m	Floodplain deposits, levee deposits, clay drapes on lateral accretion surfaces, plugs filling abandoned channels X: 10^2 m – 10^3 m Y: 10^2 m – 10^3 m Z: 10^{-1} m – 10's m	Due to well-sorted sand and gravel at bases of channels, permeability can be orders of magnitude higher in this zone. High risk of off-site contaminant transport due to groundwater flow controlled by channel orientation and not groundwater gradient. Local groundwater flow up to 270 degrees from regional gradient. Channel-fills highly asymmetric with cutbank characterized by sharp erosional edge and point bar characterized by interfingering with floodplain fines impacting potential for contaminant mass storage. Lateral accretion drapes can separate point bar deposits that would appear to be connected laterally. Clay plugs filling abandoned oxbow lakes common.	High both laterally and vertically if site size is greater than channel widths
Braided Fluvial 	Channel axial fill, bar forms X: 1 m – 10's m Y: 10 m – 10^2 m Z: 10^{-1} m – 1's m	Floodplain deposits, silt and clay plugs filling abandoned channels X: 10^2 m – 10^3 m Y: 10^1 m – 10^2 m Z: 10^{-1} m – 1's m	"Streaky" groundwater flow with isolated high-permeability zones. Overall high permeability and porosity with amalgamated channel deposits. Local groundwater flow up to 90 degrees from gradient, but typically within 45 degrees of gradient	High, but dependent on degree of amalgamation of channels determined by fines content (greater fines content results in less channel connectivity)
offshore 	Offshore bar, transgressive sand X: 10's m – 10^2 m Y: 10^2 m – 10^3 m Z: 10^{-1} m – 10 m	High-frequency transgressive flooding shales X: 10's m – 10^2 m Y: 10^2 m – 10^3 m Z: 10^{-1} m – 10 m	Laterally extensive, sand-rich deposits. Interbedded storm deposits (coarser grained) with fair-weather deposits l(finer-grained) lead to high degrees of vertical heterogeneity, and low to very low Kv/Kh ratio.	Low in lateral sense, high in vertical
Near-shore, deltaic 	Shoreface (beach), or bayhead delta in upper part, shelf in lower parts X: 10's m – 10^2 m Y: 10^2 m – 10^3 m Z: 10^{-1} m – 10 m	High-frequency transgressive flooding shales X: 10's m – 10^2 m Y: 10^2 m – 10^3 m Z: 10^{-1} m – 10 m	Laterally extensive, sand-rich near-shore units in upper parts of sequences. High degree of interbedding of coarse and fine-grained units in lower parts. Silt and clay beds capping sequences dip basinward, may lead to erroneous correlations at distances of hundreds of meters to kilometers.	Low in lateral sense, high in vertical

ATTACHMENT C

Drawdown Plots

Aquifer Pump Test Analyses

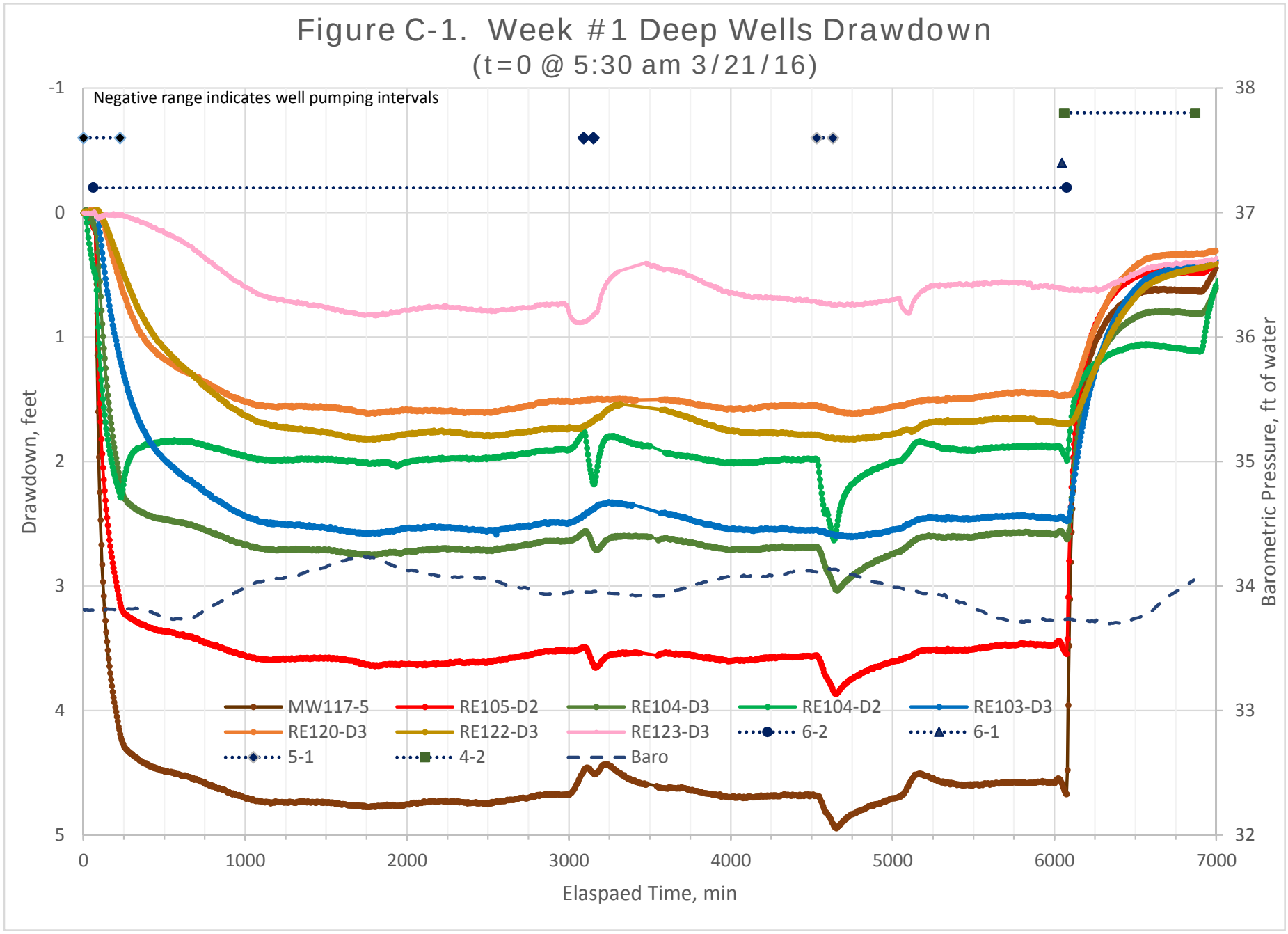


Figure C-1. Week #1 Deep Wells Drawdown
(t=0 @ 5:30 am 3/21/16)
Negative range indicates well pumping intervals
Drawdown, feet
Barometric Pressure, ft of water
Elaspaed Time, min
-1
0
1
2
3
4
5
38
37
36
35
34
33
32
0
1000
2000
3000
4000
5000
6000
7000
MW117-5
RE105-D2
RE104-D3
RE104-D2
RE103-D3
RE120-D3
RE122-D3
RE123-D3
6-2
6-1
5-1
4-2
Baro

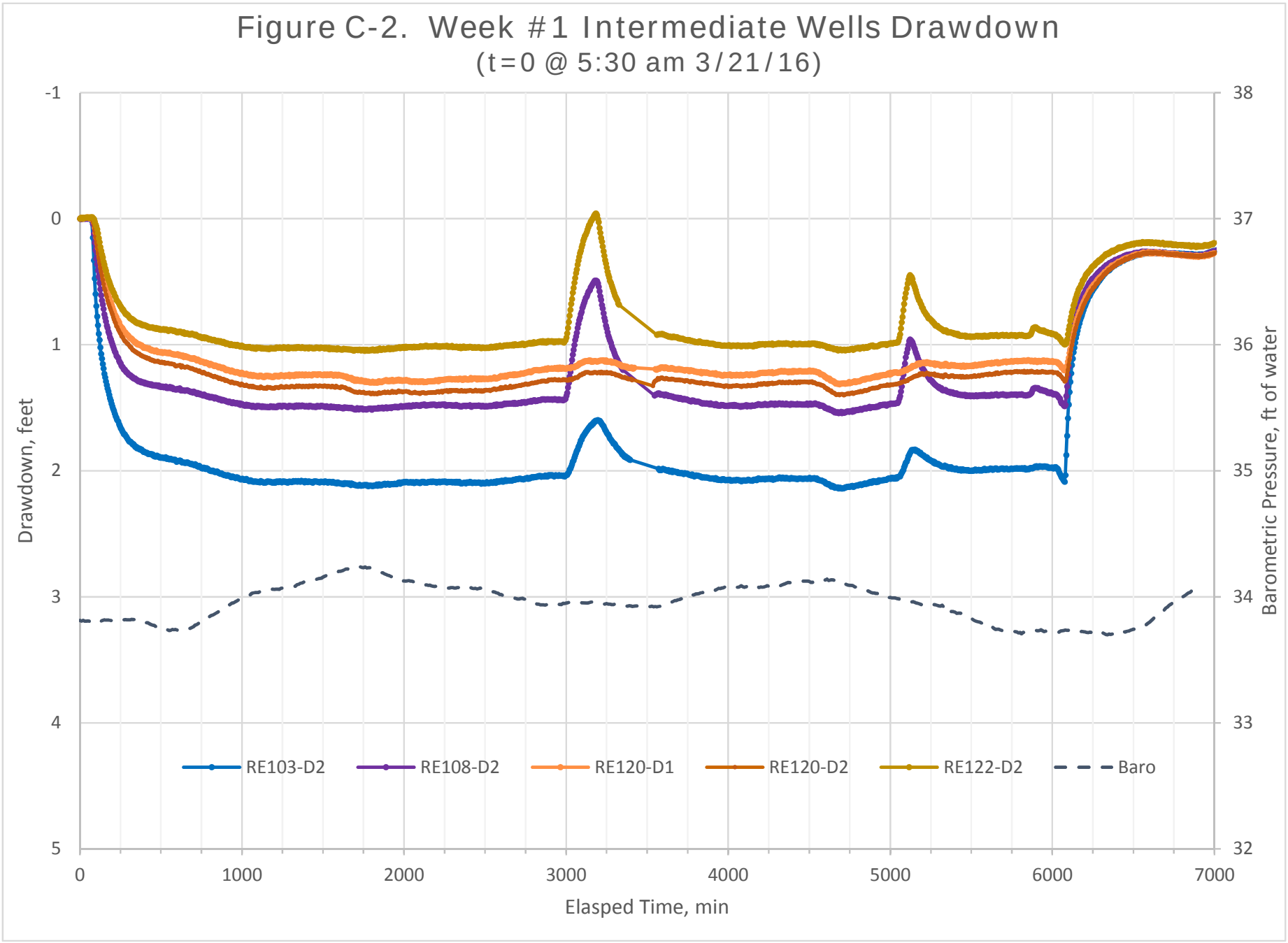


Figure C-2. Week #1 Intermediate Wells Drawdown
(t=0 @ 5:30 am 3/21/16)
Drawdown, feet
Barometric Pressure, ft of water
Elasped Time, min
-1
0
1
2
3
4
5
38
37
36
35
34
33
32
0
1000
2000
3000
4000
5000
6000
7000
RE103-D2
RE108-D2
RE120-D1
RE120-D2
RE122-D2
Baro

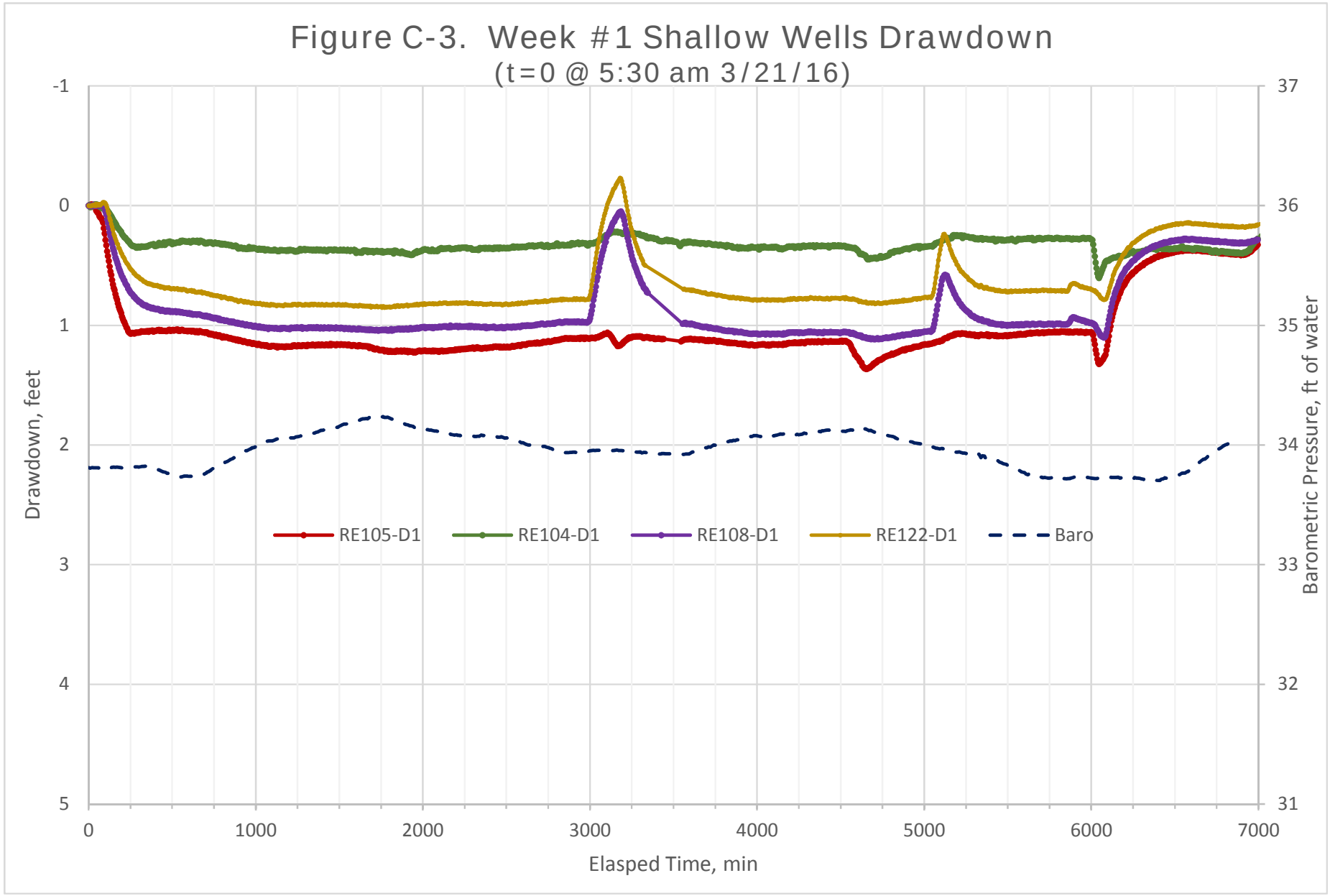


Figure C-3. Week #1 Shallow Wells Drawdown
(t=0 @ 5:30 am 3/21/16)
Drawdown, feet
Barometric Pressure, ft of water
Elasped Time, min
-1
0
1
2
3
4
5
37
36
35
34
33
32
31
0
1000
2000
3000
4000
5000
6000
7000
RE105-D1
RE104-D1
RE108-D1
RE122-D1
Baro

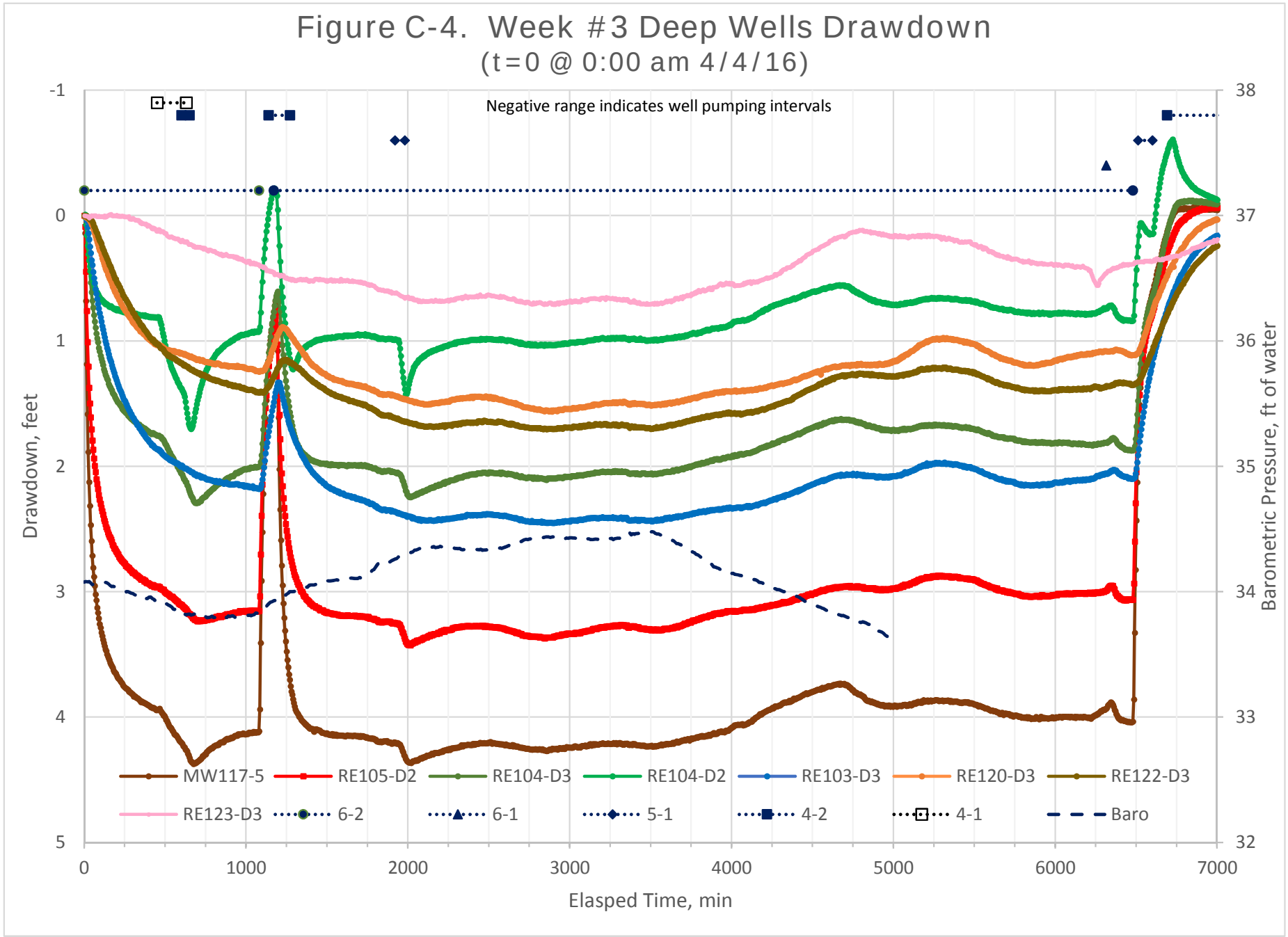
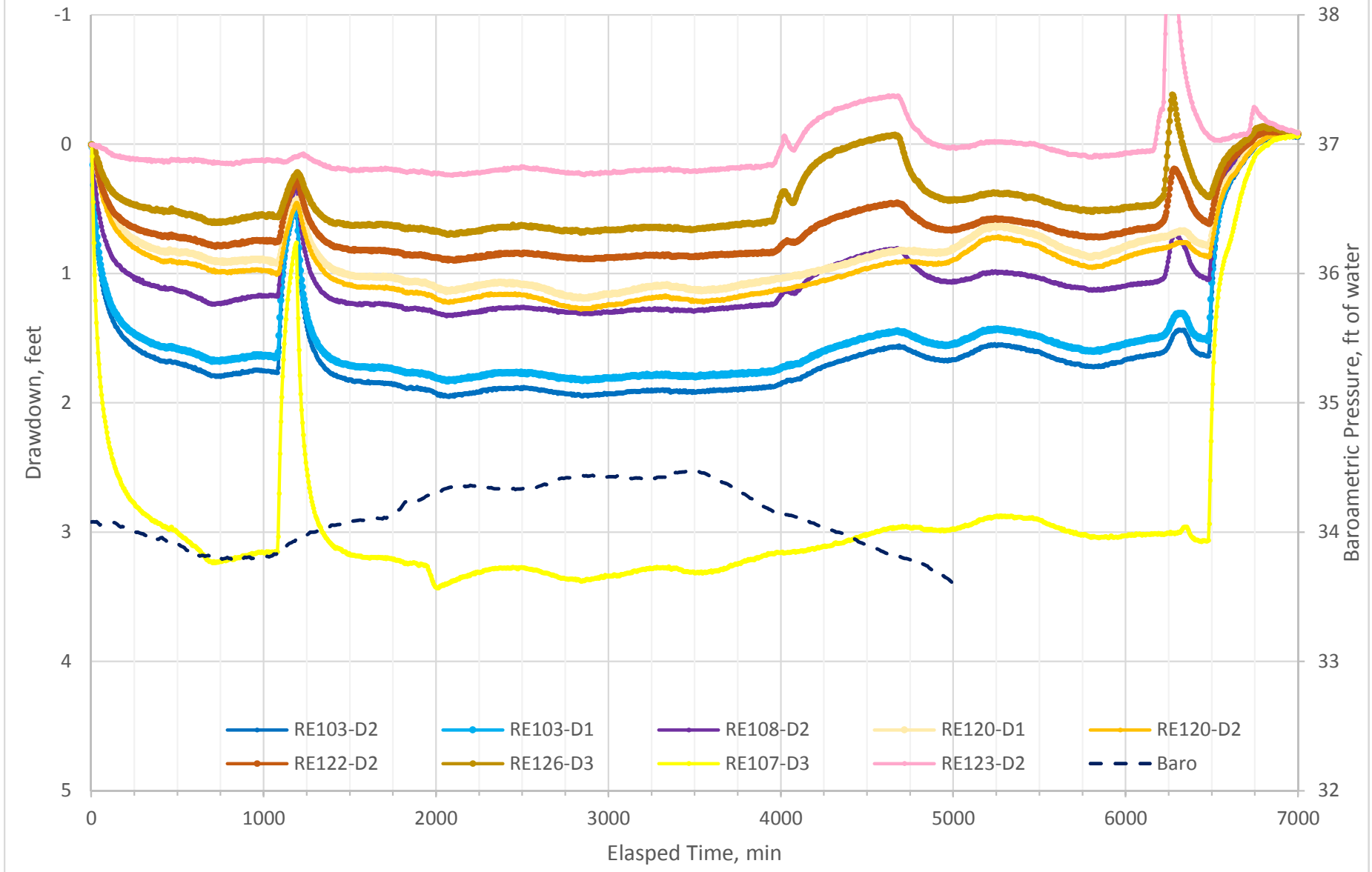


Figure C-4. Week #3 Deep Wells Drawdown
(t=0 @ 0:00 am 4/4/16)
Negative range indicates well pumping intervals
Drawdown, feet
Barometric Pressure, ft of water
Elasped Time, min
-1
0
1
2
3
4
5
38
37
36
35
34
33
32
0
1000
2000
3000
4000
5000
6000
7000
MW117-5
RE105-D2
RE104-D3
RE104-D2
RE103-D3
RE120-D3
RE122-D3
RE123-D3
6-2
6-1
5-1
4-2
4-1
Baro

Figure C-5. Week #3 Intermediate Wells Drawdown

(t=0 @ 0:00 am 4/4/16)



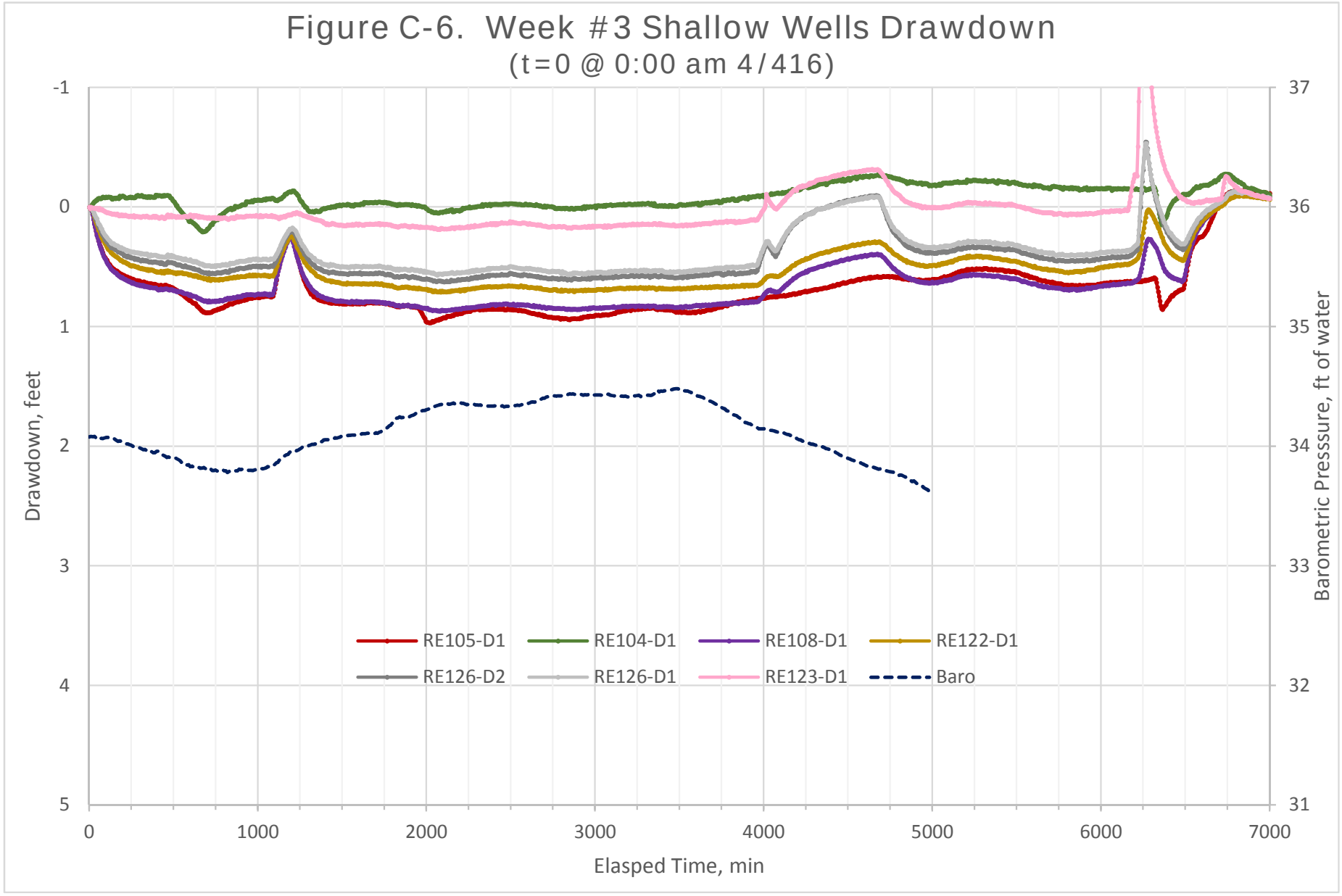


Figure C-6. Week #3 Shallow Wells Drawdown
(t=0 @ 0:00 am 4/416)
Drawdown, feet
Barometric Presssure, ft of water
Elasped Time, min
-1
0
1
2
3
4
5
37
36
35
34
33
32
31
0
1000
2000
3000
4000
5000
6000
7000
RE105-D1
RE104-D1
RE108-D1
RE122-D1
RE126-D2
RE126-D1
RE123-D1
Baro

Hantush-Jacob (1955) / Hantush (1964) Solution for a Pumping Test in a Leaky Aquifer

(Match > Solution)

Hantush and Jacob (1955) derived a solution for unsteady flow to a fully penetrating well in a homogeneous, isotropic leaky confined aquifer. The solution assumes a line source for the pumped well and therefore neglects wellbore storage.

Hantush (1964) extended the method to correct for partially penetrating wells and anisotropy. When you choose the Hantush-Jacob solution in AQTESOLV, you may analyze data for fully or partially penetrating wells.

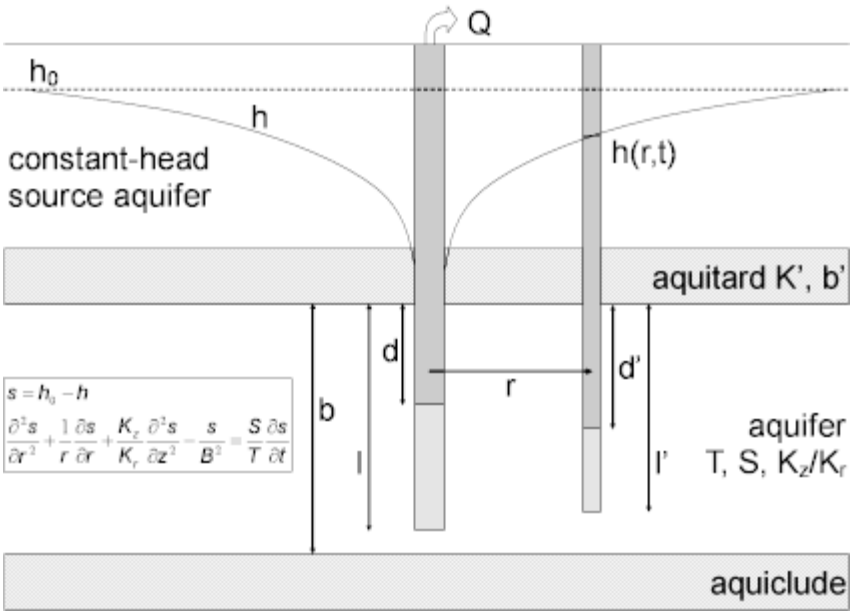
The Hantush-Jacob solution can simulate variable-rate tests including recovery through the application of the principle of superposition in time. Use this solution to analyze both pumping and recovery data from constant- or variable-rate pumping tests.

Walton (1962) developed a manual curve-fitting procedure based on the Hantush-Jacob solution. To apply Walton's method in AQTESOLV, choose the Hantush-Jacob solution.

For a well performance test, you may choose the Hantush-Jacob (1955) solution for a step-drawdown test in a leaky confined aquifer.

Vandenberg (1977) presented a solution for evaluating drawdown a leaky confined aquifer bounded by two parallel no-flow boundaries (i.e., a leaky strip aquifer). In AQTESOLV, you may use the Hantush-Jacob solution in conjunction with aquifer boundaries to evaluate the same leaky strip aquifer problem as the Vandenberg method. Unlike Vandenberg's method, however, you may use AQTESOLV to evaluate partially penetrating wells and observation wells may be located at any radial distance from the pumped well.

- **Illustration**

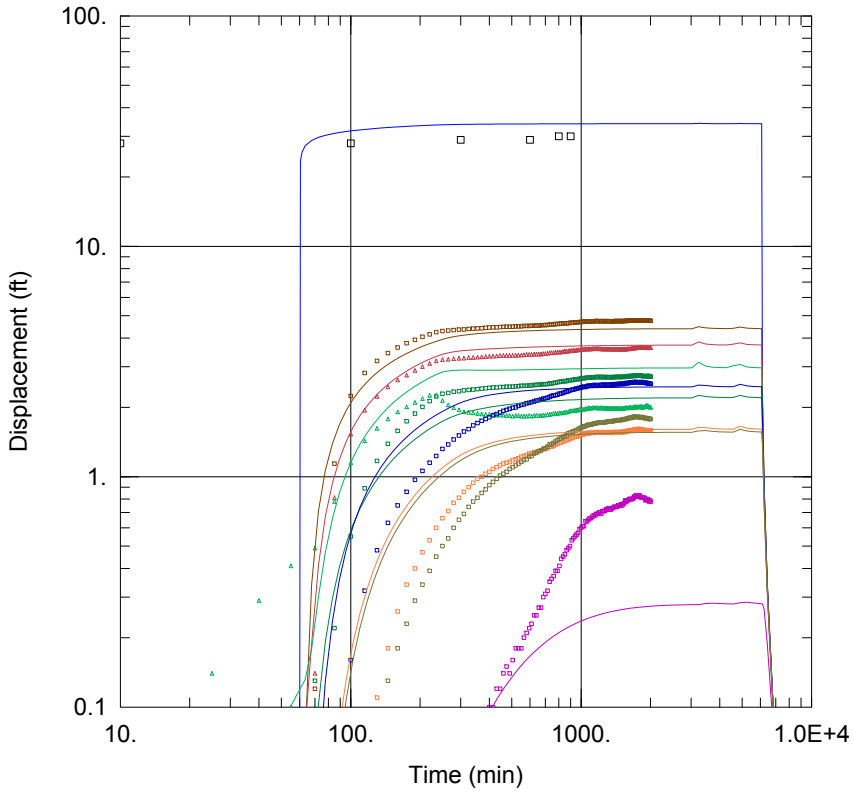


- **Equations**
- **Assumptions**

- aquifer has infinite areal extent
- aquifer is homogeneous and of uniform thickness
- pumping well is fully or partially penetrating
- flow to pumping well is horizontal when pumping well is fully penetrating
- aquifer is leaky confined
- flow is unsteady
- water is released instantaneously from storage with decline of hydraulic head
- diameter of pumping well is very small so that storage in the well can be neglected
- confining bed(s) has infinite areal extent, uniform vertical hydraulic conductivity and uniform thickness
- confining bed(s) is overlain or underlain by an infinite constant-head plane source
- flow is vertical in the aquitard(s)

- **Data Requirements**
- **Solution Options**
- **Estimated Parameters**
- **Curve Matching Tips**
- **References**

Figure C-7, Week 1 Deep Aquifer Pump Test Analysis



WELL TEST ANALYSIS

Data Set: C:\...\BWD PT WK1 Deep leaky, 2000m.aqt
Date: 10/04/16 Time: 14:54:26

PROJECT INFORMATION

Company: EnSafe
Client: Navy Clean
Project: WE69
Location: Bethpage NY
Test Well: BWD 6-2
Test Date: 3/21/16

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BWD 6-2	1126673	206174
BWD 5-1	1129164	205008

Observation Wells

Well Name	X (ft)	Y (ft)
BWD 6-2	1126673	206174
MW117 (884')	1127141	206924
RE105D2 (1110')	1126652	205064
RE104D3 (1310')	1127695	206993
RE104D2 (1325')	1127708	207000
RE103D3 (1614')	1125144	206693
RE120D3 (2240')	1125061	204618
RE122D3 (2329')	1124980	207774
RE123D3 (4155')	1124860	209912

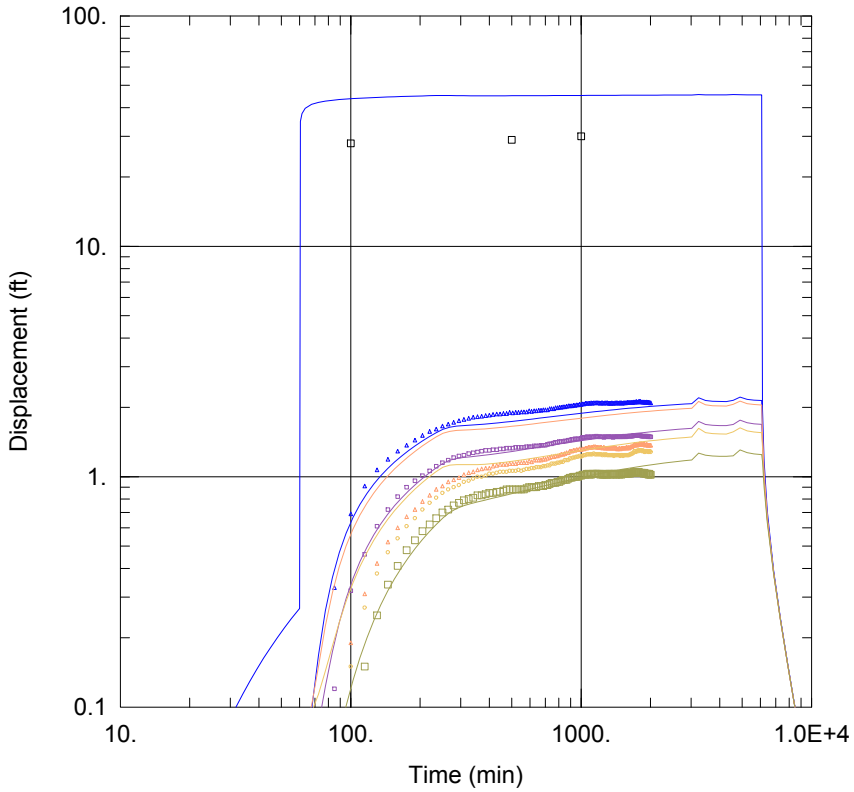
SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 5.596E+4 ft^2/day
1/B = 0.0002705 ft^{-1}
b = 470. ft

S = 0.001934
Kz/Kr = 0.0003332

Figure C-8, Week 1 Intermediate Aquifer Pump Test Analysis



WELL TEST ANALYSIS

Data Set: C:\...\BWD PT WK1 Interm leaky, 2000m.aqt
Date: 10/04/16 Time: 14:56:14

PROJECT INFORMATION

Company: EnSafe
Client: Navy Clean
Project: WE69
Location: Bethpage NY
Test Well: BWD 6-2
Test Date: 3/21/16

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BWD 6-2	1126673	206174
BWD 5-1	1129164	205008

Observation Wells

Well Name	X (ft)	Y (ft)
BWD 6-2	1126673	206174
RE103D2 (1599')	1125160	206693
RE108D2 (1906')	1125484	207663
RE120D1 (2260')	1125061	204590
RE120D2 (2270')	1125060	204577
RE122D2 (2340')	1124979	207789

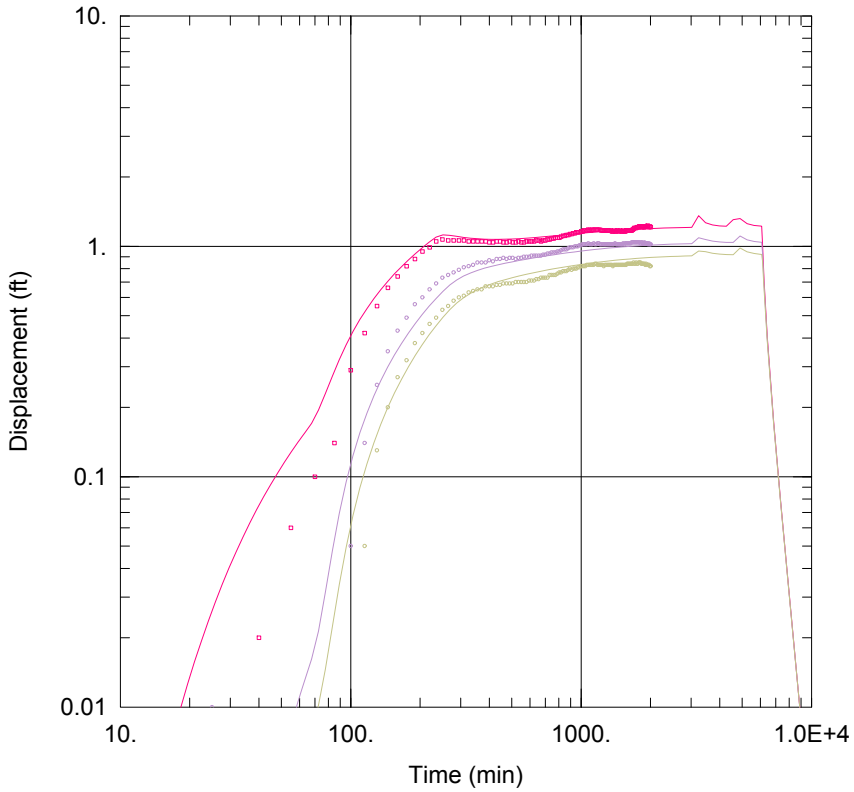
SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 4.009E+4 ft^2/day
1/B = 9.573E-5 ft^{-1}
b = 470. ft

S = 0.0006262
Kz/Kr = 0.001813

Figure C-9, Week 1 Shallow Aquifer Pump Test Analysis



WELL TEST ANALYSIS

Data Set: C:\...\BWD PT WK1 Shallow leaky, 2000m.aqt
Date: 10/04/16 Time: 14:56:47

PROJECT INFORMATION

Company: EnSafe
Client: Navy Clean
Project: WE69
Location: Bethpage NY
Test Well: BWD 6-2
Test Date: 3/21/16

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BWD 6-2	1126673	206174
BWD 5-1	1129164	205008

Observation Wells

Well Name	X (ft)	Y (ft)
RE105D1 (1101')	1126664	205073
RE104D1 (1377')	1127746	207034
RE108D1 (1897')	1125499	207665
RE122D1 (2359')	1124982	207818

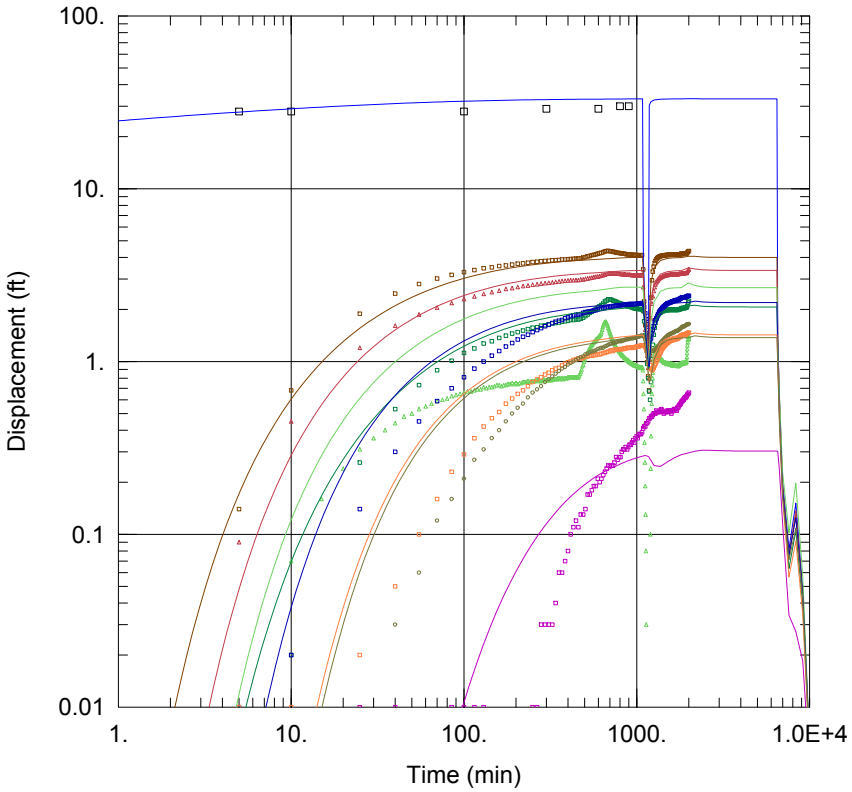
SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 3.648E+4 ft^2/day
1/B = 0.0001652 ft^{-1}
b = 470. ft

S = 0.0007337
Kz/Kr = 0.007573

Figure C-10, Week 3 Deep Aquifer Pump Test Analysis



WELL TEST ANALYSIS

Data Set: C:\...\BWD PT WK3 Deep leaky, 2000m.aqt
Date: 10/04/16 Time: 14:58:25

PROJECT INFORMATION

Company: EnSafe
Client: Navy Clean
Project: WE69
Location: Bethpage NY
Test Well: BWD 6-2
Test Date: 4/4/16

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BWD 6-2	1126673	206174
BWD 4-1	1129579	207076
BWD 4-2	1129640	206891
BWD 5-1	1129164	205008

Observation Wells

Well Name	X (ft)	Y (ft)
BWD 6-2	1126673	206174
MW117 (884')	1127141	206924
RE105D2 (1110')	1126652	205064
RE104D3 (1310')	1127695	206993
RE104D2 (1325')	1127708	207000
RE103D3 (1614')	1125144	206693
RE120D3 (2240')	1125061	204618
RE122D3 (2329')	1124980	207774
RE123D3 (4155')	1124860	209912

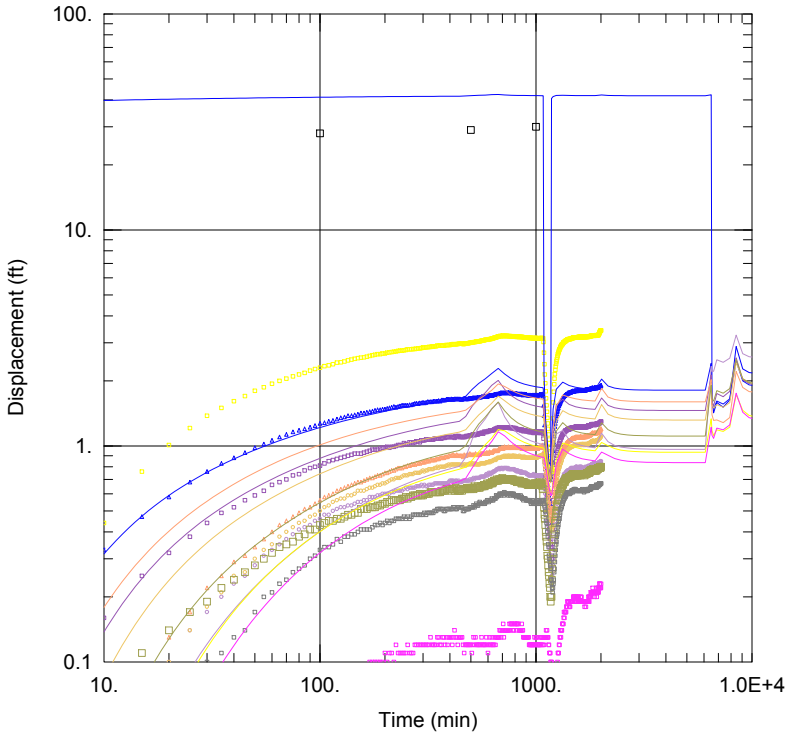
SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 5.688E+4 ft^2/day
1/B = 0.0002699 ft^{-1}
b = 470. ft

S = 0.001632
Kz/Kr = 0.0004566

Figure C-11, Week 3 Intermediate Aquifer Pump Test Analysis



WELL TEST ANALYSIS

Data Set: C:\...\BWD PT WK3 Interm leaky, 2000m.aqt
Date: 10/04/16 Time: 14:59:19

PROJECT INFORMATION

Company: EnSafe
Client: Navy Clean
Project: WE69
Location: Bethpage NY
Test Well: BWD 6-2
Test Date: 4/4/16

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BWD 6-2	1126673	206174
BWD 6-1	1126784	206200
BWD 5-1	1129164	205008
BWD 4-1	1129579	207076
BWD 4-2	1129640	206891

Observation Wells

Well Name	X (ft)	Y (ft)
BWD 6-2	1126673	206174
RE103D2 (1599')	1125160	206693
RE108D1 (1897')	1125499	207665
RE108D2 (1906')	1125484	207663
RE120D1 (2260')	1125061	204590
RE120D2 (2270')	1125060	204577
RE122D2 (2340')	1124979	207789
RE126D3 (2600')	11256644	208568
RE107D3 (3725')	1123760	208495
RE123D2 (4124')	1124886	209887

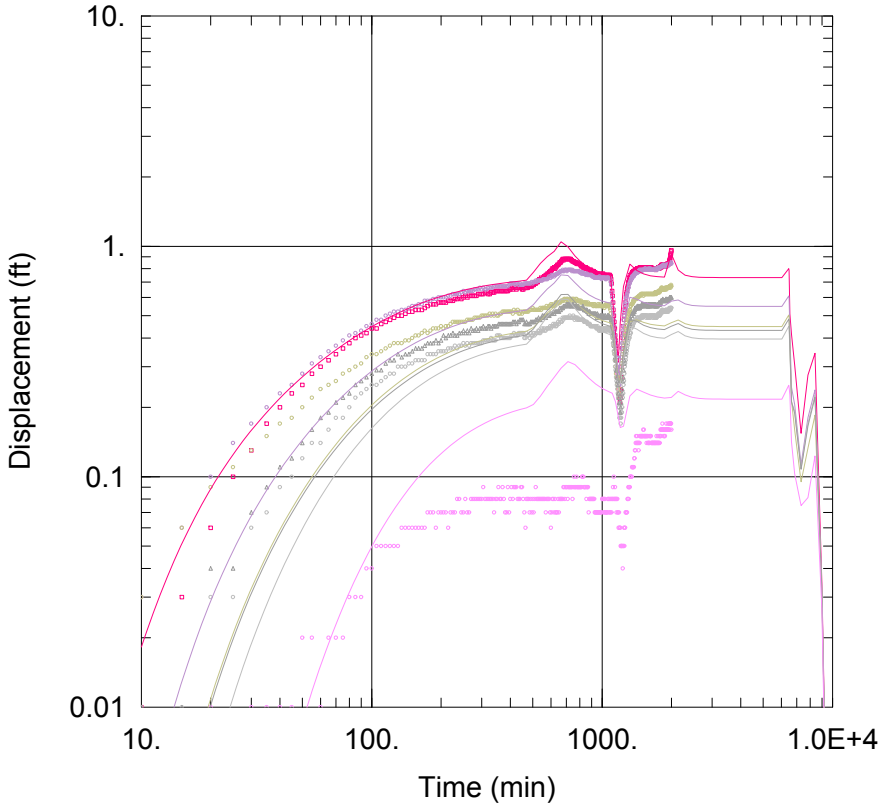
SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 4.215E+4 ft^2/day
1/B = 0.0001151 ft^{-1}
b = 470. ft

S = 0.0002493
Kz/Kr = 0.003092

Figure C-12, Week 3 Shallow Aquifer Pump Test Analysis



WELL TEST ANALYSIS

Data Set: C:\...\BWD PT WK3 Shallow leaky, 2000m.aqt
Date: 10/04/16 Time: 15:00:04

PROJECT INFORMATION

Company: EnSafe
Client: Navy Clean
Project: WE69
Location: Bethpage NY
Test Well: BWD 6-2
Test Date: 3/31/16

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BWD 6-2	1126673	206174
BWD 6-1	1126784	206200
BWD 5-1	1129164	205008
BWD 4-1	1129579	207076
BWD 4-2	1129640	206891

Observation Wells

Well Name	X (ft)	Y (ft)
RE105D1 (1101')	1126664	205073
RE104D1 (1377')	1127745.611	207036.9997
RE108D1 (1897')	1125499	207665
RE122D1 (2359')	1124982	207818
RE126D1 (2595')	1125643	208554
RE126D2 (2625')	1125644	208584
RE123D1 (4134')	1124871	209894

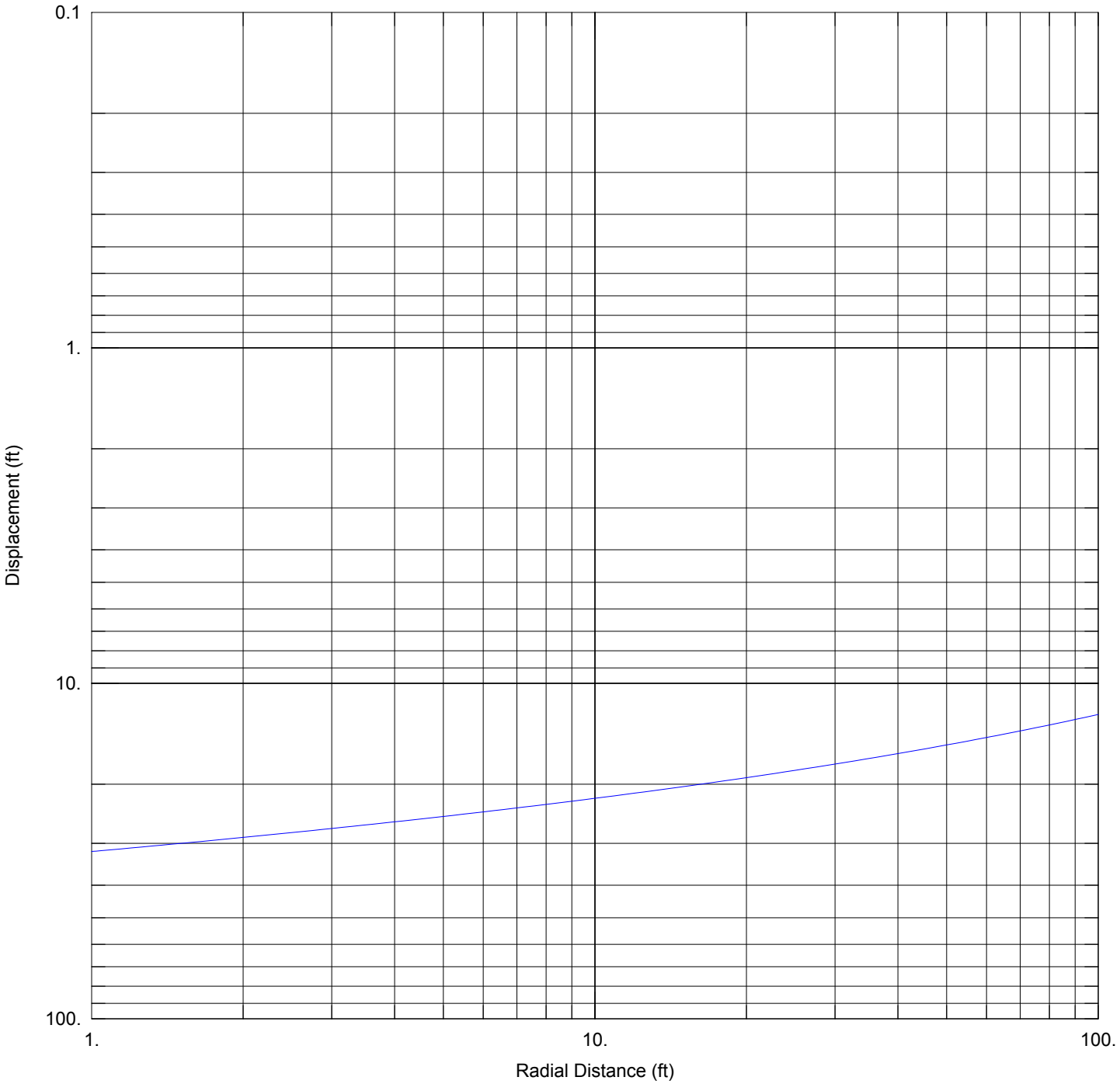
SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 3.717E+4 ft^2/day
1/B = 0.0003296 ft^{-1}
b = 470. ft

S = 0.000639
Kz/Kr = 0.01108

Figure C-13, Week 1 Deep Aquifer Distance vs Drawdown, Near Field



WELL TEST ANALYSIS

Data Set: C:\...\Predict PT WK1 Deep leaky, 2000m.aqt
Date: 10/04/16 Time: 15:10:34

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BWD 6-2	1126673	206174

Observation Wells

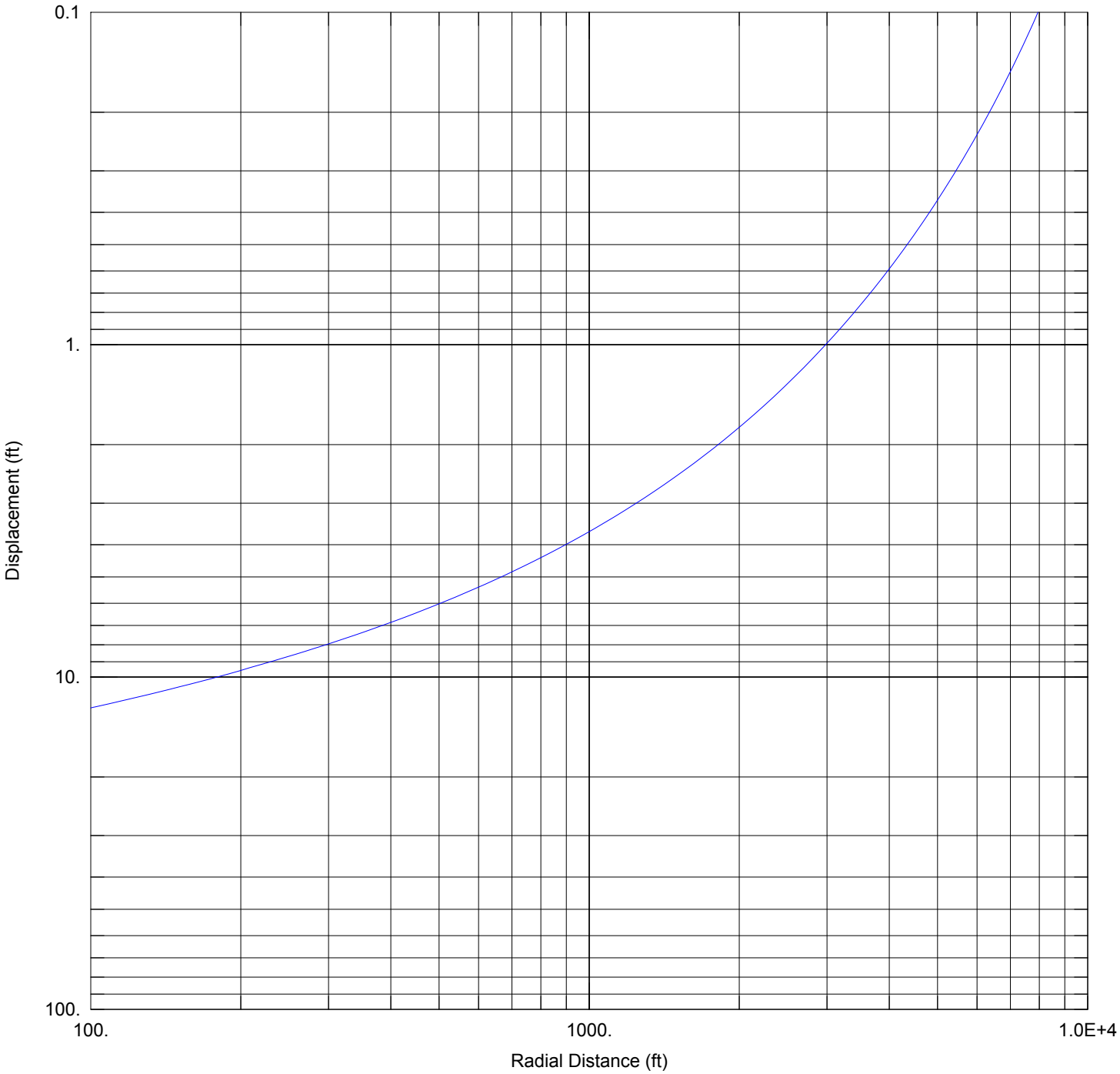
Well Name	X (ft)	Y (ft)
▫ BWD 6-2	1126673	206174

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 5.596E+4 ft^2/day
S = 0.001934
r/B = 0.0001352
Kz/Kr = 0.0003332
b = 470. ft

Figure C-14, Week 1 Deep Aquifer Distance vs Drawdown, Far Field



WELL TEST ANALYSIS

Data Set: C:\...\Predict PT WK1 Deep leaky, 2000m.aqt
Date: 10/04/16 Time: 15:09:37

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BWD 6-2	1126673	206174

Observation Wells

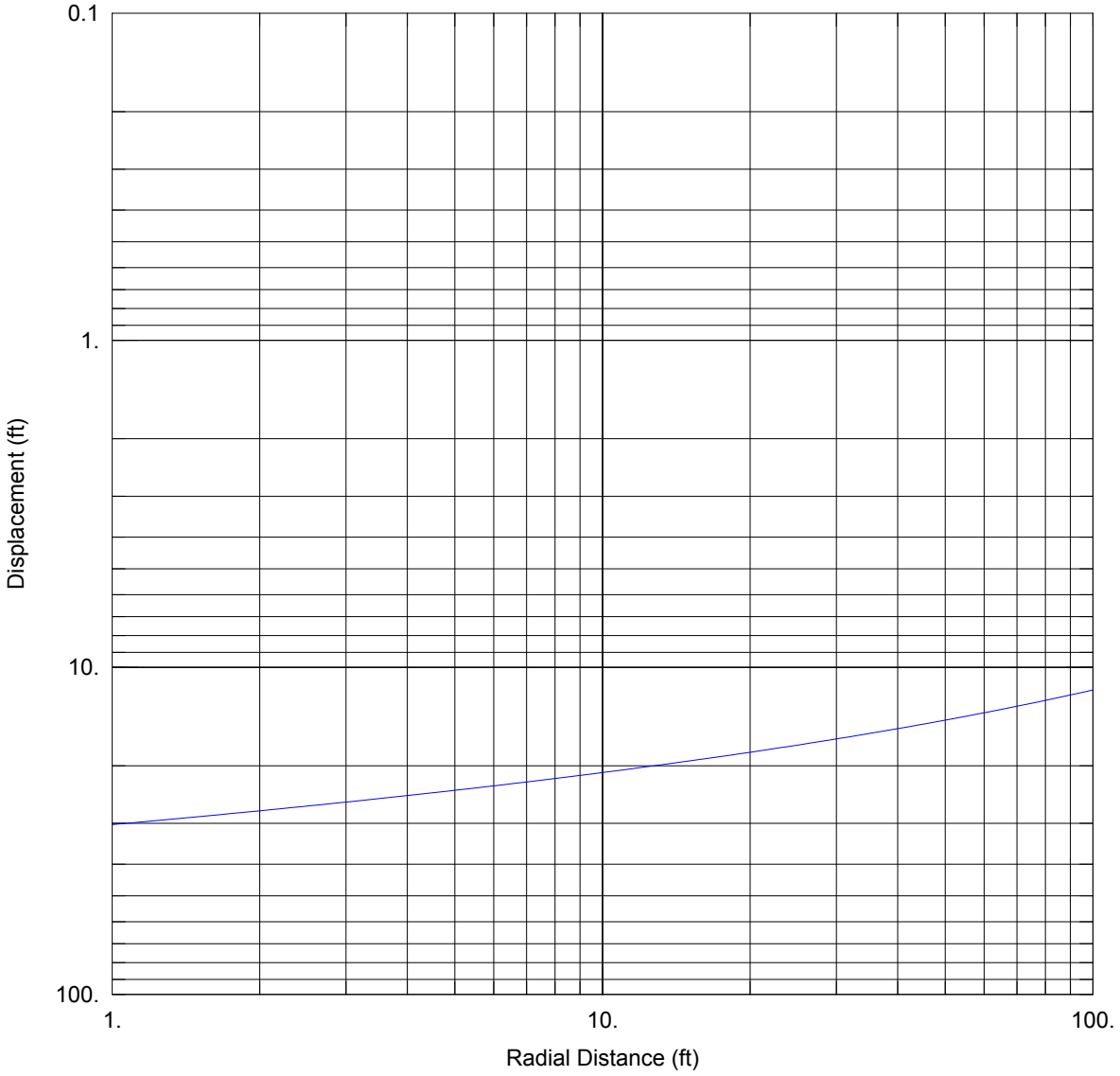
Well Name	X (ft)	Y (ft)
▫ BWD 6-2	1126673	206174

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 5.596E+4 ft^2/day
S = 0.001934
r/B = 0.0001352
Kz/Kr = 0.0003332
b = 470. ft

Figure C-15, Week 3 Deep Aquifer Distance vs Drawdown, Near Field



WELL TEST ANALYSIS

Data Set: C:\...\Predict PT WK3 Deep leaky, 2000m.aqt
Date: 10/04/16 Time: 15:13:42

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BWD 6-2	1126673	206174

Observation Wells

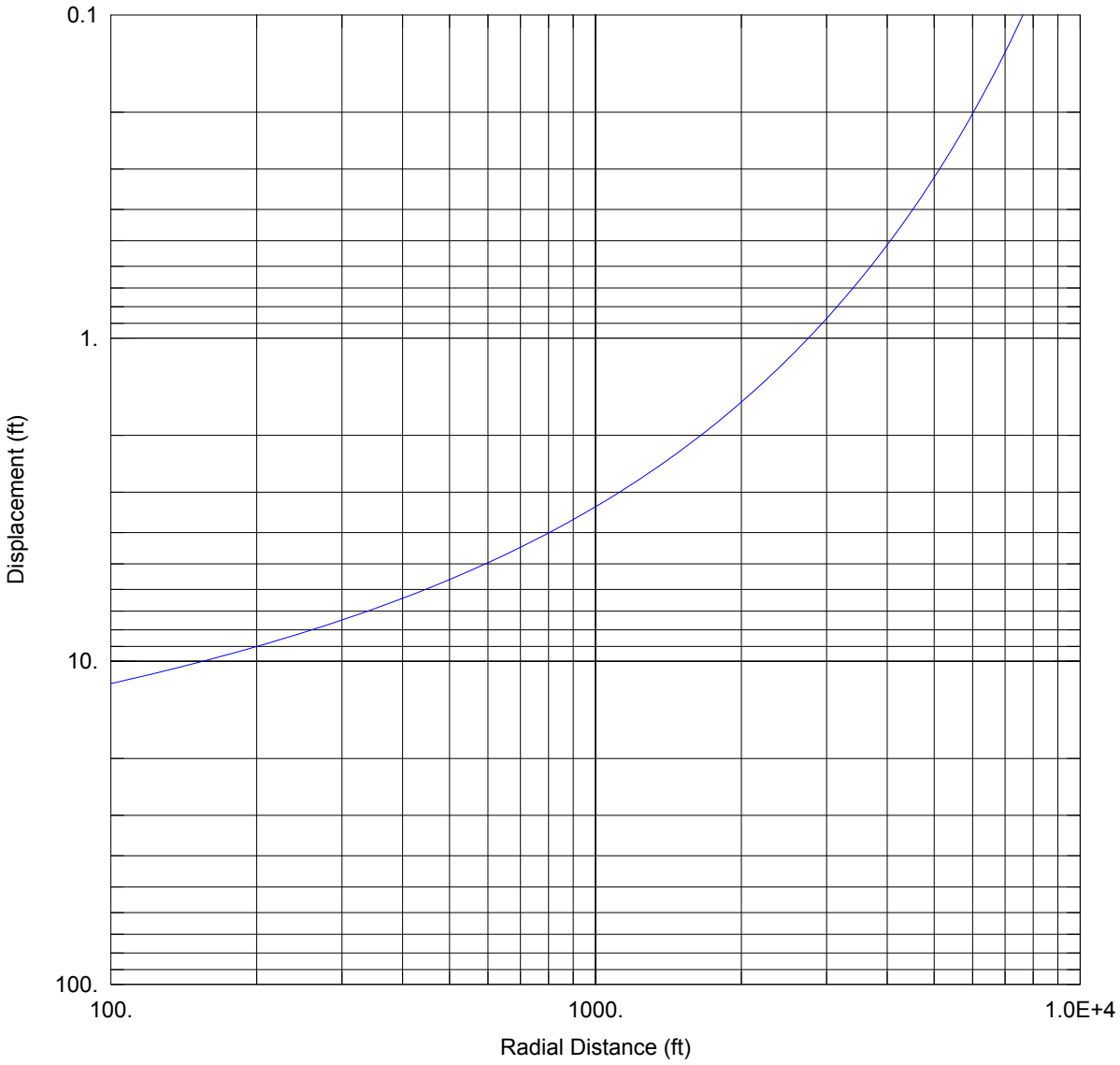
Well Name	X (ft)	Y (ft)
▫ BWD 6-2	1126673	206174

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 5.688E+4 ft^2/day
S = 0.001632
r/B = 0.0001349
Kz/Kr = 0.0004566
b = 470. ft

Figure C-16, Week 3 Deep Aquifer Distance vs Drawdown, Far Field



WELL TEST ANALYSIS

Data Set: C:\...\Predict PT WK3 Deep leaky, 2000m.aqt
Date: 10/04/16 Time: 15:12:16

WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
BWD 6-2	1126673	206174

Observation Wells

Well Name	X (ft)	Y (ft)
▫ BWD 6-2	1126673	206174

SOLUTION

Aquifer Model: Leaky
Solution Method: Hantush-Jacob

T = 5.688E+4 ft^2/day
r/B = 0.0001349
b = 470. ft

S = 0.001632
Kz/Kr = 0.0004566

RESOLUTION CONSULTANTS

ATTACHMENT D

BWD Plant 6 Water Sample Results and Laboratory Reports

Pace Analytical
575 Broad Hollow Road , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results are only for the samples and analytes requested.

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Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1603K37-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 03/25/2016 9:40 AM Point No N-03876
Received : 03/25/2016 11:09 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E522 : Prep Method: E522 Prep Date: 3/28/2016 6:59:28 AM Analyst: SH

Parameter(s)	Results	Qualifier		D.F.	Units		Limit	Analyzed:	Container:
1,4-Dioxane	12	D	+	5	µg/L			03/29/2016 3:19 PM	Container-01 of 02
Surr: 1,4-Dioxane-D8	102			1	%Rec	Limit	70-130	03/29/2016 3:53 AM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 3/29/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

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Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1603K37-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 03/25/2016 9:40 AM Point No N-03876
Received : 03/25/2016 11:09 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,1,1,2-Tetrachloroethane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,1,1-Trichloroethane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,1,2,2-Tetrachloroethane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,1,2-Trichloroethane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,1-Dichloroethane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,1-Dichloroethene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,1-Dichloropropene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,2,3-Trichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,2,3-Trichloropropane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,2,4-Trichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,2,4-Trimethylbenzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,2-Dichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,2-Dichloroethane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,2-Dichloropropane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,3,5-Trimethylbenzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,3-Dichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,3-Dichloropropane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
1,4-Dichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
2,2-Dichloropropane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
2/4-Chlorotoluene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
4-Isopropyltoluene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
Benzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
Bromobenzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
Bromochloromethane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
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Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 3/29/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

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NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1603K37-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 03/25/2016 9:40 AM Point No N-03876
Received : 03/25/2016 11:09 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Bromodichloromethane	< 0.50		1	µg/L		03/28/2016 7:14 PM	Container-01 of 02
Bromoform	< 0.50		1	µg/L		03/28/2016 7:14 PM	Container-01 of 02
Bromomethane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
Carbon tetrachloride	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
Chlorobenzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
Chloroethane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
Chloroform	< 0.50		1	µg/L		03/28/2016 7:14 PM	Container-01 of 02
Chloromethane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
cis-1,2-Dichloroethene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
cis-1,3-Dichloropropene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
Dibromochloromethane	< 0.50		1	µg/L		03/28/2016 7:14 PM	Container-01 of 02
Dibromomethane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
Dichlorodifluoromethane	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
Ethylbenzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
Hexachlorobutadiene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
Isopropylbenzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
m,p-Xylene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
Methyl tert-butyl ether	< 0.50		1	µg/L	10	03/28/2016 7:14 PM	Container-01 of 02
Methylene chloride	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
n-Butylbenzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
n-Propylbenzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
o-Xylene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
sec-Butylbenzene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02
Styrene	< 0.50		1	µg/L	5	03/28/2016 7:14 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
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P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 3/29/2016

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Sr.Project Manager : Stu Murrell

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Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1603K37-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 03/25/2016 9:40 AM Point No N-03876
Received : 03/25/2016 11:09 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)		Results	Qualifier	D.F.	Units		Limit	Analyzed:	Container:
tert-Butylbenzene		< 0.50		1	µg/L		5	03/28/2016 7:14 PM	Container-01 of 02
Tetrachloroethene		3.54		1	µg/L		5	03/28/2016 7:14 PM	Container-01 of 02
Toluene		< 0.50		1	µg/L		5	03/28/2016 7:14 PM	Container-01 of 02
Total Trihalomethanes		< 2.00		1	µg/L		80	03/28/2016 7:14 PM	Container-01 of 02
trans-1,2-Dichloroethene		< 0.50		1	µg/L		5	03/28/2016 7:14 PM	Container-01 of 02
trans-1,3-Dichloropropene		< 0.50		1	µg/L		5	03/28/2016 7:14 PM	Container-01 of 02
Trichloroethene	*	22.8	*	1	µg/L		5	03/28/2016 7:14 PM	Container-01 of 02
Trichlorofluoromethane		< 0.50		1	µg/L		5	03/28/2016 7:14 PM	Container-01 of 02
Vinyl chloride		< 0.50		1	µg/L		2	03/28/2016 7:14 PM	Container-01 of 02
Surr: 1,2-Dichlorobenzene-d4		101		1	%Rec	Limit	70-130	03/28/2016 7:14 PM	Container-01 of 02
Surr: 4-Bromofluorobenzene		94.4		1	%Rec	Limit	70-130	03/28/2016 7:14 PM	Container-01 of 02

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S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 3/29/2016

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Sr.Project Manager : Stu Murrell

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LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1603K37-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 03/25/2016 9:40 AM Point No N-08941
Received : 03/25/2016 11:09 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E522 : Prep Method: E522 Prep Date: 3/28/2016 6:59:28 AM Analyst: SH

Parameter(s)	Results	Qualifier		D.F.	Units		Limit	Analyzed:	Container:
1,4-Dioxane	9.1	D	+	5	µg/L			03/29/2016 3:43 PM	Container-01 of 02
Surr: 1,4-Dioxane-D8	102			1	%Rec	Limit	70-130	03/29/2016 4:17 AM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
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+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 3/29/2016

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Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1603K37-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 03/25/2016 9:40 AM Point No N-08941
Received : 03/25/2016 11:09 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,1,1,2-Tetrachloroethane	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,1,1-Trichloroethane	0.59		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,1,2,2-Tetrachloroethane	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,1,2-Trichloroethane	0.65		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,1-Dichloroethane	1.53		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,1-Dichloroethene	3.34		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,1-Dichloropropene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,2,3-Trichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,2,3-Trichloropropane	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,2,4-Trichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,2,4-Trimethylbenzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,2-Dichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,2-Dichloroethane	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,2-Dichloropropane	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,3,5-Trimethylbenzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,3-Dichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,3-Dichloropropane	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
1,4-Dichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
2,2-Dichloropropane	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
2/4-Chlorotoluene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
4-Isopropyltoluene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
Benzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
Bromobenzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
Bromochloromethane	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
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D.F. = Dilution Factor D = Results for Dilution
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Date Reported : 3/29/2016

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Sr.Project Manager : Stu Murrell

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NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1603K37-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 03/25/2016 9:40 AM Point No N-08941
Received : 03/25/2016 11:09 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Bromodichloromethane	< 0.50		1	µg/L		03/28/2016 7:39 PM	Container-01 of 02
Bromoform	< 0.50		1	µg/L		03/28/2016 7:39 PM	Container-01 of 02
Bromomethane	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
Carbon tetrachloride	1.75		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
Chlorobenzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
Chloroethane	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
Chloroform	1.39		1	µg/L		03/28/2016 7:39 PM	Container-01 of 02
Chloromethane	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
cis-1,2-Dichloroethene	2.43		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
cis-1,3-Dichloropropene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
Dibromochloromethane	< 0.50		1	µg/L		03/28/2016 7:39 PM	Container-01 of 02
Dibromomethane	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
Dichlorodifluoromethane	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
Ethylbenzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
Hexachlorobutadiene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
Isopropylbenzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
m,p-Xylene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
Methyl tert-butyl ether	< 0.50		1	µg/L	10	03/28/2016 7:39 PM	Container-01 of 02
Methylene chloride	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
n-Butylbenzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
n-Propylbenzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
o-Xylene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
sec-Butylbenzene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02
Styrene	< 0.50		1	µg/L	5	03/28/2016 7:39 PM	Container-01 of 02

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Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1603K37-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 03/25/2016 9:40 AM Point No N-08941
Received : 03/25/2016 11:09 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)		Results	Qualifier	D.F.	Units		Limit	Analyzed:	Container:
tert-Butylbenzene		< 0.50		1	µg/L		5	03/28/2016 7:39 PM	Container-01 of 02
Tetrachloroethene		1.99		1	µg/L		5	03/28/2016 7:39 PM	Container-01 of 02
Toluene		< 0.50		1	µg/L		5	03/28/2016 7:39 PM	Container-01 of 02
Total Trihalomethanes		< 2.00		1	µg/L		80	03/28/2016 7:39 PM	Container-01 of 02
trans-1,2-Dichloroethene		< 0.50		1	µg/L		5	03/28/2016 7:39 PM	Container-01 of 02
trans-1,3-Dichloropropene		< 0.50		1	µg/L		5	03/28/2016 7:39 PM	Container-01 of 02
Trichloroethene	*	1,280	D*	50	µg/L		5	03/29/2016 8:31 AM	Container-01 of 02
Trichlorofluoromethane		< 0.50		1	µg/L		5	03/28/2016 7:39 PM	Container-01 of 02
Vinyl chloride		< 0.50		1	µg/L		2	03/28/2016 7:39 PM	Container-01 of 02
Surr: 1,2-Dichlorobenzene-d4		103		1	%Rec	Limit	70-130	03/28/2016 7:39 PM	Container-01 of 02
Surr: 4-Bromofluorobenzene		99.6		1	%Rec	Limit	70-130	03/28/2016 7:39 PM	Container-01 of 02

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Sample Information:
Type : Potable Water
Origin: Treated Well
Special

Treatment
Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1603K37-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 03/25/2016 9:40 AM Point No ASGAC-6-16-2
Received : 03/25/2016 11:09 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E522 : Prep Method: E522 Prep Date: 3/28/2016 6:59:28 AM Analyst: SH

Parameter(s)	Results	Qualifier		D.F.	Units	Limit	Analyzed:	Container:
1,4-Dioxane	8.4	D	+	5	µg/L		03/29/2016 4:08 PM	Container-01 of 02
Surr: 1,4-Dioxane-D8	97.8			1	%Rec	Limit 70-130	03/29/2016 4:41 AM	Container-01 of 02

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Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1603K37-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 03/25/2016 9:40 AM Point No ASGAC-6-16-2
Received : 03/25/2016 11:09 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,1,1,2-Tetrachloroethane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,1,1-Trichloroethane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,1,2,2-Tetrachloroethane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,1,2-Trichloroethane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,1-Dichloroethane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,1-Dichloroethene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,1-Dichloropropene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,2,3-Trichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,2,3-Trichloropropane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,2,4-Trichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,2,4-Trimethylbenzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,2-Dichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,2-Dichloroethane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,2-Dichloropropane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,3,5-Trimethylbenzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,3-Dichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,3-Dichloropropane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
1,4-Dichlorobenzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
2,2-Dichloropropane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
2/4-Chlorotoluene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
4-Isopropyltoluene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
Benzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
Bromobenzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
Bromochloromethane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02

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Origin: Treated Well
Special

Treatment
Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1603K37-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 03/25/2016 9:40 AM Point No ASGAC-6-16-2
Received : 03/25/2016 11:09 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Bromodichloromethane	< 0.50		1	µg/L		03/28/2016 6:49 PM	Container-01 of 02
Bromoform	< 0.50		1	µg/L		03/28/2016 6:49 PM	Container-01 of 02
Bromomethane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
Carbon tetrachloride	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
Chlorobenzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
Chloroethane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
Chloroform	< 0.50		1	µg/L		03/28/2016 6:49 PM	Container-01 of 02
Chloromethane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
cis-1,2-Dichloroethene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
cis-1,3-Dichloropropene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
Dibromochloromethane	< 0.50		1	µg/L		03/28/2016 6:49 PM	Container-01 of 02
Dibromomethane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
Dichlorodifluoromethane	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
Ethylbenzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
Hexachlorobutadiene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
Isopropylbenzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
m,p-Xylene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
Methyl tert-butyl ether	< 0.50		1	µg/L	10	03/28/2016 6:49 PM	Container-01 of 02
Methylene chloride	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
n-Butylbenzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
n-Propylbenzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
o-Xylene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
sec-Butylbenzene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02
Styrene	< 0.50		1	µg/L	5	03/28/2016 6:49 PM	Container-01 of 02

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Parameter(s)	Results	Qualifier	D.F.	Units		Limit	Analyzed:	Container:
tert-Butylbenzene	< 0.50		1	µg/L		5	03/28/2016 6:49 PM	Container-01 of 02
Tetrachloroethene	< 0.50		1	µg/L		5	03/28/2016 6:49 PM	Container-01 of 02
Toluene	< 0.50		1	µg/L		5	03/28/2016 6:49 PM	Container-01 of 02
Total Trihalomethanes	< 2.00		1	µg/L		80	03/28/2016 6:49 PM	Container-01 of 02
trans-1,2-Dichloroethene	< 0.50		1	µg/L		5	03/28/2016 6:49 PM	Container-01 of 02
trans-1,3-Dichloropropene	< 0.50		1	µg/L		5	03/28/2016 6:49 PM	Container-01 of 02
Trichloroethene	< 0.50		1	µg/L		5	03/28/2016 6:49 PM	Container-01 of 02
Trichlorofluoromethane	< 0.50		1	µg/L		5	03/28/2016 6:49 PM	Container-01 of 02
Vinyl chloride	< 0.50		1	µg/L		2	03/28/2016 6:49 PM	Container-01 of 02
Surr: 1,2-Dichlorobenzene-d4	103		1	%Rec	Limit	70-130	03/28/2016 6:49 PM	Container-01 of 02
Surr: 4-Bromofluorobenzene	97.4		1	%Rec	Limit	70-130	03/28/2016 6:49 PM	Container-01 of 02

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Website: www.pacelabs.com

Sample Receipt Checklist

Client Name **BWD** Date and Time Received: **3/25/2016 11:09:00 AM**

Work Order Number: **1603K37** RcptNo: **1** Received by **Amanda De Pascale**

Completed by: John State Reviewed by: Stu Murrell

Completed Date: 3/25/2016 12:37:28 PM Reviewed Date: 3/25/2016 3:58:56 PM

Carrier name: Client

Chain of custody present?	Yes	☑	No	☐		
Chain of custody signed when relinquished and received?	Yes	☑	No	☐		
Chain of custody agrees with sample labels?	Yes	☑	No	☐		
Are matrices correctly identified on Chain of custody?	Yes	☑	No	☐		
Is it clear what analyses were requested?	Yes	☑	No	☐		
Custody seals intact on sample bottles?	Yes	☐	No	☐	Not Present	☑
Samples in proper container/bottle?	Yes	☑	No	☐		
Were correct preservatives used and noted?	Yes	☑	No	☐	NA	☐
Preservative added to bottles:						
Sample Condition?	Intact	☑	Broken	☐	Leaking	☐
Sufficient sample volume for indicated test?	Yes	☑	No	☐		
Were container labels complete (ID, Pres, Date)?	Yes	☑	No	☐		
All samples received within holding time?	Yes	☑	No	☐		
Was an attempt made to cool the samples?	Yes	☑	No	☐	NA	☐
All samples received at a temp. of > 0° C to 6.0° C?	Yes	☑	No	☐	NA	☐
Response when temperature is outside of range:	Samples were collected the same day and chilled.					
Sample Temp. taken and recorded upon receipt?	Yes	☑	No	☐	To 15.9 º	
Water - Were bubbles absent in VOC vials?	Yes	☑	No	☐	No Vials	☐
Water - Was there Chlorine Present?	Yes	☐	No	☐	NA	☑
Water - pH acceptable upon receipt?	Yes	☑	No	☐	No Water	☐
Are Samples considered acceptable?	Yes	☑	No	☐		
Custody Seals present?	Yes	☐	No	☑		
Airbill or Sticker?	Air Bil	☐	Sticker	☐	Not Present	☑
Airbill No:						

Case Number: SDG: SAS:

Any No response should be detailed in the comments section below, if applicable.

Client Contacted? ☐ Yes ☐ No ☑ NA Person Contacted:

Contact Mode: ☐ Phone: ☐ Fax: ☐ Email: ☐ In Person:

Client Instructions:

Date Contacted: Contacted By:

Regarding:

Comments:

CorrectiveAction:

Pace Analytical
575 Broad Hollow Road , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

WorkOrder :
1603K37

Certifications

STATE	CERTIFICATION #
NEW YORK	10478
NEW JERSEY	NY158
CONNECTICUT	PH-0435
MARYLAND	208
MASSACHUSETTS	M-NY026
NEW HAMPSHIRE	2987
RHODE ISLAND	LAO00340
PENNSYLVANIA	68-00350

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LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604814-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 04/08/2016 9:45 AM Point No N-03876
Received : 04/08/2016 11:00 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E524.2 : POC
Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,1,1,2-Tetrachloroethane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,1,1-Trichloroethane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,1,2,2-Tetrachloroethane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,1,2-Trichloroethane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,1-Dichloroethane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,1-Dichloroethene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,1-Dichloropropene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,2,3-Trichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,2,3-Trichloropropane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,2,4-Trichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,2,4-Trimethylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,2-Dichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,2-Dichloroethane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,2-Dichloropropane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,3,5-Trimethylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,3-Dichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,3-Dichloropropane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
1,4-Dichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
2,2-Dichloropropane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
2/4-Chlorotoluene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
4-Isopropyltoluene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
Benzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
Bromobenzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
Bromochloromethane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
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N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/12/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

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25 Adams Ave.
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Attn To : Michael Boufis

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Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 04/08/2016 9:45 AM Point No N-03876
Received : 04/08/2016 11:00 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Bromodichloromethane	< 0.50		1	µg/L		04/11/2016 10:25 AM	Container-02 of 02
Bromoform	< 0.50		1	µg/L		04/11/2016 10:25 AM	Container-02 of 02
Bromomethane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
Carbon tetrachloride	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
Chlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
Chloroethane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
Chloroform	< 0.50		1	µg/L		04/11/2016 10:25 AM	Container-02 of 02
Chloromethane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
cis-1,2-Dichloroethene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
cis-1,3-Dichloropropene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
Dibromochloromethane	< 0.50		1	µg/L		04/11/2016 10:25 AM	Container-02 of 02
Dibromomethane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
Dichlorodifluoromethane	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
Ethylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
Hexachlorobutadiene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
Isopropylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
m,p-Xylene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
Methyl tert-butyl ether	< 0.50		1	µg/L	10	04/11/2016 10:25 AM	Container-02 of 02
Methylene chloride	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
n-Butylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
n-Propylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
o-Xylene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
sec-Butylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02
Styrene	< 0.50		1	µg/L	5	04/11/2016 10:25 AM	Container-02 of 02

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25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604814-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 04/08/2016 9:45 AM Point No N-03876
Received : 04/08/2016 11:00 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)		Results	Qualifier	D.F.	Units		Limit	Analyzed:	Container:
tert-Butylbenzene		< 0.50		1	µg/L		5	04/11/2016 10:25 AM	Container-02 of 02
Tetrachloroethene		3.37		1	µg/L		5	04/11/2016 10:25 AM	Container-02 of 02
Toluene		< 0.50		1	µg/L		5	04/11/2016 10:25 AM	Container-02 of 02
Total Trihalomethanes		< 2.00		1	µg/L		80	04/11/2016 10:25 AM	Container-02 of 02
trans-1,2-Dichloroethene		< 0.50		1	µg/L		5	04/11/2016 10:25 AM	Container-02 of 02
trans-1,3-Dichloropropene		< 0.50		1	µg/L		5	04/11/2016 10:25 AM	Container-02 of 02
Trichloroethene	*	29.0	*	1	µg/L		5	04/11/2016 10:25 AM	Container-02 of 02
Trichlorofluoromethane		< 0.50		1	µg/L		5	04/11/2016 10:25 AM	Container-02 of 02
Vinyl chloride		< 0.50		1	µg/L		2	04/11/2016 10:25 AM	Container-02 of 02
Surr: 1,2-Dichlorobenzene-d4		96.8		1	%Rec	Limit	70-130	04/11/2016 10:25 AM	Container-02 of 02
Surr: 4-Bromofluorobenzene		91.4		1	%Rec	Limit	70-130	04/11/2016 10:25 AM	Container-02 of 02

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Date Reported : 4/12/2016

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Sr.Project Manager : Stu Murrell

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Sample Information:
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Origin: Raw Well
Routine

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604814-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 04/08/2016 9:45 AM Point No N-08941
Received : 04/08/2016 11:00 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E524.2 : POC
Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,1,1,2-Tetrachloroethane	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,1,1-Trichloroethane	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,1,2,2-Tetrachloroethane	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,1,2-Trichloroethane	0.59		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,1-Dichloroethane	1.33		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,1-Dichloroethene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,1-Dichloropropene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,2,3-Trichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,2,3-Trichloropropane	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,2,4-Trichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,2,4-Trimethylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,2-Dichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,2-Dichloroethane	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,2-Dichloropropane	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,3,5-Trimethylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,3-Dichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,3-Dichloropropane	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
1,4-Dichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
2,2-Dichloropropane	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
2/4-Chlorotoluene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
4-Isopropyltoluene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
Benzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
Bromobenzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
Bromochloromethane	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02

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Origin: Raw Well
Routine

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25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604814-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 04/08/2016 9:45 AM Point No N-08941
Received : 04/08/2016 11:00 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Bromodichloromethane	< 0.50		1	µg/L		04/11/2016 10:50 AM	Container-02 of 02
Bromoform	< 0.50		1	µg/L		04/11/2016 10:50 AM	Container-02 of 02
Bromomethane	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
Carbon tetrachloride	1.31		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
Chlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
Chloroethane	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
Chloroform	1.06		1	µg/L		04/11/2016 10:50 AM	Container-02 of 02
Chloromethane	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
cis-1,2-Dichloroethene	2.29		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
cis-1,3-Dichloropropene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
Dibromochloromethane	< 0.50		1	µg/L		04/11/2016 10:50 AM	Container-02 of 02
Dibromomethane	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
Dichlorodifluoromethane	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
Ethylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
Hexachlorobutadiene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
Isopropylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
m,p-Xylene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
Methyl tert-butyl ether	< 0.50		1	µg/L	10	04/11/2016 10:50 AM	Container-02 of 02
Methylene chloride	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
n-Butylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
n-Propylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
o-Xylene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
sec-Butylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02
Styrene	< 0.50		1	µg/L	5	04/11/2016 10:50 AM	Container-02 of 02

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Parameter(s)		Results	Qualifier	D.F.	Units		Limit	Analyzed:	Container:
tert-Butylbenzene		< 0.50		1	µg/L		5	04/11/2016 10:50 AM	Container-02 of 02
Tetrachloroethene		1.83		1	µg/L		5	04/11/2016 10:50 AM	Container-02 of 02
Toluene		< 0.50		1	µg/L		5	04/11/2016 10:50 AM	Container-02 of 02
Total Trihalomethanes		< 2.00		1	µg/L		80	04/11/2016 10:50 AM	Container-02 of 02
trans-1,2-Dichloroethene		< 0.50		1	µg/L		5	04/11/2016 10:50 AM	Container-02 of 02
trans-1,3-Dichloropropene		< 0.50		1	µg/L		5	04/11/2016 10:50 AM	Container-02 of 02
Trichloroethene	*	1,280	D*	50	µg/L		5	04/11/2016 11:40 AM	Container-02 of 02
Trichlorofluoromethane		< 0.50		1	µg/L		5	04/11/2016 10:50 AM	Container-02 of 02
Vinyl chloride		< 0.50		1	µg/L		2	04/11/2016 10:50 AM	Container-02 of 02
Surr: 1,2-Dichlorobenzene-d4		94.8		1	%Rec	Limit	70-130	04/11/2016 10:50 AM	Container-02 of 02
Surr: 4-Bromofluorobenzene		91.0		1	%Rec	Limit	70-130	04/11/2016 10:50 AM	Container-02 of 02

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Sample Information:
Type : Potable Water
Origin: Treated Well
Routine

Treatment
Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604814-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 04/08/2016 9:45 AM Point No ASGAC-6-16-2
Received : 04/08/2016 11:00 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,1,1,2-Tetrachloroethane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,1,1-Trichloroethane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,1,2,2-Tetrachloroethane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,1,2-Trichloroethane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,1-Dichloroethane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,1-Dichloroethene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,1-Dichloropropene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,2,3-Trichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,2,3-Trichloropropane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,2,4-Trichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,2,4-Trimethylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,2-Dichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,2-Dichloroethane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,2-Dichloropropane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,3,5-Trimethylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,3-Dichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,3-Dichloropropane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
1,4-Dichlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
2,2-Dichloropropane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
2/4-Chlorotoluene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
4-Isopropyltoluene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
Benzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
Bromobenzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
Bromochloromethane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/12/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

Pace Analytical
575 Broad Hollow Road , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results are only for the samples and analytes requested.

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the tests requested.

Sample Information:
Type : Potable Water
Origin: Treated Well
Routine

Treatment
Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604814-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 04/08/2016 9:45 AM Point No ASGAC-6-16-2
Received : 04/08/2016 11:00 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Bromodichloromethane	< 0.50		1	µg/L		04/11/2016 10:00 AM	Container-02 of 02
Bromoform	< 0.50		1	µg/L		04/11/2016 10:00 AM	Container-02 of 02
Bromomethane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
Carbon tetrachloride	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
Chlorobenzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
Chloroethane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
Chloroform	< 0.50		1	µg/L		04/11/2016 10:00 AM	Container-02 of 02
Chloromethane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
cis-1,2-Dichloroethene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
cis-1,3-Dichloropropene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
Dibromochloromethane	< 0.50		1	µg/L		04/11/2016 10:00 AM	Container-02 of 02
Dibromomethane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
Dichlorodifluoromethane	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
Ethylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
Hexachlorobutadiene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
Isopropylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
m,p-Xylene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
Methyl tert-butyl ether	< 0.50		1	µg/L	10	04/11/2016 10:00 AM	Container-02 of 02
Methylene chloride	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
n-Butylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
n-Propylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
o-Xylene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
sec-Butylbenzene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02
Styrene	< 0.50		1	µg/L	5	04/11/2016 10:00 AM	Container-02 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
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N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/12/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

Pace Analytical
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TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results are only for the samples and analytes requested.

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Sample Information:
Type : Potable Water
Origin: Treated Well
Routine

Treatment
Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604814-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 04/08/2016 9:45 AM Point No ASGAC-6-16-2
Received : 04/08/2016 11:00 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units		Limit	Analyzed:	Container:
tert-Butylbenzene	< 0.50		1	µg/L		5	04/11/2016 10:00 AM	Container-02 of 02
Tetrachloroethene	< 0.50		1	µg/L		5	04/11/2016 10:00 AM	Container-02 of 02
Toluene	< 0.50		1	µg/L		5	04/11/2016 10:00 AM	Container-02 of 02
Total Trihalomethanes	< 2.00		1	µg/L		80	04/11/2016 10:00 AM	Container-02 of 02
trans-1,2-Dichloroethene	< 0.50		1	µg/L		5	04/11/2016 10:00 AM	Container-02 of 02
trans-1,3-Dichloropropene	< 0.50		1	µg/L		5	04/11/2016 10:00 AM	Container-02 of 02
Trichloroethene	< 0.50		1	µg/L		5	04/11/2016 10:00 AM	Container-02 of 02
Trichlorofluoromethane	< 0.50		1	µg/L		5	04/11/2016 10:00 AM	Container-02 of 02
Vinyl chloride	< 0.50		1	µg/L		2	04/11/2016 10:00 AM	Container-02 of 02
Surr: 1,2-Dichlorobenzene-d4	92.6		1	%Rec	Limit	70-130	04/11/2016 10:00 AM	Container-02 of 02
Surr: 4-Bromofluorobenzene	85.2		1	%Rec	Limit	70-130	04/11/2016 10:00 AM	Container-02 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
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c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/12/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

PACE ANALYTICAL
575 Broad Hollow Road
Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
Website: www.pacelabs.com

Sample Receipt Checklist

Client Name **BWD** Date and Time Received: **4/8/2016 11:00:00 AM**

Work Order Number: **1604814** RcptNo: **1** Received by **Matthew Grasso**

Completed by: Reviewed by:

Completed Date: 4/8/2016 4:00:36 PM Reviewed Date: 4/9/2016 2:49:16 PM

Carrier name: Client

Chain of custody present?	Yes	☑	No	☐		
Chain of custody signed when relinquished and received?	Yes	☑	No	☐		
Chain of custody agrees with sample labels?	Yes	☑	No	☐		
Are matrices correctly identified on Chain of custody?	Yes	☑	No	☐		
Is it clear what analyses were requested?	Yes	☑	No	☐		
Custody seals intact on sample bottles?	Yes	☐	No	☐	Not Present	☑
Samples in proper container/bottle?	Yes	☑	No	☐		
Were correct preservatives used and noted?	Yes	☑	No	☐	NA	☐
Preservative added to bottles:						
Sample Condition?	Intact	☑	Broken	☐	Leaking	☐
Sufficient sample volume for indicated test?	Yes	☑	No	☐		
Were container labels complete (ID, Pres, Date)?	Yes	☑	No	☐		
All samples received within holding time?	Yes	☑	No	☐		
Was an attempt made to cool the samples?	Yes	☑	No	☐	NA	☐
All samples received at a temp. of > 0° C to 6.0° C?	Yes	☐	No	☐	NA	☑
Response when temperature is outside of range:						
Sample Temp. taken and recorded upon receipt?	Yes	☑	No	☐	To 14.7 º	
Water - Were bubbles absent in VOC vials?	Yes	☑	No	☐	No Vials	☐
Water - Was there Chlorine Present?	Yes	☐	No	☐	NA	☑
Water - pH acceptable upon receipt?	Yes	☑	No	☐	No Water	☐
Are Samples considered acceptable?	Yes	☑	No	☐		
Custody Seals present?	Yes	☐	No	☑		
Airbill or Sticker?	Air Bil	☐	Sticker	☐	Not Present	☑
Airbill No:						

Case Number: SDG: SAS:

Any No response should be detailed in the comments section below, if applicable.

Client Contacted? ☐ Yes ☐ No ☑ NA Person Contacted:

Contact Mode: ☐ Phone: ☐ Fax: ☐ Email: ☐ In Person:

Client Instructions:

Date Contacted: Contacted By:

Regarding:

Comments:

CorrectiveAction:

Pace Analytical
575 Broad Hollow Road , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

WorkOrder :
1604814

Certifications

STATE	CERTIFICATION #
NEW YORK	10478
NEW JERSEY	NY158
CONNECTICUT	PH-0435
MARYLAND	208
MASSACHUSETTS	M-NY026
NEW HAMPSHIRE	2987
RHODE ISLAND	LAO00340
PENNSYLVANIA	68-00350

Pace Analytical
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NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results are only for the samples and analytes requested.

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604813-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 04/08/2016 9:45 AM Point No N-03876
Received : 04/08/2016 11:00 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E522 : Prep Method: E522 Prep Date: 4/11/2016 6:48:33 AM Analyst: SH

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,4-Dioxane	9.6	D +	5	µg/L		04/12/2016 2:42 AM	Container-01 of 02
Surr: 1,4-Dioxane-D8	88.0		1	%Rec	Limit 70-130	04/12/2016 12:13 AM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/12/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

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TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results are only for the samples and analytes requested.

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Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604813-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 04/08/2016 9:45 AM Point No N-08941
Received : 04/08/2016 11:00 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E522 : Prep Method: E522 Prep Date: 4/11/2016 6:48:33 AM Analyst: SH

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,4-Dioxane	7.3	D +	5	µg/L		04/12/2016 3:07 AM	Container-01 of 02
Surr: 1,4-Dioxane-D8	90.6		1	%Rec	Limit 70-130	04/12/2016 12:37 AM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/12/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

Pace Analytical
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NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results are only for the samples and analytes requested.

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the tests requested.

Sample Information:
Type : Potable Water
Origin: Treated Well
Special

Treatment
Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604813-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 04/08/2016 9:45 AM Point No ASGAC-6-16-2
Received : 04/08/2016 11:00 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E522 : Prep Method: E522 Prep Date: 4/11/2016 6:48:33 AM Analyst: SH

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,4-Dioxane	7.4	D +	5	µg/L		04/12/2016 3:32 AM	Container-01 of 02
Surr: 1,4-Dioxane-D8	92.5		1	%Rec	Limit 70-130	04/12/2016 1:02 AM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/12/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

PACE ANALYTICAL
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Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
Website: www.pacelabs.com

Sample Receipt Checklist

Client Name **BWD** Date and Time Received: **4/8/2016 11:00:00 AM**

Work Order Number: **1604813** RcptNo: **1** Received by **Matthew Grasso**

Completed by:  Reviewed by: 

Completed Date: 4/8/2016 3:57:11 PM Reviewed Date: 4/9/2016 2:48:31 PM

Carrier name: Client

Chain of custody present?	Yes	☑	No	☐		
Chain of custody signed when relinquished and received?	Yes	☑	No	☐		
Chain of custody agrees with sample labels?	Yes	☑	No	☐		
Are matrices correctly identified on Chain of custody?	Yes	☑	No	☐		
Is it clear what analyses were requested?	Yes	☑	No	☐		
Custody seals intact on sample bottles?	Yes	☐	No	☐	Not Present	☑
Samples in proper container/bottle?	Yes	☑	No	☐		
Were correct preservatives used and noted?	Yes	☑	No	☐	NA	☐
Preservative added to bottles:						
Sample Condition?	Intact	☑	Broken	☐	Leaking	☐
Sufficient sample volume for indicated test?	Yes	☑	No	☐		
Were container labels complete (ID, Pres, Date)?	Yes	☑	No	☐		
All samples received within holding time?	Yes	☑	No	☐		
Was an attempt made to cool the samples?	Yes	☑	No	☐	NA	☐
All samples received at a temp. of > 0° C to 6.0° C?	Yes	☐	No	☐	NA	☑
Response when temperature is outside of range:						
Sample Temp. taken and recorded upon receipt?	Yes	☑	No	☐	To 14.7 º	
Water - Were bubbles absent in VOC vials?	Yes	☐	No	☐	No Vials	☑
Water - Was there Chlorine Present?	Yes	☐	No	☐	NA	☑
Water - pH acceptable upon receipt?	Yes	☑	No	☐	No Water	☐
Are Samples considered acceptable?	Yes	☑	No	☐		
Custody Seals present?	Yes	☐	No	☑		
Airbill or Sticker?	Air Bil	☐	Sticker	☐	Not Present	☑
Airbill No:						

Case Number: SDG: SAS:

Any No response should be detailed in the comments section below, if applicable.

Client Contacted? ☐ Yes ☐ No ☑ NA Person Contacted:

Contact Mode: ☐ Phone: ☐ Fax: ☐ Email: ☐ In Person:

Client Instructions:

Date Contacted: Contacted By:

Regarding:

Comments:

CorrectiveAction:

Pace Analytical
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TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

WorkOrder :
1604813

Certifications

STATE	CERTIFICATION #
NEW YORK	10478
NEW JERSEY	NY158
CONNECTICUT	PH-0435
MARYLAND	208
MASSACHUSETTS	M-NY026
NEW HAMPSHIRE	2987
RHODE ISLAND	LAO00340
PENNSYLVANIA	68-00350

Pace Analytical
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NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results are only for the samples and analytes requested.

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604L10-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 04/22/2016 10:30 AM Point No: N-03876
Received : 04/22/2016 11:00 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: MaiN

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,1,1,2-Tetrachloroethane	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,1,1-Trichloroethane	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,1,2,2-Tetrachloroethane	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,1,2-Trichloroethane	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,1-Dichloroethane	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,1-Dichloroethene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,1-Dichloropropene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,2,3-Trichlorobenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,2,3-Trichloropropane	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,2,4-Trichlorobenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,2,4-Trimethylbenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,2-Dichlorobenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,2-Dichloroethane	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,2-Dichloropropane	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,3,5-Trimethylbenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,3-Dichlorobenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,3-Dichloropropane	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
1,4-Dichlorobenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
2,2-Dichloropropane	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
2/4-Chlorotoluene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
4-Isopropyltoluene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Benzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Bromobenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Bromochloromethane	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Bromodichloromethane	< 0.50		1	µg/L		04/25/2016 2:20 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
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M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/26/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

Pace Analytical
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TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604L10-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 04/22/2016 10:30 AM Point No: N-03876
Received : 04/22/2016 11:00 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: MaiN

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Bromoform	< 0.50		1	µg/L		04/25/2016 2:20 PM	Container-01 of 02
Bromomethane	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Carbon tetrachloride	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Chlorobenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Chloroethane	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Chloroform	< 0.50		1	µg/L		04/25/2016 2:20 PM	Container-01 of 02
Chloromethane	< 0.50	S	1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
cis-1,2-Dichloroethene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
cis-1,3-Dichloropropene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Dibromochloromethane	< 0.50		1	µg/L		04/25/2016 2:20 PM	Container-01 of 02
Dibromomethane	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Dichlorodifluoromethane	< 0.50	S	1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Ethylbenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Hexachlorobutadiene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Isopropylbenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
m,p-Xylene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Methyl tert-butyl ether	< 0.50		1	µg/L	10	04/25/2016 2:20 PM	Container-01 of 02
Methylene chloride	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
n-Butylbenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
n-Propylbenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
o-Xylene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
sec-Butylbenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Styrene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
tert-Butylbenzene	< 0.50		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02
Tetrachloroethene	3.88		1	µg/L	5	04/25/2016 2:20 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
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S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/26/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

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NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604L10-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 04/22/2016 10:30 AM Point No: N-03876
Received : 04/22/2016 11:00 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: MaiN

Parameter(s)		Results	Qualifier	D.F.	Units		Limit	Analyzed:	Container:
Toluene		< 0.50		1	µg/L		5	04/25/2016 2:20 PM	Container-01 of 02
Total Trihalomethanes		< 2.00		1	µg/L		80	04/25/2016 2:20 PM	Container-01 of 02
trans-1,2-Dichloroethene		< 0.50		1	µg/L		5	04/25/2016 2:20 PM	Container-01 of 02
trans-1,3-Dichloropropene		< 0.50		1	µg/L		5	04/25/2016 2:20 PM	Container-01 of 02
Trichloroethene	*	34.2	*	1	µg/L		5	04/25/2016 2:20 PM	Container-01 of 02
Trichlorofluoromethane		< 0.50		1	µg/L		5	04/25/2016 2:20 PM	Container-01 of 02
Vinyl chloride		< 0.50		1	µg/L		2	04/25/2016 2:20 PM	Container-01 of 02
Surr: 1,2-Dichlorobenzene-d4		93.4		1	%Rec	Limit	70-130	04/25/2016 2:20 PM	Container-01 of 02
Surr: 4-Bromofluorobenzene		80.6		1	%Rec	Limit	70-130	04/25/2016 2:20 PM	Container-01 of 02

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M-, M+ = Matrix Spike recovery below / above control limit
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r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
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Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/26/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

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LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604L10-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 04/22/2016 10:30 AM Point No: N-08941
Received : 04/22/2016 11:00 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: MaiN

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,1,1,2-Tetrachloroethane	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,1,1-Trichloroethane	0.53		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,1,2,2-Tetrachloroethane	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,1,2-Trichloroethane	0.63		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,1-Dichloroethane	1.44		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,1-Dichloroethene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,1-Dichloropropene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,2,3-Trichlorobenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,2,3-Trichloropropane	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,2,4-Trichlorobenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,2,4-Trimethylbenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,2-Dichlorobenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,2-Dichloroethane	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,2-Dichloropropane	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,3,5-Trimethylbenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,3-Dichlorobenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,3-Dichloropropane	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
1,4-Dichlorobenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
2,2-Dichloropropane	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
2/4-Chlorotoluene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
4-Isopropyltoluene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Benzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Bromobenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Bromochloromethane	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Bromodichloromethane	< 0.50		1	µg/L		04/25/2016 1:04 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
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Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/26/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

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LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604L10-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 04/22/2016 10:30 AM Point No: N-08941
Received : 04/22/2016 11:00 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: MaiN

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Bromoform	< 0.50		1	µg/L		04/25/2016 1:04 PM	Container-01 of 02
Bromomethane	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Carbon tetrachloride	1.55		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Chlorobenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Chloroethane	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Chloroform	1.26		1	µg/L		04/25/2016 1:04 PM	Container-01 of 02
Chloromethane	< 0.50	S	1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
cis-1,2-Dichloroethene	2.52		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
cis-1,3-Dichloropropene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Dibromochloromethane	< 0.50		1	µg/L		04/25/2016 1:04 PM	Container-01 of 02
Dibromomethane	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Dichlorodifluoromethane	< 0.50	S	1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Ethylbenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Hexachlorobutadiene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Isopropylbenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
m,p-Xylene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Methyl tert-butyl ether	< 0.50		1	µg/L	10	04/25/2016 1:04 PM	Container-01 of 02
Methylene chloride	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
n-Butylbenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
n-Propylbenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
o-Xylene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
sec-Butylbenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Styrene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
tert-Butylbenzene	< 0.50		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02
Tetrachloroethene	2.06		1	µg/L	5	04/25/2016 1:04 PM	Container-01 of 02

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S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/26/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

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LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604L10-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 04/22/2016 10:30 AM Point No: N-08941
Received : 04/22/2016 11:00 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: MaiN

Parameter(s)		Results	Qualifier	D.F.	Units		Limit	Analyzed:	Container:
Toluene		< 0.50		1	µg/L		5	04/25/2016 1:04 PM	Container-01 of 02
Total Trihalomethanes		< 2.00		1	µg/L		80	04/25/2016 1:04 PM	Container-01 of 02
trans-1,2-Dichloroethene		< 0.50		1	µg/L		5	04/25/2016 1:04 PM	Container-01 of 02
trans-1,3-Dichloropropene		< 0.50		1	µg/L		5	04/25/2016 1:04 PM	Container-01 of 02
Trichloroethene	*	947	D*	50	µg/L		5	04/25/2016 5:15 PM	Container-02 of 02
Trichlorofluoromethane		< 0.50		1	µg/L		5	04/25/2016 1:04 PM	Container-01 of 02
Vinyl chloride		< 0.50		1	µg/L		2	04/25/2016 1:04 PM	Container-01 of 02
Surr: 1,2-Dichlorobenzene-d4		95.2		1	%Rec	Limit	70-130	04/25/2016 1:04 PM	Container-01 of 02
Surr: 4-Bromofluorobenzene		91.6		1	%Rec	Limit	70-130	04/25/2016 1:04 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
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P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/26/2016

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LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Treated Well
Routine

Treatment
Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604L10-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 04/22/2016 10:30 AM Point No: ASGAC-6-16-2
Received : 04/22/2016 11:00 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: MaiN

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,1,1,2-Tetrachloroethane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,1,1-Trichloroethane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,1,2,2-Tetrachloroethane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,1,2-Trichloroethane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,1-Dichloroethane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,1-Dichloroethene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,1-Dichloropropene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,2,3-Trichlorobenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,2,3-Trichloropropane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,2,4-Trichlorobenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,2,4-Trimethylbenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,2-Dichlorobenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,2-Dichloroethane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,2-Dichloropropane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,3,5-Trimethylbenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,3-Dichlorobenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,3-Dichloropropane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
1,4-Dichlorobenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
2,2-Dichloropropane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
2/4-Chlorotoluene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
4-Isopropyltoluene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Benzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Bromobenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Bromochloromethane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Bromodichloromethane	< 0.50		1	µg/L		04/26/2016 8:42 AM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
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N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/26/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

Pace Analytical
575 Broad Hollow Road , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results are only for the samples and analytes requested.

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the tests requested.

Sample Information:
Type : Potable Water
Origin: Treated Well
Routine

Treatment
Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604L10-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 04/22/2016 10:30 AM Point No: ASGAC-6-16-2
Received : 04/22/2016 11:00 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: MaiN

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Bromoform	< 0.50		1	µg/L		04/26/2016 8:42 AM	Container-01 of 02
Bromomethane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Carbon tetrachloride	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Chlorobenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Chloroethane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Chloroform	< 0.50		1	µg/L		04/26/2016 8:42 AM	Container-01 of 02
Chloromethane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
cis-1,2-Dichloroethene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
cis-1,3-Dichloropropene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Dibromochloromethane	< 0.50		1	µg/L		04/26/2016 8:42 AM	Container-01 of 02
Dibromomethane	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Dichlorodifluoromethane	< 0.50	S	1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Ethylbenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Hexachlorobutadiene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Isopropylbenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
m,p-Xylene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Methyl tert-butyl ether	< 0.50		1	µg/L	10	04/26/2016 8:42 AM	Container-01 of 02
Methylene chloride	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
n-Butylbenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
n-Propylbenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
o-Xylene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
sec-Butylbenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Styrene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
tert-Butylbenzene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02
Tetrachloroethene	< 0.50		1	µg/L	5	04/26/2016 8:42 AM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
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r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/26/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

Pace Analytical
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TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Treated Well
Routine

Treatment
Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604L10-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 04/22/2016 10:30 AM Point No: ASGAC-6-16-2
Received : 04/22/2016 11:00 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: MaiN

Parameter(s)	Results	Qualifier	D.F.	Units		Limit	Analyzed:	Container:
Toluene	< 0.50		1	µg/L		5	04/26/2016 8:42 AM	Container-01 of 02
Total Trihalomethanes	< 2.00		1	µg/L		80	04/26/2016 8:42 AM	Container-01 of 02
trans-1,2-Dichloroethene	< 0.50		1	µg/L		5	04/26/2016 8:42 AM	Container-01 of 02
trans-1,3-Dichloropropene	< 0.50		1	µg/L		5	04/26/2016 8:42 AM	Container-01 of 02
Trichloroethene	0.59		1	µg/L		5	04/26/2016 8:42 AM	Container-01 of 02
Trichlorofluoromethane	< 0.50		1	µg/L		5	04/26/2016 8:42 AM	Container-01 of 02
Vinyl chloride	< 0.50		1	µg/L		2	04/26/2016 8:42 AM	Container-01 of 02
Surr: 1,2-Dichlorobenzene-d4	93.2		1	%Rec	Limit	70-130	04/26/2016 8:42 AM	Container-01 of 02
Surr: 4-Bromofluorobenzene	85.2		1	%Rec	Limit	70-130	04/26/2016 8:42 AM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
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N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/26/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

PACE ANALYTICAL
575 Broad Hollow Road
Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
Website: www.pacelabs.com

Sample Receipt Checklist

Client Name **BWD** Date and Time Received: **4/22/2016 11:00:00 AM**

Work Order Number: **1604L10** RcptNo: **1** Received by: **George Cappadona**

Completed by: John State Reviewed by: Stu Murrell

Completed Date: 4/22/2016 12:00:36 PM Reviewed Date: 4/26/2016 11:12:15 AM

Carrier name: Client

Chain of custody present?	Yes	☑	No	☐		
Chain of custody signed when relinquished and received?	Yes	☑	No	☐		
Chain of custody agrees with sample labels?	Yes	☑	No	☐		
Are matrices correctly identified on Chain of custody?	Yes	☑	No	☐		
Is it clear what analyses were requested?	Yes	☑	No	☐		
Custody seals intact on sample bottles?	Yes	☐	No	☐	Not Present	☑
Samples in proper container/bottle?	Yes	☑	No	☐		
Were correct preservatives used and noted?	Yes	☑	No	☐	NA	☐
Preservative added to bottles:						
Sample Condition?	Intact	☑	Broken	☐	Leaking	☐
Sufficient sample volume for indicated test?	Yes	☑	No	☐		
Were container labels complete (ID, Pres, Date)?	Yes	☑	No	☐		
All samples received within holding time?	Yes	☑	No	☐		
Was an attempt made to cool the samples?	Yes	☑	No	☐	NA	☐
All samples received at a temp. of > 0° C to 6.0° C?	Yes	☑	No	☐	NA	☐
Response when temperature is outside of range:	Samples were collected the same day and chilled.					
Sample Temp. taken and recorded upon receipt?	Yes	☑	No	☐	To 16.2 º	
Water - Were bubbles absent in VOC vials?	Yes	☑	No	☐	No Vials	☐
Water - Was there Chlorine Present?	Yes	☐	No	☐	NA	☑
Water - pH acceptable upon receipt?	Yes	☑	No	☐	No Water	☐
Are Samples considered acceptable?	Yes	☑	No	☐		
Custody Seals present?	Yes	☐	No	☑		
Airbill or Sticker?	Air Bill	☐	Sticker	☐	Not Present	☑
Airbill No:						

Case Number: SDG: SAS:

Any No response should be detailed in the comments section below, if applicable.

Client Contacted? ☐ Yes ☐ No ☑ NA Person Contacted:

Contact Mode: ☐ Phone: ☐ Fax: ☐ Email: ☐ In Person:

Client Instructions:

Date Contacted: Contacted By:

Regarding:

Comments:

CorrectiveAction:

Pace Analytical
575 Broad Hollow Road , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

WorkOrder :
1604L10

Certifications

STATE	CERTIFICATION #
NEW YORK	10478
NEW JERSEY	NY158
CONNECTICUT	PH-0435
MARYLAND	208
MASSACHUSETTS	M-NY026
NEW HAMPSHIRE	2987
RHODE ISLAND	LAO00340
PENNSYLVANIA	68-00350

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LABORATORY RESULTS

Results are only for the samples and analytes requested.

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604L07-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 04/22/2016 10:30 AM Point No: N-03876
Received : 04/22/2016 11:00 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E522 : Prep Method: E522 Prep Date: 4/22/2016 1:30:00 PM Analyst: SH

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,4-Dioxane	11	D +	5	µg/L		04/23/2016 12:03 AM	Container-01 of 02
Surr: 1,4-Dioxane-D8	95.4		1	%Rec	Limit 70-130	04/22/2016 9:58 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with ♣ Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/26/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

Pace Analytical
575 Broad Hollow Road , Melville, NY 11747
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NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results are only for the samples and analytes requested.

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Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604L07-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 04/22/2016 10:30 AM Point No: N-08941
Received : 04/22/2016 11:00 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E522 : Prep Method: E522 Prep Date: 4/22/2016 1:30:00 PM Analyst: SH

Parameter(s)	Results	Qualifier	D.F.	Units	Limit		Analyzed:	Container:
1,4-Dioxane	8.5	D +	5	µg/L			04/23/2016 12:28 AM	Container-01 of 02
Surr: 1,4-Dioxane-D8	97.1		1	%Rec	Limit	70-130	04/22/2016 10:23 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/26/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

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NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results are only for the samples and analytes requested.

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Sample Information:
Type : Potable Water
Origin: Treated Well
Special

Treatment
Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604L07-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 04/22/2016 10:30 AM Point No: ASGAC-6-16-2
Received : 04/22/2016 11:00 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E522 : Prep Method: E522 Prep Date: 4/22/2016 1:30:00 PM Analyst: SH

Parameter(s)	Results	Qualifier	D.F.	Units	Limit		Analyzed:	Container:
1,4-Dioxane	8.8	D +	5	µg/L			04/23/2016 12:53 AM	Container-01 of 02
Surr: 1,4-Dioxane-D8	96.1		1	%Rec	Limit	70-130	04/22/2016 10:48 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with ♣ Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 4/26/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

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Melville, NY 11747
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Website: www.pacelabs.com

Sample Receipt Checklist

Client Name **BWD** Date and Time Received: **4/22/2016 11:00:00 AM**

Work Order Number: **1604L07** RcptNo: **1** Received by: **George Cappadona**

Completed by: John State Reviewed by: Stu Murrell

Completed Date: 4/22/2016 11:57:48 AM Reviewed Date: 4/26/2016 11:11:47 AM

Carrier name: Client

Chain of custody present?	Yes	☑	No	☐		
Chain of custody signed when relinquished and received?	Yes	☑	No	☐		
Chain of custody agrees with sample labels?	Yes	☑	No	☐		
Are matrices correctly identified on Chain of custody?	Yes	☑	No	☐		
Is it clear what analyses were requested?	Yes	☑	No	☐		
Custody seals intact on sample bottles?	Yes	☐	No	☐	Not Present	☑
Samples in proper container/bottle?	Yes	☑	No	☐		
Were correct preservatives used and noted?	Yes	☑	No	☐	NA	☐
Preservative added to bottles:						
Sample Condition?	Intact	☑	Broken	☐	Leaking	☐
Sufficient sample volume for indicated test?	Yes	☑	No	☐		
Were container labels complete (ID, Pres, Date)?	Yes	☑	No	☐		
All samples received within holding time?	Yes	☑	No	☐		
Was an attempt made to cool the samples?	Yes	☑	No	☐	NA	☐
All samples received at a temp. of > 0° C to 6.0° C?	Yes	☑	No	☐	NA	☐
Response when temperature is outside of range:	Samples were collected the same day and chilled.					
Sample Temp. taken and recorded upon receipt?	Yes	☑	No	☐	To 16.2 º	
Water - Were bubbles absent in VOC vials?	Yes	☐	No	☐	No Vials	☑
Water - Was there Chlorine Present?	Yes	☐	No	☐	NA	☑
Water - pH acceptable upon receipt?	Yes	☑	No	☐	No Water	☐
Are Samples considered acceptable?	Yes	☑	No	☐		
Custody Seals present?	Yes	☐	No	☑		
Airbill or Sticker?	Air Bill	☐	Sticker	☐	Not Present	☑
Airbill No:						

Case Number: SDG: SAS:

Any No response should be detailed in the comments section below, if applicable.

Client Contacted? ☐ Yes ☐ No ☑ NA Person Contacted:

Contact Mode: ☐ Phone: ☐ Fax: ☐ Email: ☐ In Person:

Client Instructions:

Date Contacted: Contacted By:

Regarding:

Comments:

CorrectiveAction:

Pace Analytical
575 Broad Hollow Road , Melville, NY 11747
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NYSDOH ID#10478 www.pacelabs.com

WorkOrder :
1604L07

Certifications

STATE	CERTIFICATION #
NEW YORK	10478
NEW JERSEY	NY158
CONNECTICUT	PH-0435
MARYLAND	208
MASSACHUSETTS	M-NY026
NEW HAMPSHIRE	2987
RHODE ISLAND	LAO00340
PENNSYLVANIA	68-00350

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LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604R27-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 04/29/2016 9:15 AM Point No: N-03876
Received : 04/29/2016 10:00 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,1,1,2-Tetrachloroethane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,1,1-Trichloroethane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,1,2,2-Tetrachloroethane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,1,2-Trichloroethane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,1-Dichloroethane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,1-Dichloroethene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,1-Dichloropropene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,2,3-Trichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,2,3-Trichloropropane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,2,4-Trichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,2,4-Trimethylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,2-Dichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,2-Dichloroethane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,2-Dichloropropane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,3,5-Trimethylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,3-Dichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,3-Dichloropropane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
1,4-Dichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
2,2-Dichloropropane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
2/4-Chlorotoluene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
4-Isopropyltoluene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Benzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Bromobenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Bromochloromethane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Bromodichloromethane	< 0.50		1	µg/L		05/03/2016 3:16 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
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D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 5/3/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

Pace Analytical
575 Broad Hollow Road , Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604R27-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 04/29/2016 9:15 AM Point No: N-03876
Received : 04/29/2016 10:00 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Bromoform	< 0.50		1	µg/L		05/03/2016 3:16 PM	Container-01 of 02
Bromomethane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Carbon tetrachloride	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Chlorobenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Chloroethane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Chloroform	< 0.50		1	µg/L		05/03/2016 3:16 PM	Container-01 of 02
Chloromethane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
cis-1,2-Dichloroethene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
cis-1,3-Dichloropropene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Dibromochloromethane	< 0.50		1	µg/L		05/03/2016 3:16 PM	Container-01 of 02
Dibromomethane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Dichlorodifluoromethane	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Ethylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Hexachlorobutadiene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Isopropylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
m,p-Xylene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Methyl tert-butyl ether	< 0.50		1	µg/L	10	05/03/2016 3:16 PM	Container-01 of 02
Methylene chloride	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
n-Butylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
n-Propylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
o-Xylene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
sec-Butylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Styrene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
tert-Butylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02
Tetrachloroethene	3.13		1	µg/L	5	05/03/2016 3:16 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 5/3/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

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NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604R27-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 04/29/2016 9:15 AM Point No: N-03876
Received : 04/29/2016 10:00 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)		Results	Qualifier	D.F.	Units		Limit	Analyzed:	Container:
Toluene		< 0.50		1	µg/L		5	05/03/2016 3:16 PM	Container-01 of 02
Total Trihalomethanes		< 2.00		1	µg/L		80	05/03/2016 3:16 PM	Container-01 of 02
trans-1,2-Dichloroethene		< 0.50		1	µg/L		5	05/03/2016 3:16 PM	Container-01 of 02
trans-1,3-Dichloropropene		< 0.50		1	µg/L		5	05/03/2016 3:16 PM	Container-01 of 02
Trichloroethene	*	22.1	*	1	µg/L		5	05/03/2016 3:16 PM	Container-01 of 02
Trichlorofluoromethane		< 0.50		1	µg/L		5	05/03/2016 3:16 PM	Container-01 of 02
Vinyl chloride		< 0.50		1	µg/L		2	05/03/2016 3:16 PM	Container-01 of 02
Surr: 1,2-Dichlorobenzene-d4		94.8		1	%Rec	Limit	70-130	05/03/2016 3:16 PM	Container-01 of 02
Surr: 4-Bromofluorobenzene		90.6		1	%Rec	Limit	70-130	05/03/2016 3:16 PM	Container-01 of 02

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M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
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r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 5/3/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

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NYSDOH ID#10478 www.pacelabs.com

Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

LABORATORY RESULTS

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Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604R27-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 04/29/2016 9:15 AM Point No: N-08941
Received : 04/29/2016 10:00 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,1,1,2-Tetrachloroethane	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,1,1-Trichloroethane	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,1,2,2-Tetrachloroethane	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,1,2-Trichloroethane	0.63		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,1-Dichloroethane	1.41		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,1-Dichloroethene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,1-Dichloropropene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,2,3-Trichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,2,3-Trichloropropane	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,2,4-Trichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,2,4-Trimethylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,2-Dichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,2-Dichloroethane	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,2-Dichloropropane	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,3,5-Trimethylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,3-Dichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,3-Dichloropropane	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
1,4-Dichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
2,2-Dichloropropane	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
2/4-Chlorotoluene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
4-Isopropyltoluene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Benzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Bromobenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Bromochloromethane	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Bromodichloromethane	< 0.50		1	µg/L		05/03/2016 3:41 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
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D.F. = Dilution Factor D = Results for Dilution
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Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 5/3/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

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NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results are only for the samples and analytes requested.

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Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604R27-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 04/29/2016 9:15 AM Point No: N-08941
Received : 04/29/2016 10:00 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Bromoform	< 0.50		1	µg/L		05/03/2016 3:41 PM	Container-01 of 02
Bromomethane	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Carbon tetrachloride	1.53		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Chlorobenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Chloroethane	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Chloroform	1.10		1	µg/L		05/03/2016 3:41 PM	Container-01 of 02
Chloromethane	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
cis-1,2-Dichloroethene	2.21		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
cis-1,3-Dichloropropene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Dibromochloromethane	< 0.50		1	µg/L		05/03/2016 3:41 PM	Container-01 of 02
Dibromomethane	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Dichlorodifluoromethane	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Ethylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Hexachlorobutadiene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Isopropylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
m,p-Xylene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Methyl tert-butyl ether	< 0.50		1	µg/L	10	05/03/2016 3:41 PM	Container-01 of 02
Methylene chloride	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
n-Butylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
n-Propylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
o-Xylene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
sec-Butylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Styrene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
tert-Butylbenzene	< 0.50		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02
Tetrachloroethene	2.00		1	µg/L	5	05/03/2016 3:41 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
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Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 5/3/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

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LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Raw Well
Routine

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604R27-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 04/29/2016 9:15 AM Point No: N-08941
Received : 04/29/2016 10:00 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)		Results	Qualifier	D.F.	Units		Limit	Analyzed:	Container:
Toluene		< 0.50		1	µg/L		5	05/03/2016 3:41 PM	Container-01 of 02
Total Trihalomethanes		< 2.00		1	µg/L		80	05/03/2016 3:41 PM	Container-01 of 02
trans-1,2-Dichloroethene		< 0.50		1	µg/L		5	05/03/2016 3:41 PM	Container-01 of 02
trans-1,3-Dichloropropene		< 0.50		1	µg/L		5	05/03/2016 3:41 PM	Container-01 of 02
Trichloroethene	*	1,440	D*	50	µg/L		5	05/03/2016 4:56 PM	Container-02 of 02
Trichlorofluoromethane		< 0.50		1	µg/L		5	05/03/2016 3:41 PM	Container-01 of 02
Vinyl chloride		< 0.50		1	µg/L		2	05/03/2016 3:41 PM	Container-01 of 02
Surr: 1,2-Dichlorobenzene-d4		97.2		1	%Rec	Limit	70-130	05/03/2016 3:41 PM	Container-01 of 02
Surr: 4-Bromofluorobenzene		89.0		1	%Rec	Limit	70-130	05/03/2016 3:41 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
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r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 5/3/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

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LABORATORY RESULTS

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Sample Information:
Type : Potable Water
Origin: Treated Well
Routine

Treatment
Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604R27-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 04/29/2016 9:15 AM Point No: ASGAC-6-16-2
Received : 04/29/2016 10:00 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,1,1,2-Tetrachloroethane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,1,1-Trichloroethane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,1,2,2-Tetrachloroethane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,1,2-Trichloroethane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,1-Dichloroethane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,1-Dichloroethene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,1-Dichloropropene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,2,3-Trichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,2,3-Trichloropropane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,2,4-Trichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,2,4-Trimethylbenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,2-Dichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,2-Dichloroethane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,2-Dichloropropane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,3,5-Trimethylbenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,3-Dichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,3-Dichloropropane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
1,4-Dichlorobenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
2,2-Dichloropropane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
2/4-Chlorotoluene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
4-Isopropyltoluene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Benzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Bromobenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Bromochloromethane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Bromodichloromethane	< 0.50		1	µg/L		05/03/2016 2:51 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 5/3/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

Pace Analytical
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TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results are only for the samples and analytes requested.

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the tests requested.

Sample Information:
Type : Potable Water
Origin: Treated Well
Routine

Treatment
Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604R27-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 04/29/2016 9:15 AM Point No: ASGAC-6-16-2
Received : 04/29/2016 10:00 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
Bromoform	< 0.50		1	µg/L		05/03/2016 2:51 PM	Container-01 of 02
Bromomethane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Carbon tetrachloride	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Chlorobenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Chloroethane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Chloroform	< 0.50		1	µg/L		05/03/2016 2:51 PM	Container-01 of 02
Chloromethane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
cis-1,2-Dichloroethene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
cis-1,3-Dichloropropene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Dibromochloromethane	< 0.50		1	µg/L		05/03/2016 2:51 PM	Container-01 of 02
Dibromomethane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Dichlorodifluoromethane	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Ethylbenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Hexachlorobutadiene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Isopropylbenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
m,p-Xylene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Methyl tert-butyl ether	< 0.50		1	µg/L	10	05/03/2016 2:51 PM	Container-01 of 02
Methylene chloride	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
n-Butylbenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
n-Propylbenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
o-Xylene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
sec-Butylbenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Styrene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
tert-Butylbenzene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02
Tetrachloroethene	< 0.50		1	µg/L	5	05/03/2016 2:51 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
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H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 5/3/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

Pace Analytical
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TEL: (631) 694-3040 FAX: (631) 420-8436
NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results are only for the samples and analytes requested.

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the tests requested.

Sample Information:
Type : Potable Water
Origin: Treated Well
Routine

Treatment
Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604R27-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 04/29/2016 9:15 AM Point No: ASGAC-6-16-2
Received : 04/29/2016 10:00 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E524.2 : POC — Analyst: KG

Parameter(s)	Results	Qualifier	D.F.	Units		Limit	Analyzed:	Container:
Toluene	< 0.50		1	µg/L		5	05/03/2016 2:51 PM	Container-01 of 02
Total Trihalomethanes	< 2.00		1	µg/L		80	05/03/2016 2:51 PM	Container-01 of 02
trans-1,2-Dichloroethene	< 0.50		1	µg/L		5	05/03/2016 2:51 PM	Container-01 of 02
trans-1,3-Dichloropropene	< 0.50		1	µg/L		5	05/03/2016 2:51 PM	Container-01 of 02
Trichloroethene	0.72		1	µg/L		5	05/03/2016 2:51 PM	Container-01 of 02
Trichlorofluoromethane	< 0.50		1	µg/L		5	05/03/2016 2:51 PM	Container-01 of 02
Vinyl chloride	< 0.50		1	µg/L		2	05/03/2016 2:51 PM	Container-01 of 02
Surr: 1,2-Dichlorobenzene-d4	95.2		1	%Rec	Limit	70-130	05/03/2016 2:51 PM	Container-01 of 02
Surr: 4-Bromofluorobenzene	85.4		1	%Rec	Limit	70-130	05/03/2016 2:51 PM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
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c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 5/3/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

PACE ANALYTICAL
575 Broad Hollow Road
Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
Website: www.pacelabs.com

Sample Receipt Checklist

Client Name **BWD** Date and Time Received: **4/29/2016 10:00:00 AM**

Work Order Number: **1604R27** RcptNo: **1** Received by: **Matthew Grasso**

Completed by: John State Reviewed by: Stu Murrell

Completed Date: 4/29/2016 11:22:49 AM Reviewed Date: 5/2/2016 11:14:01 AM

Carrier name: Client

Chain of custody present?	Yes	☑	No	☐		
Chain of custody signed when relinquished and received?	Yes	☑	No	☐		
Chain of custody agrees with sample labels?	Yes	☑	No	☐		
Are matrices correctly identified on Chain of custody?	Yes	☑	No	☐		
Is it clear what analyses were requested?	Yes	☑	No	☐		
Custody seals intact on sample bottles?	Yes	☐	No	☐	Not Present	☑
Samples in proper container/bottle?	Yes	☑	No	☐		
Were correct preservatives used and noted?	Yes	☑	No	☐	NA	☐
Preservative added to bottles:						
Sample Condition?	Intact	☑	Broken	☐	Leaking	☐
Sufficient sample volume for indicated test?	Yes	☑	No	☐		
Were container labels complete (ID, Pres, Date)?	Yes	☑	No	☐		
All samples received within holding time?	Yes	☑	No	☐		
Was an attempt made to cool the samples?	Yes	☑	No	☐	NA	☐
All samples received at a temp. of > 0° C to 6.0° C?	Yes	☑	No	☐	NA	☐
Response when temperature is outside of range:	Samples were collected the same day and chilled.					
Sample Temp. taken and recorded upon receipt?	Yes	☑	No	☐	To 11.5 º	
Water - Were bubbles absent in VOC vials?	Yes	☑	No	☐	No Vials	☐
Water - Was there Chlorine Present?	Yes	☐	No	☐	NA	☑
Water - pH acceptable upon receipt?	Yes	☑	No	☐	No Water	☐
Are Samples considered acceptable?	Yes	☑	No	☐		
Custody Seals present?	Yes	☐	No	☑		
Airbill or Sticker?	Air Bill	☐	Sticker	☐	Not Present	☑
Airbill No:						

Case Number: SDG: SAS:

Any No response should be detailed in the comments section below, if applicable.

Client Contacted? ☐ Yes ☐ No ☑ NA Person Contacted:

Contact Mode: ☐ Phone: ☐ Fax: ☐ Email: ☐ In Person:

Client Instructions:

Date Contacted: Contacted By:

Regarding:

Comments:

CorrectiveAction:

Pace Analytical
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NYSDOH ID#10478 www.pacelabs.com

WorkOrder :
1604R27

Certifications

STATE	CERTIFICATION #
NEW YORK	10478
NEW JERSEY	NY158
CONNECTICUT	PH-0435
MARYLAND	208
MASSACHUSETTS	M-NY026
NEW HAMPSHIRE	2987
RHODE ISLAND	LAO00340
PENNSYLVANIA	68-00350

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LABORATORY RESULTS

Results are only for the samples and analytes requested.

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604R24-001
Client Sample ID. : N-03876

Federal ID : 2902817
Collected : 04/29/2016 9:15 AM Point No N-03876
Received : 04/29/2016 10:00 AM Location: Well 6-1
Collected By : PS99

Analytical Method: E522 : Prep Method: E522 Prep Date: 5/2/2016 6:52:39 AM Analyst: SH

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,4-Dioxane	12	D +	10	µg/L		05/03/2016 4:30 AM	Container-01 of 02
Surr: 1,4-Dioxane-D8	111		1	%Rec	Limit 70-130	05/03/2016 2:26 AM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 5/3/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

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NYSDOH ID#10478 www.pacelabs.com

LABORATORY RESULTS

Results are only for the samples and analytes requested.

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the tests requested.

Sample Information:
Type : Potable Water
Origin: Raw Well
Special

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604R24-002
Client Sample ID. : N-08941

Federal ID : 2902817
Collected : 04/29/2016 9:15 AM Point No N-08941
Received : 04/29/2016 10:00 AM Location: Well 6-2
Collected By : PS99

Analytical Method: E522 : Prep Method: E522 Prep Date: 5/2/2016 6:52:39 AM Analyst: SH

Parameter(s)	Results	Qualifier	D.F.	Units	Limit	Analyzed:	Container:
1,4-Dioxane	8.6	D +	10	µg/L		05/03/2016 4:55 AM	Container-01 of 02
Surr: 1,4-Dioxane-D8	114		1	%Rec	Limit 70-130	05/03/2016 2:51 AM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 5/3/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

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LABORATORY RESULTS

Results are only for the samples and analytes requested.

The lab is not directly responsible for the integrity of the sample before receipt at the lab and is responsible only for the tests requested.

Sample Information:
Type : Potable Water
Origin: Treated Well
Special

Treatment
Treated-GAC

Bethpage Water District
25 Adams Ave.
Bethpage, NY 11714
Attn To : Michael Boufis

Lab No. : 1604R24-003
Client Sample ID. : ASGAC-6-16-2

Federal ID : 2902817
Collected : 04/29/2016 9:15 AM Point No ASGAC-6-16-2
Received : 04/29/2016 10:00 AM Location: Plant 6 Airstripper/GAC
Collected By : PS99

Analytical Method: E522 : Prep Method: E522 Prep Date: 5/2/2016 6:52:39 AM Analyst: SH

Parameter(s)	Results	Qualifier	D.F.	Units	Limit		Analyzed:	Container:
1,4-Dioxane	8.6	D +	10	µg/L			05/03/2016 5:20 AM	Container-01 of 02
Surr: 1,4-Dioxane-D8	109		1	%Rec	Limit	70-130	05/03/2016 3:16 AM	Container-01 of 02

Qualifiers: E = Value above quantitation range, Value estimated.
B = Found in Blank
D.F. = Dilution Factor D = Results for Dilution
c = Calibration acceptability criteria exceeded for this analyte.Value estimated
H = Received/analyzed outside of analytical holding time
J = Estimated value - below calibration range
M-, M+ = Matrix Spike recovery below / above control limit
N = Indicates presumptive evidence of compound
P = Duplicate RPD outside of control limit
r = Reporting limit below calibration range. Value estimated.
S = Recovery outside of control limits for this analyte
+ = NYSDOH ELAP does not offer certification for this analyte / matrix / method
Result(s) reported meet(s) NYS Regulatory Limit(s).
Result(s) flagged with * Exceed NYS Regulatory Limit(s). Limit noted.
Date Reported : 5/3/2016

Stu Murrell
Sr.Project Manager : Stu Murrell

Test results meet the requirements of NELAC unless otherwise noted.

PACE ANALYTICAL
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Melville, NY 11747
TEL: (631) 694-3040 FAX: (631) 420-8436
Website: www.pacelabs.com

Sample Receipt Checklist

Client Name **BWD** Date and Time Received: **4/29/2016 10:00:00 AM**

Work Order Number: **1604R24** RcptNo: **1** Received by **Matthew Grasso**

Completed by:  Reviewed by: 

Completed Date: 4/29/2016 11:15:42 AM Reviewed Date: 5/2/2016 11:13:27 AM

Carrier name: Client

Chain of custody present?	Yes	☑	No	☐		
Chain of custody signed when relinquished and received?	Yes	☑	No	☐		
Chain of custody agrees with sample labels?	Yes	☑	No	☐		
Are matrices correctly identified on Chain of custody?	Yes	☑	No	☐		
Is it clear what analyses were requested?	Yes	☑	No	☐		
Custody seals intact on sample bottles?	Yes	☐	No	☐	Not Present	☑
Samples in proper container/bottle?	Yes	☑	No	☐		
Were correct preservatives used and noted?	Yes	☑	No	☐	NA	☐
Preservative added to bottles:						
Sample Condition?	Intact	☑	Broken	☐	Leaking	☐
Sufficient sample volume for indicated test?	Yes	☑	No	☐		
Were container labels complete (ID, Pres, Date)?	Yes	☑	No	☐		
All samples received within holding time?	Yes	☑	No	☐		
Was an attempt made to cool the samples?	Yes	☑	No	☐	NA	☐
All samples received at a temp. of > 0° C to 6.0° C?	Yes	☐	No	☑	NA	☐
Response when temperature is outside of range:	Samples were collected the same day and chilled.					
Sample Temp. taken and recorded upon receipt?	Yes	☑	No	☐	To 11.5 º	
Water - Were bubbles absent in VOC vials?	Yes	☐	No	☐	No Vials	☑
Water - Was there Chlorine Present?	Yes	☐	No	☐	NA	☑
Water - pH acceptable upon receipt?	Yes	☑	No	☐	No Water	☐
Are Samples considered acceptable?	Yes	☑	No	☐		
Custody Seals present?	Yes	☐	No	☑		
Airbill or Sticker?	Air Bil	☐	Sticker	☐	Not Present	☑
Airbill No:						

Case Number: SDG: SAS:

Any No response should be detailed in the comments section below, if applicable.

Client Contacted? ☐ Yes ☐ No ☑ NA Person Contacted:

Contact Mode: ☐ Phone: ☐ Fax: ☐ Email: ☐ In Person:

Client Instructions:

Date Contacted: Contacted By:

Regarding:

Comments:

CorrectiveAction:

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NYSDOH ID#10478 www.pacelabs.com

WorkOrder :
1604R24

Certifications

STATE	CERTIFICATION #
NEW YORK	10478
NEW JERSEY	NY158
CONNECTICUT	PH-0435
MARYLAND	208
MASSACHUSETTS	M-NY026
NEW HAMPSHIRE	2987
RHODE ISLAND	LAO00340
PENNSYLVANIA	68-00350

ATTACHMENT E

Ambient Air Sample Results and Laboratory Reports

Table E-1. Ambient Air Sample Analytical Results

	Sample Delivery Group		SJ2674		SJ2674		SJ2674	
	Lab ID		SJ2674-1		SJ2674-2		SJ2674-3	
	Sample ID		DW1-BWD-AIR-041916		DW2-BWD-AIR-041916		UW1-BWD-AIR-041916	
	Sample Date		4/20/2016		4/20/2016		4/20/2016	
	Sample Type		Ambient Air		Ambient Air		Ambient Air	
Analyte	CAS No	Units	Result	Qual	Result	Qual	Result	Qual
1,1,1-TRICHLOROETHANE	71-55-6	UG_M3	0.27	U	0.27	U	0.27	U
1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_M3	0.34	U	0.34	U	0.34	U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHAN	76-13-1	UG_M3	0.71	J	0.61	J	0.6	J
1,1,2-TRICHLOROETHANE	79-00-5	UG_M3	0.27	U	0.27	U	0.27	U
1,1-DICHLOROETHANE	75-34-3	UG_M3	0.2	U	0.2	U	0.2	U
1,1-DICHLOROETHENE	75-35-4	UG_M3	0.2	U	0.2	U	0.2	U
1,2,4-TRICHLOROBENZENE	120-82-1	UG_M3	0.37	U	0.37	U	0.37	U
1,2-DIBROMOETHANE	106-93-4	UG_M3	0.38	U	0.38	U	0.38	U
1,2-DICHLOROBENZENE	95-50-1	UG_M3	0.3	U	0.3	U	0.3	U
1,2-DICHLOROETHANE	107-06-2	UG_M3	0.2	U	0.085	J	0.073	J
1,2-DICHLOROPROPANE	78-87-5	UG_M3	0.23	U	0.23	U	0.23	U
1,3-DICHLOROBENZENE	541-73-1	UG_M3	0.3	U	0.3	U	0.3	U
1,4-DICHLOROBENZENE	106-46-7	UG_M3	0.3	U	0.3	U	0.3	U
2-BUTANONE	78-93-3	UG_M3	0.77		1.1		0.47	J
2-HEXANONE	591-78-6	UG_M3	0.2	U	0.2	U	0.2	U
4-METHYL-2-PENTANONE	108-10-1	UG_M3	0.2	U	0.11	J	0.2	U
ACETONE	67-64-1	UG_M3	7.8		6.6		5	
BENZENE	71-43-2	UG_M3	0.21	J	0.29	J	0.25	J
BROMODICHLOROMETHANE	75-27-4	UG_M3	0.33	U	0.33	U	0.33	U
BROMOFORM	75-25-2	UG_M3	0.52	U	0.52	U	0.52	U
BROMOMETHANE	74-83-9	UG_M3	0.19	U	0.19	U	0.19	U
CARBON DISULFIDE	75-15-0	UG_M3	0.16	U	0.16	U	0.16	U
CARBON TETRACHLORIDE	56-23-5	UG_M3	0.51	J	0.51	J	0.47	J
CHLOROBENZENE	108-90-7	UG_M3	0.23	U	0.23	U	0.23	U
CHLOROETHANE	75-00-3	UG_M3	0.13	U	0.13	U	0.13	U
CHLOROFORM	67-66-3	UG_M3	0.12	J	0.098	J	0.24	U
CHLOROMETHANE	74-87-3	UG_M3	1.2		1.2		1.2	
CIS-1,2-DICHLOROETHENE	156-59-2	UG_M3	0.2	U	0.2	U	0.2	U
CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_M3	0.23	U	0.23	U	0.23	U
CYCLOHEXANE	110-82-7	UG_M3	0.17	U	0.17	U	0.17	U
DIBROMOCHLOROMETHANE	124-48-1	UG_M3	0.42	U	0.42	U	0.42	U
DICHLORODIFLUOROMETHANE	75-71-8	UG_M3	2.4		2.5		2.5	
ETHYLBENZENE	100-41-4	UG_M3	0.082	J	0.074	J	0.087	J
ISOPROPYLBENZENE	98-82-8	UG_M3	0.054	J	0.24	U	0.24	U
M- AND P-XYLENE	8-38-3/106-	UG_M3	0.45	J	0.48	J	0.56	J
METHYL TERT-BUTYL ETHER	1634-04-4	UG_M3	0.18	U	0.18	U	0.18	U
METHYLENE CHLORIDE	75-09-2	UG_M3	1.5		1.2		0.45	J
O-XYLENE	95-47-6	UG_M3	0.087	J	0.11	J	0.11	J
STYRENE	100-42-5	UG_M3	0.21	U	0.21	U	0.21	U
TETRACHLOROETHENE	127-18-4	UG_M3	0.19	J	0.16	J	0.18	J
TOLUENE	108-88-3	UG_M3	0.72		1.1		0.53	
TRANS-1,2-DICHLOROETHENE	156-60-5	UG_M3	0.2	U	0.2	U	0.2	U
TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_M3	0.23	U	0.23	U	0.23	U
TRICHLOROETHENE	79-01-6	UG_M3	34		8		0.27	U
TRICHLOROFLUOROMETHANE	75-69-4	UG_M3	1.3		1.3		1.3	
VINYL CHLORIDE	75-01-4	UG_M3	0.13	U	0.13	U	0.13	U
XYLENES, TOTAL	1330-20-7	UG_M3	0.92	J	1	J	1.2	J

Notes:

Analytical Method TO-15

UG_M3 - Micrograms per cubic meter of air

Qual - Final interpreted qualifier

Reason Code

U - Undetected — The parameter was analyzed but not detected.

J - Estimated value — Value was below the limit of quantitation or a quality control parameter was outside control limits.

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Mar. 31, 2016
08:16 AM

Login Number: SJ2053

Account: ENSAFE001
ENSAFE

Project: AECOM-BETHPAGE
NWIRP Bethpage, NY

Primary Report Address:
Dana Miller
EnSafe
5724 Summer Trees Drive

Memphis,TN 38134
dmiller@Ensafe.com

Primary Invoice Address:
Accounts Payable
EnSafe
5724 Summer Trees Drive

Memphis,TN 38134

Report CC Addresses:
Invoice CC Addresses:

Web

Quote/Incoming: AECOM-BETHPAGE

Login Information:

ANALYSIS INSTRUCTIONS	:	Air. Follow DoD QSM Version 4.2 using DoD limits. "U" LOD. "J" flag between DL and LOQ.
CHECK NO.	:	
CLIENT PO#	:	20892
CLIENT PROJECT MANAGE	:	Brian Caldwell
CONTRACT	:	0888817613.PT.LT
COOLER TEMPERATURE	:	n/a
DELIVERY SERVICES	:	FedEx
EDD FORMAT	:	KAS135QC-CSV
LOGIN INITIALS	:	GN
PM	:	JO
PROJECT NAME	:	Bethpage BWD Well 6-2 Pilot Test / WE69
QC LEVEL	:	IV
REGULATORY LIST	:	
REPORT INSTRUCTIONS	:	Sample Data Summary needs all forms. Send Hardcopy and CD to Dana. Upload PDF and EDD to SDS folder. Email level 2 report to Dana. Email invoice to purchasing@ensafe.com.

Laboratory Sample ID	Client Sample Number	Collect Date/Time	SDG ID / SDG STATUS	Receive Date	PR	Verbal Date	Due Date	Mailed
SJ2053-1	ONSITE-AIR-032416	24-MAR-16 09:16		28-MAR-16			16-APR-16	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Air	S	TO-15-S	23-APR-16	Canister		**PLANT6ONSITE-AIR-032416**

Laboratory Sample ID	Client Sample Number	Collect Date/Time	SDG ID / SDG STATUS	Receive Date	PR	Verbal Date	Due Date	Mailed
SJ2053-2	OFFSITE-AIR-032416	24-MAR-16 09:53		28-MAR-16			16-APR-16	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Air	S	TO-15-S	23-APR-16	Canister		**PLANT6OFFSITE-AIR-032416**

Total Samples: **2** ***Total Analyses:*** **2**

03.31.16

0000011

SAMPLE DATA SUMMARY PACKAGE

KATAHDIN ANALYTICAL SERVICES - ORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL/LOQ or "U" LOD, where the rate of false negatives is <1%.

* Compound recovery or percent RPD (relative percent difference) was outside of quality control limits.

D Indicates the result was obtained from analysis of a diluted sample. Surrogate recoveries may not be calculable.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ)(previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

or

J Used for Pesticides, PCBs, Herbicides, Formaldehyde, Explosives and Method 504.1 analytes when there is a greater than 40% difference for detected concentrations between the two GC columns.

B Indicates the analyte was detected in the laboratory method blank analyzed concurrently with the sample.

C Indicates that the flagged compound did not meet DoD criteria in the corresponding daily calibration verification (CV).

L Indicates that the flagged compound did not meet DoD criteria in the corresponding Laboratory Control Sample (LCS) and/or Laboratory Control Sample Duplicate (LCSD) prepared and/or analyzed concurrently with the sample.

M Indicates that the flagged compound did not meet DoD criteria in the Matrix Spike and/or Matrix Spike Duplicate prepared and/or analyzed concurrently with the native sample.

N Presumptive evidence of a compound based on a mass spectral library search.

A Indicates that a tentatively identified compound is a suspected aldol-condensation product.

P Used for Pesticide/Aroclor analyte when there is a greater than 25% difference for detected concentrations between the two GC columns. (for CLP methods only).

Report of Analytical Results

Client: ENSAFE
Lab ID: SJ2053-1
Client ID: ONSITE-AIR-032416
Project: Bethpage BWD Well 6-2 Pilot Test / W
SDG: SJ2053
Lab File ID: A2402.D

Sample Date: 24-MAR-16
Received Date: 28-MAR-16
Extract Date: 12-APR-16
Extracted By: AAB
Extraction Method: TO 15
Lab Prep Batch: WG181786

Analysis Date: 12-APR-16
Analyst: AAB
Analysis Method: EPA TO-15
Matrix: AR
% Solids: NA
Report Date: 14-APR-16

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane		2.7	ug/m3	1	.1	0.49	0.030	0.25
Chloromethane		1.3	ug/m3	1	.1	0.21	0.039	0.10
Vinyl Chloride	U	0.13	ug/m3	1	.1	0.26	0.038	0.13
Bromomethane	J	0.070	ug/m3	1	.1	0.39	0.043	0.19
Chloroethane	U	0.13	ug/m3	1	.1	0.26	0.090	0.13
Acetone		8.1	ug/m3	1	.25	0.59	0.069	0.24
Trichlorofluoromethane		1.5	ug/m3	1	.1	0.56	0.079	0.28
1,1-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.036	0.20
Methylene Chloride	J	0.73	ug/m3	1	.25	0.87	0.14	0.35
Freon-113	J	0.73	ug/m3	1	.1	0.77	0.061	0.38
Carbon Disulfide	U	0.16	ug/m3	1	.1	0.31	0.022	0.16
trans-1,2-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.059	0.20
1,1-Dichloroethane	U	0.20	ug/m3	1	.1	0.40	0.044	0.20
Methyl tert-Butyl Ether	U	0.18	ug/m3	1	.1	0.36	0.054	0.18
2-Butanone		0.88	ug/m3	1	.25	0.74	0.062	0.15
cis-1,2-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.059	0.20
Chloroform	J	0.16	ug/m3	1	.1	0.49	0.044	0.24
1,2-Dichloroethane	U	0.20	ug/m3	1	.1	0.40	0.040	0.20
1,1,1-Trichloroethane	U	0.27	ug/m3	1	.1	0.54	0.044	0.27
Benzene		0.54	ug/m3	1	.1	0.32	0.019	0.16
Carbon Tetrachloride	J	0.50	ug/m3	1	.1	0.63	0.10	0.31
Cyclohexane	J	0.089	ug/m3	1	.1	0.34	0.031	0.17
1,2-Dichloropropane	U	0.23	ug/m3	1	.1	0.46	0.092	0.23
Bromodichloromethane	U	0.33	ug/m3	1	.1	0.67	0.074	0.33
Trichloroethene		20.	ug/m3	1	.1	0.54	0.048	0.27
cis-1,3-Dichloropropene	U	0.23	ug/m3	1	.1	0.45	0.045	0.23
4-Methyl-2-Pentanone	J	0.094	ug/m3	1	.1	0.41	0.053	0.20
trans-1,3-Dichloropropene	U	0.23	ug/m3	1	.1	0.45	0.023	0.23
1,1,2-Trichloroethane	U	0.27	ug/m3	1	.1	0.54	0.065	0.27
Toluene		0.79	ug/m3	1	.1	0.38	0.038	0.19
2-Hexanone	U	0.20	ug/m3	1	.25	1.0	0.12	0.20
Dibromochloromethane	U	0.42	ug/m3	1	.1	0.85	0.094	0.42
1,2-Dibromoethane	U	0.38	ug/m3	1	.1	0.77	0.10	0.38
Tetrachloroethene	J	0.22	ug/m3	1	.1	0.68	0.088	0.34
Chlorobenzene	U	0.23	ug/m3	1	.1	0.46	0.028	0.23

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Tel:(207) 874-2400 Fax:(207) 775-4029

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Report of Analytical Results

Client: ENSAFE
Lab ID: SJ2053-1
Client ID: ONSITE-AIR-032416
Project: Bethpage BWD Well 6-2 Pilot Test / W
SDG: SJ2053
Lab File ID: A2402.D

Sample Date: 24-MAR-16
Received Date: 28-MAR-16
Extract Date: 12-APR-16
Extracted By: AAB
Extraction Method: TO 15
Lab Prep Batch: WG181786

Analysis Date: 12-APR-16
Analyst: AAB
Analysis Method: EPA TO-15
Matrix: AR
% Solids: NA
Report Date: 14-APR-16

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Ethylbenzene	J	0.11	ug/m3	1	.1	0.43	0.056	0.22
m+p-Xylenes	J	0.63	ug/m3	1	.2	1.7	0.16	0.87
Bromoform	U	0.52	ug/m3	1	.1	1.0	0.083	0.52
Styrene	U	0.21	ug/m3	1	.1	0.42	0.055	0.21
1,1,2,2-Tetrachloroethane	U	0.34	ug/m3	1	.1	0.69	0.11	0.34
o-Xylene	J	0.12	ug/m3	1	.1	0.43	0.061	0.22
1,3-Dichlorobenzene	J	0.060	ug/m3	1	.1	0.60	0.054	0.30
Xylenes (Total)	J	1.3	ug/m3	1	.3	3.9	0.18	2.0
1,4-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.13	0.30
1,2-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.090	0.30
1,2,4-Trichlorobenzene	J	0.36	ug/m3	1	.1	0.74	0.10	0.37
Isopropylbenzene	U	0.24	ug/m3	1	.1	0.49	0.049	0.24

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Report of Analytical Results

Client: ENSAFE
Lab ID: SJ2053-2
Client ID: OFFSITE-AIR-032416
Project: Bethpage BWD Well 6-2 Pilot Test / W
SDG: SJ2053
Lab File ID: A2403.D

Sample Date: 24-MAR-16
Received Date: 28-MAR-16
Extract Date: 12-APR-16
Extracted By: AAB
Extraction Method: TO 15
Lab Prep Batch: WG181786

Analysis Date: 12-APR-16
Analyst: AAB
Analysis Method: EPA TO-15
Matrix: AR
% Solids: NA
Report Date: 14-APR-16

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane		2.7	ug/m3	1	.1	0.49	0.030	0.25
Chloromethane		1.4	ug/m3	1	.1	0.21	0.039	0.10
Vinyl Chloride	U	0.13	ug/m3	1	.1	0.26	0.038	0.13
Bromomethane	J	0.082	ug/m3	1	.1	0.39	0.043	0.19
Chloroethane	U	0.13	ug/m3	1	.1	0.26	0.090	0.13
Acetone		7.6	ug/m3	1	.25	0.59	0.069	0.24
Trichlorofluoromethane		1.5	ug/m3	1	.1	0.56	0.079	0.28
1,1-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.036	0.20
Methylene Chloride		0.94	ug/m3	1	.25	0.87	0.14	0.35
Freon-113	J	0.62	ug/m3	1	.1	0.77	0.061	0.38
Carbon Disulfide	U	0.16	ug/m3	1	.1	0.31	0.022	0.16
trans-1,2-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.059	0.20
1,1-Dichloroethane	U	0.20	ug/m3	1	.1	0.40	0.044	0.20
Methyl tert-Butyl Ether	U	0.18	ug/m3	1	.1	0.36	0.054	0.18
2-Butanone		0.85	ug/m3	1	.25	0.74	0.062	0.15
cis-1,2-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.059	0.20
Chloroform	J	0.13	ug/m3	1	.1	0.49	0.044	0.24
1,2-Dichloroethane	J	0.073	ug/m3	1	.1	0.40	0.040	0.20
1,1,1-Trichloroethane	U	0.27	ug/m3	1	.1	0.54	0.044	0.27
Benzene		0.57	ug/m3	1	.1	0.32	0.019	0.16
Carbon Tetrachloride	J	0.50	ug/m3	1	.1	0.63	0.10	0.31
Cyclohexane	J	0.093	ug/m3	1	.1	0.34	0.031	0.17
1,2-Dichloropropane	U	0.23	ug/m3	1	.1	0.46	0.092	0.23
Bromodichloromethane	U	0.33	ug/m3	1	.1	0.67	0.074	0.33
Trichloroethene		3.5	ug/m3	1	.1	0.54	0.048	0.27
cis-1,3-Dichloropropene	U	0.23	ug/m3	1	.1	0.45	0.045	0.23
4-Methyl-2-Pentanone	J	0.070	ug/m3	1	.1	0.41	0.053	0.20
trans-1,3-Dichloropropene	U	0.23	ug/m3	1	.1	0.45	0.023	0.23
1,1,2-Trichloroethane	U	0.27	ug/m3	1	.1	0.54	0.065	0.27
Toluene		0.87	ug/m3	1	.1	0.38	0.038	0.19
2-Hexanone	U	0.20	ug/m3	1	.25	1.0	0.12	0.20
Dibromochloromethane	U	0.42	ug/m3	1	.1	0.85	0.094	0.42
1,2-Dibromoethane	U	0.38	ug/m3	1	.1	0.77	0.10	0.38
Tetrachloroethene	J	0.20	ug/m3	1	.1	0.68	0.088	0.34
Chlorobenzene	U	0.23	ug/m3	1	.1	0.46	0.028	0.23

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Report of Analytical Results

Client: ENSAFE
Lab ID: SJ2053-2
Client ID: OFFSITE-AIR-032416
Project: Bethpage BWD Well 6-2 Pilot Test / W
SDG: SJ2053
Lab File ID: A2403.D

Sample Date: 24-MAR-16
Received Date: 28-MAR-16
Extract Date: 12-APR-16
Extracted By: AAB
Extraction Method: TO 15
Lab Prep Batch: WG181786

Analysis Date: 12-APR-16
Analyst: AAB
Analysis Method: EPA TO-15
Matrix: AR
% Solids: NA
Report Date: 14-APR-16

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Ethylbenzene	J	0.14	ug/m3	1	.1	0.43	0.056	0.22
m+p-Xylenes	J	0.69	ug/m3	1	.2	1.7	0.16	0.87
Bromoform	U	0.52	ug/m3	1	.1	1.0	0.083	0.52
Styrene	U	0.21	ug/m3	1	.1	0.42	0.055	0.21
1,1,2,2-Tetrachloroethane	U	0.34	ug/m3	1	.1	0.69	0.11	0.34
o-Xylene	J	0.15	ug/m3	1	.1	0.43	0.061	0.22
1,3-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.054	0.30
Xylenes (Total)	J	1.4	ug/m3	1	.3	3.9	0.18	2.0
1,4-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.13	0.30
1,2-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.090	0.30
1,2,4-Trichlorobenzene	U	0.37	ug/m3	1	.1	0.74	0.10	0.37
Isopropylbenzene	U	0.24	ug/m3	1	.1	0.49	0.049	0.24

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ORGANICS COMPLETE SDG FILE (CSF) INVENTORY SHEET

LABORATORY NAME Katahdin Analytical Services
CITY/STATE Scarborough, Maine

CASE NO. WE15 SDG NO. SJ2674 SDG NOS. TO FOLLOW
SAS NO.

CONTRACT NO.
SOW NO.

All documents delivered in the Complete SDG File must be original documents where possible.

	PAGE NOs FROM	PAGE NOs TO	CHECK LAB	CHECK EPA
1. **Inventory Sheet** (Form DC-2) (Do not Number)	0000001	0000003	✓	
2. **SDG Case Narrative**	0000006	0000007	✓	
3. **SDG Cover Sheet/Traffic Report**	0000004	0000005	✓	
4. **Volatiles Data** TO-15				
a. QC Summary				
System Monitoring Compound Summary (Form II	~~0000012~~ NA	NA	NA	
Matrix Spike/Matrix Spike Duplicate Summary (Form III VOA)	NA	↓	↓	
Method Blank Summary (Form IV VOA)	0000012	0000014	✓	
GC/MS Instrument Performance Check (Form V VOA)	0000015	0000015	✓	
Internal Standard Area and RT Summary (Form VIII VOA)	0000018	0000016	✓	
b. Sample Data	0000017	0000096		
TCL Results - (Form I VOA-1, VOA-2)			—	
Tentatively Identified Compounds (Form I VOA-			—	
Reconstructed total ion chromatograms (RIC) for each sample			—	
For each sample:				
Raw Spectra and background-subtracted mass spectra of target compounds identified			—	
Quantitation reports			—	
Mass Spectra of all reported TICs with three best library matches			—	
c. Standards Data (All Instruments)	0000097	0000147		
Initial Calibration Data (Form VI VOA-1, VOA-2)			—	
RICs and Quan Reports for all Standards			—	
Continuing Calibration Data (Form VII VOA-1, VOA-2)			—	
RICs and Quantitation Reports for all Standards			—	
d. Raw QC Data			—	
BFB	0000148	0000150	—	
Blank Data	0000151	0000158	—	
Martix Spike/Matrix Spike Duplicate Data	0000159	0000166	—	

CASE NO. WE15 SDG NO. SJ2674 SDG NOS. TO FOLLOW _____

_____ _____ SAS NO. _____

	PAGE NOs FROM	PAGE NOs TO	CHECK LAB	CHECK EPA
6. **Pesticides Data** (Cont.)				
e. Raw GPC Data	NA	NA	NA	
f. Raw Florisil Data	↓	↓	↓	
7. **Miscellaneous Data**				
Original preparation and analysis forms or of preparation and analysis logbook pages	TO-15 00000167	00000168	✓	
Internal sample and sample extract transfer chain-of-custody records	NA	NA	NA	
Screening records	↓	↓	↓	
All instrument output, including strip charts from screening activities (describe or list)	↓	↓	↓	
_____	↓	↓	↓	
_____	↓	↓	↓	
8. **EPA Shipping/Receiving Documents**				
Airbills (No. of shipments _____)	↓	↓	↓	
Chain-of-Custody Records	00000010	00000010	✓	
Sample Tags				
Sample Log-in Sheet (Lab & DC1)	NA	NA	NA	
Miscellaneous Shipping/Receiving Records (describe or list)				
Sample Receipt Condition Report	00000009	00000009	✓	
Login Chain of Custody	00000011	00000011	✓	
9. **Internal Lab Sample Transfer Records and Tracking Sheets** (describe or list)				
_____	NA	NA	NA	
_____	↓	↓	↓	
10. **Other Records** (describe or list)				
Telephone Communication Log	↓	↓	↓	
_____	↓	↓	↓	
_____	↓	↓	↓	

11. **Comments:** _____

_____

_____

ORGANICS COMPLETE SDG FILE (CSF) INVENTORY SHEET (cont.)

CASE NO. WE15 SDG NO. SJ2674 SDG NOS. TO FOLLOW _____

_____ _____ SAS NO. _____

Completed by: (CLP Lab)	[signature] (Signature)	Heather Mancini/PM (Printed Name/Title)	5-6-16 (Date)
Verified by: (CLP Lab)	_____ (Signature)	_____ (Printed Name/Title)	_____ (Date)
Audited by: (EPA)	_____ (Signature)	_____ (Printed Name/Title)	_____ (Date)

ENSAFE
NAVY CLEAN WE15-03-06 NWIRP
BETHPAGE, NY
SJ2674

KATAHDIN ANALYTICAL SERVICES, LLC
600 TECHNOLOGY WAY
SCARBOROUGH, ME 04074

00000084

SAMPLE DATA PACKAGE

SDG NARRATIVE
KATAHDIN ANALYTICAL SERVICES
ENSAFE
NAVY CLEAN WE15-03-06 NWIRP BETHPAGE, NY
SJ2674

Sample Receipt

The following samples were received on April 21, 2016 and were logged in under Katahdin Analytical Services work order number SJ2674 for a hardcopy due date of May 10, 2016.

KATAHDIN Sample No.	ENSAFE Sample Identification
SJ2674-1	DW1-BWD-AIR-041916
SJ2674-2	DW2-BWD-AIR-041916
SJ2674-3	UW1-BWD-AIR-041916

The samples were logged in for the analyses specified on the chain of custody form. All problems encountered and resolved during sample receipt have been documented on the applicable chain of custody forms.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in this narrative or in the Report of Analysis.

Sample analyses have been performed by the methods as noted herein.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact your Katahdin Analytical Services Project Manager, **Ms. Jennifer Obrin**. This narrative is an integral part of the Report of Analysis.

Organics Analysis

The samples of Work Order SJ2674 were analyzed in accordance with "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air: Compendium Method TO-15." 2nd Edition, 1999, Office of Research and Development, U.S. EPA, and/or for the specific methods listed below or on the Report of Analysis.

TO-15 Analysis

All samples were manually integrated for various target analytes. The specific reasons for the manual integrations are indicated on the raw data by the manual integration codes (M1-M11). These codes are further explained in the attachment following this narrative.

The target analyte 1,2,4-trichlorobenzene was detected in the method blank, WG182261-10. According to the DoD QSM section D.1.1.1, a method blank is considered to be contaminated if the concentration of any target analyte in the blank exceeds ½ the reporting limit. Since the method blank was acceptable, no further action was taken.

There were no other protocol deviations or observations noted by the organics laboratory staff.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package has been authorized by the Operations Manager or the Quality Assurance Officer as verified by the following signature.

Leslie Dimond
05.06.16

Leslie Dimond
Quality Assurance Officer

Katahdin Analytical Services, Inc.

Manual Integration Codes For GC/MS, GC, HPLC and/or IC

M1	Peak splitting.
M2	Well defined peaks on the shoulders of the other peaks.
M3	There is additional area due to a coeluting interferant.
M4	There are negative spikes in the baseline.
M5	There are rising or falling baselines.
M6	The software has failed to detect a peak or misidentified a peak.
M7	Excessive peak tailing.
M8	Analysis such as GRO, DRO and TPH require a baseline hold.
M9	Peak was not completely integrated as in GC/MS.
M10	Primary ion was correctly integrated, but secondary or tertiary ion needed manual integration as in GC/MS.
M11	For GC analysis, when a sample is diluted by 1:10 or more, the surrogate is set to undetected and then the area under the surrogate is manually integrated.
M12	Manual integration saved in method due to TurboChrom floating point error.

Katahdin Analytical Services, Inc. — Sample Receipt Condition Report

Client: Ensafe	KAS PM: JO	Sampled By: Client
Project:	KIMS Entry By: GN	Delivered By: FedEx
KAS Work Order#: 5J2674	KIMS Review By:	Received By: GN
SDG #:	Cooler: 1 of 1	Date/Time Rec.: 4-21-16/0955

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		✓			
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.				✓	Temp (°C): N/A
Samples received at <6 °C w/o freezing?				✓	Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?				✓	The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?				✓	
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?				✓	
Soil/Sediment:					
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2				✓	
Sulfide - >9				✓	
Cyanide – pH >12				✓	

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

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Katahdin
ANALYTICAL SERVICES

600 Technology Way
P.O. Box 540
Scarborough, ME 04070
Tel: (207) 874-2400 Fax: (207) 775-4029

Air Analysis Chain of Custody

Client: RESCON | Contact: Farrell Bell | Phone: (516)209-1546 | Fax: —

Address: 998 C Old Country Rd | City: Plainview | State: NY | Zip: 11803

Purchase Order #: 6026665216 | Project Name/No.: NWIRP- Bethpage | E-mail: FBell@enso-fe.com

Billing Address (if different):

Sampler (Print/Sign): Farrell Bell | Copies To: —

Lab Use Only | Work Order #: SJ2674 | KAS Project Manager:

Shipping: UPS Fed-Ex Mail Drop-Off

Sample Description (Sample Identification and/or Lot #)	Collection: Date	Start Time	End Time	Initial Vac	Final Vac	Matrix	Sampler	Can Size	Can ID	Flow Controller ID	Requested Services: TO15			Comments
DW1-BWD-Air-041916	4/19/16	1400	14:15	-32	-9	—	FB	6L/hr	20081	0043	1			24/hr Summa
	4/20/16													
DW2-BWD-Air-041916	4/19/2016 4/20/2016	1345	14:03	-31	-25	—	F.B	6L/hr	8442	0317	1			
DW1-BWD-Air-041916	4-19-2016 4-20-2016	14:01	14:12	-31	-30	—	F.B	6L/hr	11855	0050	1			

Relinquished By:	Date/Time:	Received By:	Relinquished By:	Date/Time:	Received By:
	4/19/16 17:00	Fedex			4-21-16 09:55

Katahdin inspects and verifies all equipment including, but not limited to, canisters and flow controllers before being sent to the client. As the client you have agreed to pay a rental fee for use of this equipment, which is the sole property of Katahdin. All equipment will be inspected for damage and completeness upon return to Katahdin. In the event that rental equipment is missing and/or damaged, by signing this COC, you (the client) agrees to pay Katahdin for replacement of any unuseuable, damaged or missing equipment.

COC010

Katahdin ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Apr. 22, 2016
07:36 AM

Login Number: SJ2674

Account: ENSAFE001
ENSAFE

Project: AECOM-BETHPAGE
NWIRP Bethpage, NY

Quote/Incoming: AECOM-BETHPAGE

Web

Primary Report Address:
Dana Miller
EnSafe
5724 Summer Trees Drive

Memphis,TN 38134
dmiller@Ensafe.com

Primary Invoice Address:
Accounts Payable
EnSafe
5724 Summer Trees Drive

Memphis,TN 38134

Report CC Addresses:

Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	:	Air. Follow DoD QSM Version 4.2 using DoD limits. "U" LOD. "J" flag between DL and LOQ.
CHECK NO.	:	
CLIENT PO#	:	20128
CLIENT PROJECT MANAGE	:	Brian Caldwell
CONTRACT	:	
COOLER TEMPERATURE	:	n/a
DELIVERY SERVICES	:	FedEx
EDD FORMAT	:	KAS135QC-CSV
LOGIN INITIALS	:	GN
PM	:	JO
PROJECT NAME	:	Navy Clean WE15-03-06 NWIRP Bethpage, NY
QC LEVEL	:	IV
REGULATORY LIST	:	
REPORT INSTRUCTIONS	:	Sample Data Summary needs all forms. Send Hardcopy and CD to Dana. Upload PDF and EDD to SDS folder. Email level 2 report to Dana. Email invoice to purchasing@ensafe.com.

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	SDG ID / SDG STATUS	PR	Verbal Date	Due Date	Mailed
SJ2674-1	DW1-BWD-AIR-041916	20-APR-16 14:15	21-APR-16				10-MAY-16	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Air	S	TO-15-S	20-MAY-16	Canister		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	SDG ID / SDG STATUS	PR	Verbal Date	Due Date	Mailed
SJ2674-2	DW2-BWD-AIR-041916	20-APR-16 14:03	21-APR-16				10-MAY-16	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Air	S	TO-15-S	20-MAY-16	Canister		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	SDG ID / SDG STATUS	PR	Verbal Date	Due Date	Mailed
SJ2674-3	UW1-BWD-AIR-041916	20-APR-16 14:12	21-APR-16				10-MAY-16	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Air	S	TO-15-S	20-MAY-16	Canister		

Total Samples: *3* ***Total Analyses:*** *3*

QP
04.22.16

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SAMPLE DATA SUMMARY PACKAGE

KATAHDIN ANALYTICAL SERVICES - ORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Limit of Quantitation (LOQ)(previously called Practical Quantitation Level (PQL)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL/LOQ or "U" LOD, where the rate of false negatives is <1%.

* Compound recovery or percent RPD (relative percent difference) was outside of quality control limits.

D Indicates the result was obtained from analysis of a diluted sample. Surrogate recoveries may not be calculable.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Limit of Quantitation (LOQ)(previously called Practical Quantitation Limit (PQL)), but above the Method Detection Limit (MDL).

or

J Used for Pesticides, PCBs, Herbicides, Formaldehyde, Explosives and Method 504.1 analytes when there is a greater than 40% difference for detected concentrations between the two GC columns.

B Indicates the analyte was detected in the laboratory method blank analyzed concurrently with the sample.

C Indicates that the flagged compound did not meet DoD criteria in the corresponding daily calibration verification (CV).

L Indicates that the flagged compound did not meet DoD criteria in the corresponding Laboratory Control Sample (LCS) and/or Laboratory Control Sample Duplicate (LCSD) prepared and/or analyzed concurrently with the sample.

M Indicates that the flagged compound did not meet DoD criteria in the Matrix Spike and/or Matrix Spike Duplicate prepared and/or analyzed concurrently with the native sample.

N Presumptive evidence of a compound based on a mass spectral library search.

A Indicates that a tentatively identified compound is a suspected aldol-condensation product.

P Used for Pesticide/Aroclor analyte when there is a greater than 25% difference for detected concentrations between the two GC columns. (for CLP methods only).

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: ENSAFE
Lab ID: SJ2674-1
Client ID: DW1-BWD-AIR-041916
Project: Navy Clean WE15-03-06 NWIRP Bethp
SDG: SJ2674
Lab File ID: A2501.D

Sample Date: 20-APR-16
Received Date: 21-APR-16
Extract Date: 22-APR-16
Extracted By: AAB
Extraction Method: TO 15
Lab Prep Batch: WG182261

Analysis Date: 22-APR-16
Analyst: AAB
Analysis Method: EPA TO-15
Matrix: AR
% Solids: NA
Report Date: 25-APR-16

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane		2.4	ug/m3	1	.1	0.49	0.030	0.25
Chloromethane		1.2	ug/m3	1	.1	0.21	0.039	0.10
Vinyl Chloride	U	0.13	ug/m3	1	.1	0.26	0.038	0.13
Bromomethane	U	0.19	ug/m3	1	.1	0.39	0.043	0.19
Chloroethane	U	0.13	ug/m3	1	.1	0.26	0.090	0.13
Acetone		7.8	ug/m3	1	.25	0.59	0.069	0.24
Trichlorofluoromethane		1.3	ug/m3	1	.1	0.56	0.079	0.28
1,1-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.036	0.20
Methylene Chloride		1.5	ug/m3	1	.25	0.87	0.14	0.35
Freon-113	J	0.71	ug/m3	1	.1	0.77	0.061	0.38
Carbon Disulfide	U	0.16	ug/m3	1	.1	0.31	0.022	0.16
trans-1,2-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.059	0.20
1,1-Dichloroethane	U	0.20	ug/m3	1	.1	0.40	0.044	0.20
Methyl tert-Butyl Ether	U	0.18	ug/m3	1	.1	0.36	0.054	0.18
2-Butanone		0.77	ug/m3	1	.25	0.74	0.062	0.15
cis-1,2-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.059	0.20
Chloroform	J	0.12	ug/m3	1	.1	0.49	0.044	0.24
1,2-Dichloroethane	U	0.20	ug/m3	1	.1	0.40	0.040	0.20
1,1,1-Trichloroethane	U	0.27	ug/m3	1	.1	0.54	0.044	0.27
Benzene	J	0.21	ug/m3	1	.1	0.32	0.019	0.16
Carbon Tetrachloride	J	0.51	ug/m3	1	.1	0.63	0.10	0.31
Cyclohexane	U	0.17	ug/m3	1	.1	0.34	0.031	0.17
1,2-Dichloropropane	U	0.23	ug/m3	1	.1	0.46	0.092	0.23
Bromodichloromethane	U	0.33	ug/m3	1	.1	0.67	0.074	0.33
Trichloroethene		34.	ug/m3	1	.1	0.54	0.048	0.27
cis-1,3-Dichloropropene	U	0.23	ug/m3	1	.1	0.45	0.045	0.23
4-Methyl-2-Pentanone	U	0.20	ug/m3	1	.1	0.41	0.053	0.20
trans-1,3-Dichloropropene	U	0.23	ug/m3	1	.1	0.45	0.023	0.23
1,1,2-Trichloroethane	U	0.27	ug/m3	1	.1	0.54	0.065	0.27
Toluene		0.72	ug/m3	1	.1	0.38	0.038	0.19
2-Hexanone	U	0.20	ug/m3	1	.25	1.0	0.12	0.20
Dibromochloromethane	U	0.42	ug/m3	1	.1	0.85	0.094	0.42
1,2-Dibromoethane	U	0.38	ug/m3	1	.1	0.77	0.10	0.38
Tetrachloroethene	J	0.19	ug/m3	1	.1	0.68	0.088	0.34
Chlorobenzene	U	0.23	ug/m3	1	.1	0.46	0.028	0.23

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://www.katahdinlab.com

Report of Analytical Results

Client: ENSAFE
Lab ID: SJ2674-1
Client ID: DW1-BWD-AIR-041916
Project: Navy Clean WE15-03-06 NWIRP Bethp
SDG: SJ2674
Lab File ID: A2501.D

Sample Date: 20-APR-16
Received Date: 21-APR-16
Extract Date: 22-APR-16
Extracted By: AAB
Extraction Method: TO 15
Lab Prep Batch: WG182261

Analysis Date: 22-APR-16
Analyst: AAB
Analysis Method: EPA TO-15
Matrix: AR
% Solids: NA
Report Date: 25-APR-16

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Ethylbenzene	J	0.082	ug/m3	1	.1	0.43	0.056	0.22
m+p-Xylenes	J	0.45	ug/m3	1	.2	1.7	0.16	0.87
Bromoform	U	0.52	ug/m3	1	.1	1.0	0.083	0.52
Styrene	U	0.21	ug/m3	1	.1	0.42	0.055	0.21
1,1,2,2-Tetrachloroethane	U	0.34	ug/m3	1	.1	0.69	0.11	0.34
o-Xylene	J	0.087	ug/m3	1	.1	0.43	0.061	0.22
1,3-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.054	0.30
Xylenes (Total)	J	0.92	ug/m3	1	.3	3.9	0.18	2.0
1,4-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.13	0.30
1,2-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.090	0.30
1,2,4-Trichlorobenzene	U	0.37	ug/m3	1	.1	0.74	0.10	0.37
Isopropylbenzene	J	0.054	ug/m3	1	.1	0.49	0.049	0.24

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Tel:(207) 874-2400 Fax:(207) 775-4029

http://www.katahdinlab.com

Katahdin
ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client: ENSAFE
Lab ID: SJ2674-2
Client ID: DW2-BWD-AIR-041916
Project: Navy Clean WE15-03-06 NWIRP Bethp
SDG: SJ2674
Lab File ID: A2502.D

Sample Date: 20-APR-16
Received Date: 21-APR-16
Extract Date: 22-APR-16
Extracted By: AAB
Extraction Method: TO 15
Lab Prep Batch: WG182261

Analysis Date: 22-APR-16
Analyst: AAB
Analysis Method: EPA TO-15
Matrix: AR
% Solids: NA
Report Date: 25-APR-16

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane		2.5	ug/m3	1	.1	0.49	0.030	0.25
Chloromethane		1.2	ug/m3	1	.1	0.21	0.039	0.10
Vinyl Chloride	U	0.13	ug/m3	1	.1	0.26	0.038	0.13
Bromomethane	U	0.19	ug/m3	1	.1	0.39	0.043	0.19
Chloroethane	U	0.13	ug/m3	1	.1	0.26	0.090	0.13
Acetone		6.6	ug/m3	1	.25	0.59	0.069	0.24
Trichlorofluoromethane		1.3	ug/m3	1	.1	0.56	0.079	0.28
1,1-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.036	0.20
Methylene Chloride		1.2	ug/m3	1	.25	0.87	0.14	0.35
Freon-113	J	0.61	ug/m3	1	.1	0.77	0.061	0.38
Carbon Disulfide	U	0.16	ug/m3	1	.1	0.31	0.022	0.16
trans-1,2-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.059	0.20
1,1-Dichloroethane	U	0.20	ug/m3	1	.1	0.40	0.044	0.20
Methyl tert-Butyl Ether	U	0.18	ug/m3	1	.1	0.36	0.054	0.18
2-Butanone		1.1	ug/m3	1	.25	0.74	0.062	0.15
cis-1,2-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.059	0.20
Chloroform	J	0.098	ug/m3	1	.1	0.49	0.044	0.24
1,2-Dichloroethane	J	0.085	ug/m3	1	.1	0.40	0.040	0.20
1,1,1-Trichloroethane	U	0.27	ug/m3	1	.1	0.54	0.044	0.27
Benzene	J	0.29	ug/m3	1	.1	0.32	0.019	0.16
Carbon Tetrachloride	J	0.51	ug/m3	1	.1	0.63	0.10	0.31
Cyclohexane	U	0.17	ug/m3	1	.1	0.34	0.031	0.17
1,2-Dichloropropane	U	0.23	ug/m3	1	.1	0.46	0.092	0.23
Bromodichloromethane	U	0.33	ug/m3	1	.1	0.67	0.074	0.33
Trichloroethene		8.0	ug/m3	1	.1	0.54	0.048	0.27
cis-1,3-Dichloropropene	U	0.23	ug/m3	1	.1	0.45	0.045	0.23
4-Methyl-2-Pentanone	J	0.11	ug/m3	1	.1	0.41	0.053	0.20
trans-1,3-Dichloropropene	U	0.23	ug/m3	1	.1	0.45	0.023	0.23
1,1,2-Trichloroethane	U	0.27	ug/m3	1	.1	0.54	0.065	0.27
Toluene		1.1	ug/m3	1	.1	0.38	0.038	0.19
2-Hexanone	U	0.20	ug/m3	1	.25	1.0	0.12	0.20
Dibromochloromethane	U	0.42	ug/m3	1	.1	0.85	0.094	0.42
1,2-Dibromoethane	U	0.38	ug/m3	1	.1	0.77	0.10	0.38
Tetrachloroethene	J	0.16	ug/m3	1	.1	0.68	0.088	0.34
Chlorobenzene	U	0.23	ug/m3	1	.1	0.46	0.028	0.23

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Tel:(207) 874-2400 Fax:(207) 775-4029

http://www.katahdinlab.com

Report of Analytical Results

Client: ENSAFE
Lab ID: SJ2674-2
Client ID: DW2-BWD-AIR-041916
Project: Navy Clean WE15-03-06 NWIRP Bethp
SDG: SJ2674
Lab File ID: A2502.D

Sample Date: 20-APR-16
Received Date: 21-APR-16
Extract Date: 22-APR-16
Extracted By: AAB
Extraction Method: TO 15
Lab Prep Batch: WG182261

Analysis Date: 22-APR-16
Analyst: AAB
Analysis Method: EPA TO-15
Matrix: AR
% Solids: NA
Report Date: 25-APR-16

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Ethylbenzene	J	0.074	ug/m3	1	.1	0.43	0.056	0.22
m+p-Xylenes	J	0.48	ug/m3	1	.2	1.7	0.16	0.87
Bromoform	U	0.52	ug/m3	1	.1	1.0	0.083	0.52
Styrene	U	0.21	ug/m3	1	.1	0.42	0.055	0.21
1,1,2,2-Tetrachloroethane	U	0.34	ug/m3	1	.1	0.69	0.11	0.34
o-Xylene	J	0.11	ug/m3	1	.1	0.43	0.061	0.22
1,3-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.054	0.30
Xylenes (Total)	J	1.0	ug/m3	1	.3	3.9	0.18	2.0
1,4-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.13	0.30
1,2-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.090	0.30
1,2,4-Trichlorobenzene	U	0.37	ug/m3	1	.1	0.74	0.10	0.37
Isopropylbenzene	U	0.24	ug/m3	1	.1	0.49	0.049	0.24

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Report of Analytical Results

Client: ENSAFE
Lab ID: SJ2674-3
Client ID: UW1-BWD-AIR-041916
Project: Navy Clean WE15-03-06 NWIRP Bethp
SDG: SJ2674
Lab File ID: A2503.D

Sample Date: 20-APR-16
Received Date: 21-APR-16
Extract Date: 22-APR-16
Extracted By: AAB
Extraction Method: TO 15
Lab Prep Batch: WG182261

Analysis Date: 22-APR-16
Analyst: AAB
Analysis Method: EPA TO-15
Matrix: AR
% Solids: NA
Report Date: 25-APR-16

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane		2.5	ug/m3	1	.1	0.49	0.030	0.25
Chloromethane		1.2	ug/m3	1	.1	0.21	0.039	0.10
Vinyl Chloride	U	0.13	ug/m3	1	.1	0.26	0.038	0.13
Bromomethane	U	0.19	ug/m3	1	.1	0.39	0.043	0.19
Chloroethane	U	0.13	ug/m3	1	.1	0.26	0.090	0.13
Acetone		5.0	ug/m3	1	.25	0.59	0.069	0.24
Trichlorofluoromethane		1.3	ug/m3	1	.1	0.56	0.079	0.28
1,1-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.036	0.20
Methylene Chloride	J	0.45	ug/m3	1	.25	0.87	0.14	0.35
Freon-113	J	0.60	ug/m3	1	.1	0.77	0.061	0.38
Carbon Disulfide	U	0.16	ug/m3	1	.1	0.31	0.022	0.16
trans-1,2-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.059	0.20
1,1-Dichloroethane	U	0.20	ug/m3	1	.1	0.40	0.044	0.20
Methyl tert-Butyl Ether	U	0.18	ug/m3	1	.1	0.36	0.054	0.18
2-Butanone	J	0.47	ug/m3	1	.25	0.74	0.062	0.15
cis-1,2-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.059	0.20
Chloroform	U	0.24	ug/m3	1	.1	0.49	0.044	0.24
1,2-Dichloroethane	J	0.073	ug/m3	1	.1	0.40	0.040	0.20
1,1,1-Trichloroethane	U	0.27	ug/m3	1	.1	0.54	0.044	0.27
Benzene	J	0.25	ug/m3	1	.1	0.32	0.019	0.16
Carbon Tetrachloride	J	0.47	ug/m3	1	.1	0.63	0.10	0.31
Cyclohexane	U	0.17	ug/m3	1	.1	0.34	0.031	0.17
1,2-Dichloropropane	U	0.23	ug/m3	1	.1	0.46	0.092	0.23
Bromodichloromethane	U	0.33	ug/m3	1	.1	0.67	0.074	0.33
Trichloroethene	U	0.27	ug/m3	1	.1	0.54	0.048	0.27
cis-1,3-Dichloropropene	U	0.23	ug/m3	1	.1	0.45	0.045	0.23
4-Methyl-2-Pentanone	U	0.20	ug/m3	1	.1	0.41	0.053	0.20
trans-1,3-Dichloropropene	U	0.23	ug/m3	1	.1	0.45	0.023	0.23
1,1,2-Trichloroethane	U	0.27	ug/m3	1	.1	0.54	0.065	0.27
Toluene		0.53	ug/m3	1	.1	0.38	0.038	0.19
2-Hexanone	U	0.20	ug/m3	1	.25	1.0	0.12	0.20
Dibromochloromethane	U	0.42	ug/m3	1	.1	0.85	0.094	0.42
1,2-Dibromoethane	U	0.38	ug/m3	1	.1	0.77	0.10	0.38
Tetrachloroethene	J	0.18	ug/m3	1	.1	0.68	0.088	0.34
Chlorobenzene	U	0.23	ug/m3	1	.1	0.46	0.028	0.23

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Report of Analytical Results

Client: ENSAFE
Lab ID: SJ2674-3
Client ID: UW1-BWD-AIR-041916
Project: Navy Clean WE15-03-06 NWIRP Bethp
SDG: SJ2674
Lab File ID: A2503.D

Sample Date: 20-APR-16
Received Date: 21-APR-16
Extract Date: 22-APR-16
Extracted By: AAB
Extraction Method: TO 15
Lab Prep Batch: WG182261

Analysis Date: 22-APR-16
Analyst: AAB
Analysis Method: EPA TO-15
Matrix: AR
% Solids: NA
Report Date: 25-APR-16

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Ethylbenzene	J	0.087	ug/m3	1	.1	0.43	0.056	0.22
m+p-Xylenes	J	0.56	ug/m3	1	.2	1.7	0.16	0.87
Bromoform	U	0.52	ug/m3	1	.1	1.0	0.083	0.52
Styrene	U	0.21	ug/m3	1	.1	0.42	0.055	0.21
1,1,2,2-Tetrachloroethane	U	0.34	ug/m3	1	.1	0.69	0.11	0.34
o-Xylene	J	0.11	ug/m3	1	.1	0.43	0.061	0.22
1,3-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.054	0.30
Xylenes (Total)	J	1.2	ug/m3	1	.3	3.9	0.18	2.0
1,4-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.13	0.30
1,2-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.090	0.30
1,2,4-Trichlorobenzene	U	0.37	ug/m3	1	.1	0.74	0.10	0.37
Isopropylbenzene	U	0.24	ug/m3	1	.1	0.49	0.049	0.24

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ANALYTICAL SERVICES

Cert No E87604

Report of Analytical Results

Client:
Lab ID: WG182261-10
Client ID: Method Blank Sample
Project:
SDG: SJ2674
Lab File ID: A2499.D

Sample Date:
Received Date:
Extract Date: 22-APR-16
Extracted By: AAB
Extraction Method: TO 15
Lab Prep Batch: WG182261

Analysis Date: 22-APR-16
Analyst: AAB
Analysis Method: EPA TO-15
Matrix: AR
% Solids: NA
Report Date: 25-APR-16

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Dichlorodifluoromethane	U	0.25	ug/m3	1	.1	0.49	0.030	0.25
Chloromethane	U	0.10	ug/m3	1	.1	0.21	0.039	0.10
Vinyl Chloride	U	0.13	ug/m3	1	.1	0.26	0.038	0.13
Bromomethane	U	0.19	ug/m3	1	.1	0.39	0.043	0.19
Chloroethane	U	0.13	ug/m3	1	.1	0.26	0.090	0.13
Acetone	U	0.24	ug/m3	1	.25	0.59	0.069	0.24
Trichlorofluoromethane	U	0.28	ug/m3	1	.1	0.56	0.079	0.28
1,1-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.036	0.20
Methylene Chloride	U	0.35	ug/m3	1	.25	0.87	0.14	0.35
Freon-113	U	0.38	ug/m3	1	.1	0.77	0.061	0.38
Carbon Disulfide	U	0.16	ug/m3	1	.1	0.31	0.022	0.16
trans-1,2-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.059	0.20
1,1-Dichloroethane	U	0.20	ug/m3	1	.1	0.40	0.044	0.20
Methyl tert-Butyl Ether	U	0.18	ug/m3	1	.1	0.36	0.054	0.18
2-Butanone	U	0.15	ug/m3	1	.25	0.74	0.062	0.15
cis-1,2-Dichloroethene	U	0.20	ug/m3	1	.1	0.40	0.059	0.20
Chloroform	U	0.24	ug/m3	1	.1	0.49	0.044	0.24
1,2-Dichloroethane	U	0.20	ug/m3	1	.1	0.40	0.040	0.20
1,1,1-Trichloroethane	U	0.27	ug/m3	1	.1	0.54	0.044	0.27
Benzene	U	0.16	ug/m3	1	.1	0.32	0.019	0.16
Carbon Tetrachloride	U	0.31	ug/m3	1	.1	0.63	0.10	0.31
Cyclohexane	U	0.17	ug/m3	1	.1	0.34	0.031	0.17
1,2-Dichloropropane	U	0.23	ug/m3	1	.1	0.46	0.092	0.23
Bromodichloromethane	U	0.33	ug/m3	1	.1	0.67	0.074	0.33
Trichloroethene	U	0.27	ug/m3	1	.1	0.54	0.048	0.27
cis-1,3-Dichloropropene	U	0.23	ug/m3	1	.1	0.45	0.045	0.23
4-Methyl-2-Pentanone	U	0.20	ug/m3	1	.1	0.41	0.053	0.20
trans-1,3-Dichloropropene	U	0.23	ug/m3	1	.1	0.45	0.023	0.23
1,1,2-Trichloroethane	U	0.27	ug/m3	1	.1	0.54	0.065	0.27
Toluene	U	0.19	ug/m3	1	.1	0.38	0.038	0.19
2-Hexanone	U	0.20	ug/m3	1	.25	1.0	0.12	0.20
Dibromochloromethane	U	0.42	ug/m3	1	.1	0.85	0.094	0.42
1,2-Dibromoethane	U	0.38	ug/m3	1	.1	0.77	0.10	0.38
Tetrachloroethene	U	0.34	ug/m3	1	.1	0.68	0.088	0.34

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Report of Analytical Results

Client:
Lab ID: WG182261-10
Client ID: Method Blank Sample
Project:
SDG: SJ2674
Lab File ID: A2499.D

Sample Date:
Received Date:
Extract Date: 22-APR-16
Extracted By: AAB
Extraction Method: TO 15
Lab Prep Batch: WG182261

Analysis Date: 22-APR-16
Analyst: AAB
Analysis Method: EPA TO-15
Matrix: AR
% Solids: NA
Report Date: 25-APR-16

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Chlorobenzene	U	0.23	ug/m3	1	.1	0.46	0.028	0.23
Ethylbenzene	U	0.22	ug/m3	1	.1	0.43	0.056	0.22
m+p-Xylenes	U	0.87	ug/m3	1	.2	1.7	0.16	0.87
Bromoform	U	0.52	ug/m3	1	.1	1.0	0.083	0.52
Styrene	U	0.21	ug/m3	1	.1	0.42	0.055	0.21
1,1,2,2-Tetrachloroethane	U	0.34	ug/m3	1	.1	0.69	0.11	0.34
o-Xylene	U	0.22	ug/m3	1	.1	0.43	0.061	0.22
1,3-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.054	0.30
Xylenes (Total)	U	2.0	ug/m3	1	.3	3.9	0.18	2.0
1,4-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.13	0.30
1,2-Dichlorobenzene	U	0.30	ug/m3	1	.1	0.60	0.090	0.30
1,2,4-Trichlorobenzene	J	0.13	ug/m3	1	.1	0.74	0.10	0.37
Isopropylbenzene	U	0.24	ug/m3	1	.1	0.49	0.049	0.24

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ANALYTICAL SERVICES

Cert No E87604

LCS Recovery Report

Client:
Lab ID: WG182261-9
Client ID: LCS
Project:
SDG: SJ2674
LCS File ID: A2497.D

Sample Date:
Received Date:
Extract Date: 22-APR-16
Extracted By: AAB
Extraction Method: TO 15
Lab Prep Batch: WG182261

Analysis Date: 22-APR-16
Analyst: AAB
Analysis Method: EPA TO-15
Matrix: AR
% Solids: NA
Report Date: 25-APR-16

Compound	Recovery (%)	Conc Added	Conc Recovered	Conc Units	Limits
Dichlorodifluoromethane	94.0	5.00	4.70	ppb/v	70-130
Chloromethane	88.0	5.00	4.40	ppb/v	70-130
Vinyl Chloride	94.0	5.00	4.70	ppb/v	70-130
Bromomethane	94.0	5.00	4.70	ppb/v	70-130
Chloroethane	92.0	5.00	4.60	ppb/v	70-130
Acetone	100.	5.00	5.00	ppb/v	60-140
Trichlorofluoromethane	98.0	5.00	4.90	ppb/v	70-130
1,1-Dichloroethene	100.	5.00	5.00	ppb/v	70-130
Methylene Chloride	96.0	5.00	4.80	ppb/v	60-140
Freon-113	96.0	5.00	4.80	ppb/v	70-130
Carbon Disulfide	100.	5.00	5.00	ppb/v	70-130
trans-1,2-Dichloroethene	94.0	5.00	4.70	ppb/v	70-130
1,1-Dichloroethane	92.0	5.00	4.60	ppb/v	70-130
Methyl tert-Butyl Ether	100.	5.00	5.00	ppb/v	70-130
2-Butanone	94.0	5.00	4.70	ppb/v	70-130
cis-1,2-Dichloroethene	92.0	5.00	4.60	ppb/v	70-130
Chloroform	96.0	5.00	4.80	ppb/v	70-130
1,2-Dichloroethane	94.0	5.00	4.70	ppb/v	70-130
1,1,1-Trichloroethane	102.	5.00	5.10	ppb/v	70-130
Benzene	94.0	5.00	4.70	ppb/v	70-130
Carbon Tetrachloride	106.	5.00	5.30	ppb/v	70-130
Cyclohexane	100.	5.00	5.00	ppb/v	70-130
1,2-Dichloropropane	92.0	5.00	4.60	ppb/v	70-130
Bromodichloromethane	100.	5.00	5.00	ppb/v	70-130
Trichloroethene	96.0	5.00	4.80	ppb/v	70-130
cis-1,3-Dichloropropene	110.	5.00	5.50	ppb/v	70-130
4-Methyl-2-Pentanone	96.0	5.00	4.80	ppb/v	70-130
trans-1,3-Dichloropropene	100.	5.00	5.00	ppb/v	70-130
1,1,2-Trichloroethane	92.0	5.00	4.60	ppb/v	70-130
Toluene	98.0	5.00	4.90	ppb/v	70-130
2-Hexanone	88.0	5.00	4.40	ppb/v	70-130
Dibromochloromethane	104.	5.00	5.20	ppb/v	70-130
1,2-Dibromoethane	98.0	5.00	4.90	ppb/v	70-130
Tetrachloroethene	94.0	5.00	4.70	ppb/v	70-130
Chlorobenzene	90.0	5.00	4.50	ppb/v	70-130

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LCS Recovery Report

Client:
Lab ID: WG182261-9
Client ID: LCS
Project:
SDG: SJ2674
LCS File ID: A2497.D

Sample Date:
Received Date:
Extract Date: 22-APR-16
Extracted By: AAB
Extraction Method: TO 15
Lab Prep Batch: WG182261

Analysis Date: 22-APR-16
Analyst: AAB
Analysis Method: EPA TO-15
Matrix: AR
% Solids: NA
Report Date: 25-APR-16

Compound	Recovery (%)	Conc Added	Conc Recovered	Conc Units	Limits
Ethylbenzene	100.	5.00	5.00	ppb/v	70-130
m+p-Xylenes	97.0	10.0	9.70	ppb/v	70-130
Bromoform	108.	5.00	5.40	ppb/v	70-130
Styrene	100.	5.00	5.00	ppb/v	70-130
1,1,2,2-Tetrachloroethane	90.0	5.00	4.50	ppb/v	70-130
o-Xylene	96.0	5.00	4.80	ppb/v	70-130
1,3-Dichlorobenzene	96.0	5.00	4.80	ppb/v	70-130
Xylenes (Total)	97.3	15.0	14.6	ppb/v	70-130
1,4-Dichlorobenzene	98.0	5.00	4.90	ppb/v	70-130
1,2-Dichlorobenzene	96.0	5.00	4.80	ppb/v	70-130
1,2,4-Trichlorobenzene	104.	5.00	5.20	ppb/v	70-130
Isopropylbenzene	106.	5.00	5.30	ppb/v	70-130

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Form 4
Method Blank Summary - VOA

Lab Name : Katahdin Analytical Services
SDG : SJ2674
Project : Navy Clean WE15-03-06 NWIRP Bethpage,
Lab Sample ID : WG182261-10
Lab File ID : A2499.D
Date Analyzed : 22-APR-16
Instrument ID : AIR1
Time Analyzed : 08:42
Heated Purge : No

This Method Blank applies to the following samples, LCS, MS and MSD:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Laboratory Control S	WG182261-9	A2497.D	04/22/16	07:16
DW1-BWD-AIR-041916	SJ2674-1	A2501.D	04/22/16	10:09
DW2-BWD-AIR-041916	SJ2674-2	A2502.D	04/22/16	10:55
UW1-BWD-AIR-041916	SJ2674-3	A2503.D	04/22/16	11:40

Form 5
Volatile Organic Instrument Performance Check

Lab Name : Katahdin Analytical Services
Project : Navy Clean WE15-03-06 NWIRP Bethpage,
Lab File ID : AB892.D
Instrument ID : AIR1

SDG : SJ2674
Date Analyzed : 21-APR-16
Time Analyzed : 16:06

m/e	Ion Abundance Criteria	% Relative Abundance		
50	8.0 - 40.0% of mass 95	23.5		
75	30.0 - 66.0% of mass 95	58.2		
95	Base Peak, 100% relative abundance	100		
96	5.0 - 9.0% of mass 95	6.9		
173	Less than 2.0% of mass 174	0.0	0.0	1
174	50.0 - 120.0% of mass 95	72.5		
175	4.0 - 9.0% of mass 174	5.7	7.86	1
176	93.0 - 101.0% of mass 174	73.2	101.00	1
177	5.0 - 9.0% of mass 176	5.0	6.82	2

1-Value is % mass 174 2-Value is % mass 176

This check applies to the following samples, LCS, MS, MSD and standards:

Client Sample ID	Lab Sample ID	Lab File ID	Date Analyzed	Time Analyzed
Initial Calibration	WG182261-8	A2489.D	04/21/16	16:56
Initial Calibration	WG182261-7	A2490.D	04/21/16	17:38
Initial Calibration	WG182261-6	A2491.D	04/21/16	18:19
Initial Calibration	WG182261-5	A2492.D	04/21/16	19:00
Initial Calibration	WG182261-4	A2493.D	04/21/16	19:46
Initial Calibration	WG182261-3	A2494.D	04/21/16	20:28
Initial Calibration	WG182261-2	A2495.D	04/21/16	21:09
Initial Calibration	WG182261-1	A2496.D	04/21/16	21:50
Laboratory Control S	WG182261-9	A2497.D	04/22/16	07:16
Method Blank Sample	WG182261-10	A2499.D	04/22/16	08:42
DW1-BWD-AIR-041916	SJ2674-1	A2501.D	04/22/16	10:09
DW2-BWD-AIR-041916	SJ2674-2	A2502.D	04/22/16	10:55
UW1-BWD-AIR-041916	SJ2674-3	A2503.D	04/22/16	11:40

Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services **SDG:** SJ2674

Project : Navy Clean WE15-03-06 NWIRP Bethpage, N **Instrument ID:** AIR1

Lab File IDs : A2496.D A2495.D A2494.D **Calibration Date(s):** 21-APR-16 16:56
A2493.D A2492.D A2491.D 21-APR-16 21:50
A2490.D A2489.D

	0.100000(Level 1	0.250000(Level 2	0.500000(Level 3	1.0000 Level 4	2.5000 Level 5	5.0000 Level 6	10.0000 Level 7	15.0000 Level 8	New Crv	b	m1	%RSD	Max %RSD	
Dichlorodifluoromethane	5.07178	4.68785	4.45383	4.40865	4.85657	4.41779	4.19195	3.86212	AVG		4.49382	8.44465	30.00000	O
Chloromethane	1.27366	1.23584	1.15197	1.13954	1.28696	1.18226	1.16796	1.06634	AVG		1.18807	6.22620	30.00000	O
Vinyl chloride	1.50092	1.33975	1.34310	1.35893	1.50978	1.41069	1.39290	1.28412	AVG		1.39252	5.68932	30.00000	O
Bromomethane	1.40668	1.29469	1.23206	1.17950	1.29438	1.24668	1.24153	1.19344	AVG		1.26112	5.69450	30.00000	O
Chloroethane	0.82377	0.77399	0.72367	0.72484	0.78841	0.75990	0.75943	0.71010	AVG		0.75801	5.00738	30.00000	O
Acetone	+++++	2.37954	2.44873	2.37529	2.35266	2.21157	2.17387	2.06692	AVG		2.28694	6.02070	30.00000	O
Trichlorofluoromethane	3.68935	3.69952	3.52230	3.46906	3.85406	3.60932	3.55264	3.42278	AVG		3.60238	3.91614	30.00000	O
1,1-Dichloroethene	1.36543	1.18611	1.15429	1.17564	1.24000	1.21956	1.23504	1.20385	AVG		1.22249	5.30321	30.00000	O
Methylene Chloride	+++++	1.38364	1.28986	1.22126	1.27080	1.21724	1.21683	1.12562	AVG		1.24646	6.40664	30.00000	O
Freon-113	2.65238	2.56445	2.51013	2.44275	2.56368	2.44071	2.38270	2.15565	AVG		2.46406	6.14183	30.00000	O
Carbon Disulfide	3.71361	3.53062	3.61792	3.66896	4.17238	3.95534	3.82620	3.40359	AVG		3.73608	6.54292	30.00000	O
trans-1,2-Dichloroethene	1.42476	1.39312	1.33785	1.35613	1.48360	1.42941	1.39468	1.29396	AVG		1.38919	4.27070	30.00000	O
1,1-Dichloroethane	3.21459	3.01700	3.03088	3.05473	3.18304	3.04715	3.02380	2.76484	AVG		3.04200	4.44116	30.00000	O
Methyl tert-butyl ether	3.84045	3.89545	4.03288	4.28587	4.83659	4.61447	4.50263	4.07421	AVG		4.26032	8.47548	30.00000	O
2-Butanone	+++++	3.26876	3.29905	3.47735	3.74674	3.45896	3.43916	3.07230	AVG		3.39462	6.20050	30.00000	O
cis-1,2-Dichloroethene	1.42012	1.40857	1.44352	1.47115	1.58488	1.53601	1.55462	1.48333	AVG		1.48778	4.35082	30.00000	O
Chloroform	3.91306	3.65853	3.67068	3.68367	3.78304	3.60211	3.59183	3.48645	AVG		3.67367	3.51135	30.00000	O
1,2-Dichloroethane	0.59864	0.57447	0.57136	0.56891	0.60050	0.57667	0.57534	0.58040	AVG		0.58079	2.08261	30.00000	O
1,1,1-Trichloroethane	3.74204	3.57660	3.63462	3.63847	3.85721	3.74368	3.77825	3.71546	AVG		3.71079	2.43410	30.00000	O
Benzene	0.89270	0.84605	0.87059	0.88564	0.92795	0.90188	0.87762	0.84914	AVG		0.88144	3.07817	30.00000	O
Carbon Tetrachloride	0.70886	0.67207	0.70053	0.70952	0.77160	0.77900	0.78661	0.80312	AVG		0.74141	6.59392	30.00000	O
Cyclohexane	1.93907	1.94410	2.05203	2.22855	2.46584	2.39264	2.37212	2.29068	AVG		2.21063	9.38045	30.00000	O
1,2-Dichloropropane	0.37677	0.33696	0.34070	0.33208	0.35661	0.35049	0.34394	0.34027	AVG		0.34723	4.08447	30.00000	O
Bromodichloromethane	0.70558	0.70681	0.71109	0.73297	0.80087	0.78511	0.77700	0.77237	AVG		0.74897	5.21604	30.00000	O
Trichloroethene	0.42387	0.39590	0.40951	0.40799	0.44042	0.42932	0.42619	0.42770	AVG		0.42011	3.42737	30.00000	O
cis-1,3-dichloropropene	0.40728	0.39579	0.43867	0.45329	0.54207	0.53688	0.54346	0.54765	AVG		0.48314	13.6434(	30.00000	O
4-methyl-2-pentanone	0.73828	0.71482	0.78220	0.83180	0.90332	0.83000	0.80414	0.78475	AVG		0.79866	7.36277	30.00000	O
trans-1,3-Dichloropropene	0.40896	0.40890	0.47221	0.49932	0.58291	0.58646	0.59971	0.60190	AVG		0.52005	16.0586[	30.00000	O
1,1,2-Trichloroethane	0.33347	0.32302	0.32354	0.32028	0.33772	0.32310	0.31768	0.31781	AVG		0.32458	2.23817	30.00000	O
Toluene	0.59621	0.53152	0.58832	0.60607	0.66920	0.64916	0.63404	0.62815	AVG		0.61283	6.95482	30.00000	O
2-Hexanone	+++++	0.75709	0.87944	0.93501	1.04291	0.96716	0.90992	0.86686	AVG		0.90834	9.81747	30.00000	O
Dibromochloromethane	0.59150	0.60103	0.63178	0.68845	0.76413	0.77834	0.77367	0.76709	AVG		0.69950	11.6556[	30.00000	O
1,2-Dibromoethane	0.54072	0.52747	0.56452	0.56003	0.60402	0.58322	0.56902	0.56247	AVG		0.56393	4.18079	30.00000	O
Tetrachloroethene	0.44476	0.44336	0.43704	0.45449	0.48976	0.47610	0.46187	0.45834	AVG		0.45822	3.86249	30.00000	O
Chlorobenzene	1.03135	0.98554	0.97012	0.98426	1.01612	0.98838	0.92817	0.88262	AVG		0.97332	4.90742	30.00000	O
Ethylbenzene	0.36270	0.38682	0.45270	0.47969	0.51722	0.51115	0.50305	0.49332	AVG		0.46333	12.6452[	30.00000	O

Form 6
Initial Calibration Summary

Lab Name : Katahdin Analytical Services **SDG:** SJ2674

Project : Navy Clean WE15-03-06 NWIRP Bethpage, N **Instrument ID:** AIR1

Lab File IDs : A2496.D A2495.D A2494.D A2493.D A2492.D A2491.D A2490.D A2489.D

Calibration Date(s): 21-APR-16 16:56 21-APR-16 21:50

m+p-Xylenes	0.45895	0.52687	0.56523	0.61502	0.65706	0.63642	0.60950	0.58993	AVG		0.58237	11.04555	30.00000	O
Bromoform	0.50364	0.53167	0.55950	0.63518	0.71889	0.72803	0.72011	0.70924	AVG		0.63828	14.74397	30.00000	O
Styrene	0.55704	0.63699	0.78537	0.87310	1.00653	0.97542	0.92279	0.88223	AVG		0.82994	19.28175	30.00000	O
1,1,2,2-Tetrachloroethane	1.03276	0.96741	0.92666	0.96753	1.04258	0.96631	0.91879	0.88962	AVG		0.96396	5.53165	30.00000	O
o-Xylene	0.46180	0.50646	0.56438	0.61841	0.65101	0.62858	0.60238	0.59191	AVG		0.57811	11.15576	30.00000	O
1,3-Dichlorobenzene	0.93215	0.92842	0.94998	1.04175	1.16478	1.07882	0.99854	0.96796	AVG		1.00780	8.20645	30.00000	O
Xylenes (total)	+++++	+++++	+++++	+++++	+++++	+++++	+++++	+++++	AVG		0.000e+00	0.000e+0	30.00000	M
1,4-Dichlorobenzene	0.83376	0.83667	0.88364	1.00495	1.14493	1.08136	1.00291	0.96957	AVG		0.96972	11.63466	30.00000	O
1,2-Dichlorobenzene	0.87981	0.88111	0.89926	0.98977	1.12932	1.05188	0.97716	0.94087	AVG		0.96865	9.10134	30.00000	O
1,2,4-Trichlorobenzene	0.41338	0.45234	0.51803	0.65412	0.81077	0.82208	0.79958	0.77535	AVG		0.65571	26.14809	30.00000	O
isopropylbenzene	1.55987	1.59562	1.65081	1.84525	1.96435	1.85558	1.60656	1.43355	AVG		1.68895	10.65949	30.00000	O

Legend: O = Kept Original Curve
Y = Failed Minimum RF
W = Failed %RSD Value

Form 8
Internal Standard Area and RT Summary

Lab Name : Katahdin Analytical Services
Project : Navy Clean WE15-03-06 NWIR
Lab ID : WG182261-6
Lab File ID : A2491.D

SDG: SJ2674
Analytical Date: 04/21/16 18:19
Instrument ID: AIR1

		BROMOCHLOROMETHANE			1,4-DIFLUOROBENZENE			CHLOROBENZENE-D5		
		Area	#	RT	#	Area	#	RT	#	Area	#	RT	#
	Std .	334071		8.09		1651123		10.93		1419822		16.23	
	Upper Limit	668142		8.59		3302246		11.43		2839644		16.73	
	Lower Limit	167035.5		7.59		825561.5		10.43		709911		15.73	
Client Sample ID	Lab Sample ID												
Laboratory Control S	WG182261-9	318339		8.09		1615229		10.93		1459503		16.23	
Method Blank Sample	WG182261-10	306899		8.10		1524978		10.93		1400894		16.22	
DW1-BWD-AIR-04191	SJ2674-1	297173		8.09		1451091		10.93		1279810		16.22	
DW2-BWD-AIR-04191	SJ2674-2	284113		8.09		1371871		10.93		1201049		16.22	
UW1-BWD-AIR-04191	SJ2674-3	300658		8.09		1467884		10.93		1300965		16.22	

Area Upper Limit = +100% of internal standard area
Area Lower Limit = - 50% of internal standard area
RT Upper Limit = + 0.50 minutes of internal standard RT
RT Lower Limit = - 0.50 minutes of internal standard RT

Column used to flag values outside QC limits with an asterisk.
* Values outside of QC limits.

RESOLUTION CONSULTANTS

ATTACHMENT F

Analytical Data Summary for Wells Sampled by Resolutions Consultants

TABLE **F**-1. ANALYTICAL DATA SUMMARY FOR
WELLS SAMPLED BY RESOLUTION CONSULTANTS
2016 OU2 GROUNDWATER INVESTIGATION

Location	NYSDEC Groundwater Guidance or Standard Value (Note 1)	RE122D1	RE122D2	RE122D3	RE108D1
Sample Date		3/15/2016	3/15/2016	3/15/2016	3/14/2016
Sample ID		RE122D1-GW-031516	RE122D2-GW-031516	RE122D3-GW-031516	RE108D1-GW-031416
Sample type code		N	N	N	N
VOC 8260C (ug/L)					
1,1,1-TRICHLOROETHANE	5	<0.50 U	**0.62 J**	<0.50 U	<0.50 U
1,1,2,2-TETRACHLOROETHANE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5	**4.1**	**20**	<0.50 U	**0.97 J**
1,1,2-TRICHLOROETHANE	1	<0.50 U	**3.1**	<0.50 U	<0.50 U
1,1-DICHLOROETHANE	5	<0.50 U	**1.2**	<0.50 U	<0.50 U
1,1-DICHLOROETHENE	5	**0.80 J**	**8.4**	<0.50 U	<0.50 U
1,2,4-TRICHLOROBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,2-DIBROMO-3-CHLOROPROPANE	0.04	***<0.75 U***	***<0.75 U***	***<0.75 U***	***<0.75 U***
1,2-DIBROMOETHANE	NL	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,2-DICHLOROBENZENE	3	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,2-DICHLOROETHANE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,2-DICHLOROETHENE, TOTAL	5	**1.8 J**	**5.0**	<1.0 U	**0.37 J**
1,2-DICHLOROPROPANE	1	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,3-DICHLOROBENZENE	3	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,4-DICHLOROBENZENE	3	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,4-DIOXANE (Method 8270D_SIM)	NL	**6.0**	**12**	<0.17 U	**5.0**
2-BUTANONE	50	<2.5 UJ	<2.5 UJ	<2.5 UJ	<2.5 UJ
2-HEXANONE	50	<2.5 UJ	<2.5 UJ	<2.5 UJ	<2.5 UJ
4-METHYL-2-PENTANONE	NL	<2.5 U	<2.5 U	<2.5 U	<2.5 U
ACETONE	50	<2.5 UJ	<2.5 UJ	<2.5 UJ	<2.5 UJ
BENZENE	1	<0.50 U	<0.50 U	<0.50 U	<0.50 U
BROMODICHLOROMETHANE	50	<0.50 U	<0.50 U	<0.50 U	<0.50 U
BROMOFORM	50	<0.50 U	<0.50 U	<0.50 U	<0.50 U
BROMOMETHANE	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U
CARBON DISULFIDE	60	<0.50 UJ	<0.50 UJ	<0.50 UJ	<0.50 UJ
CARBON TETRACHLORIDE	5	**0.55 J**	**2.8**	<0.50 U	<0.50 U
CHLOROBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
CHLOROETHANE	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U
CHLOROFORM	7	**0.52 J**	**2.4**	<0.50 U	<0.50 U
CHLOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U
CIS-1,2-DICHLOROETHENE	5	**1.8**	**5.0**	<0.50 U	**0.37 J**
CIS-1,3-DICHLOROPROPENE	0.4	***<0.50 U***	***<0.50 U***	***<0.50 U***	***<0.50 U***
CYCLOHEXANE	NL	<0.50 U	<0.50 U	<0.50 U	<0.50 U
DIBROMOCHLOROMETHANE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
DICHLORODIFLUOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U
ETHYLBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
ISOPROPYLBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
M- AND P-XYLENE	NL	<1.0 U	<1.0 U	<1.0 U	<1.0 U
METHYL ACETATE	NL	<0.75 U	<0.75 U	<0.75 U	<0.75 U
METHYL CYCLOHEXANE	NL	<0.50 U	<0.50 U	<0.50 U	<0.50 U
METHYL TERT-BUTYL ETHER	10	<0.50 U	<0.50 U	<0.50 U	<0.50 U
METHYLENE CHLORIDE	5	<2.5 U	<2.5 U	<2.5 U	<2.5 U
O-XYLENE	NL	<0.50 U	<0.50 U	<0.50 U	<0.50 U
STYRENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
TETRACHLOROETHENE	5	**1.1 J**	**3.1 J**	<0.50 U	**1.8 J**
TOLUENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
TRANS-1,2-DICHLOROETHENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
TRANS-1,3-DICHLOROPROPENE	0.4	***<0.50 U***	***<0.50 U***	***<0.50 U***	***<0.50 U***
TRICHLOROETHENE	5	**610**	**5300**	**2.1**	**120**
TRICHLOROFLUOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U
VINYL CHLORIDE	2	<1.0 U	<1.0 U	<1.0 U	<1.0 U
XYLENES, TOTAL	5	<1.5 U	<1.5 U	<1.5 U	<1.5 U

TABLE **F**-1. ANALYTICAL DATA SUMMARY FOR
WELLS SAMPLED BY RESOLUTION CONSULTANTS
2016 OU2 GROUNDWATER INVESTIGATION

Location	NYSDEC Groundwater Guidance or Standard Value (Note 1)	RE108D2	RE103D1	RE103D2	RE103D3
Sample Date		3/14/2016	3/14/2016	3/14/2016	3/14/2016
Sample ID		RE108D2-GW-031416	RE103D1-GW-031416	RE103D2-GW-031416	RE103D3-GW-031416
Sample type code		N	N	N	N
VOC 8260C (ug/L)					
1,1,1-TRICHLOROETHANE	5	**1.0**	**0.48 J**	<0.50 U	<0.50 U
1,1,2,2-TETRACHLOROETHANE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5	**6.4**	**15**	**4.3**	**2.3**
1,1,2-TRICHLOROETHANE	1	**1.9**	**0.75 J**	**0.55 J**	**0.33 J**
1,1-DICHLOROETHANE	5	**5.1**	**1.2**	**0.78 J**	<0.50 U
1,1-DICHLOROETHENE	5	**7.4**	**9.0**	**1.6**	**0.59 J**
1,2,4-TRICHLOROBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,2-DIBROMO-3-CHLOROPROPANE	0.04	***<0.75 U***	***<0.75 U***	***<0.75 U***	***<0.75 U***
1,2-DIBROMOETHANE	NL	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,2-DICHLOROBENZENE	3	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,2-DICHLOROETHANE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,2-DICHLOROETHENE, TOTAL	5	**8.3**	**4.2**	**1.8 J**	**0.92 J**
1,2-DICHLOROPROPANE	1	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,3-DICHLOROBENZENE	3	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,4-DICHLOROBENZENE	3	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,4-DIOXANE (Method 8270D_SIM)	NL	**8.3**	**18**	**2.4**	**1.1**
2-BUTANONE	50	<2.5 UJ	<2.5 UJ	<2.5 UJ	<2.5 UJ
2-HEXANONE	50	<2.5 UJ	<2.5 UJ	<2.5 UJ	<2.5 UJ
4-METHYL-2-PENTANONE	NL	<2.5 U	<2.5 U	<2.5 U	<2.5 U
ACETONE	50	<2.5 UJ	<2.5 UJ	<2.5 UJ	<2.5 UJ
BENZENE	1	<0.50 U	<0.50 U	<0.50 U	<0.50 U
BROMODICHLOROMETHANE	50	<0.50 U	<0.50 U	<0.50 U	<0.50 U
BROMOFORM	50	<0.50 U	<0.50 U	<0.50 U	<0.50 U
BROMOMETHANE	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U
CARBON DISULFIDE	60	<0.50 UJ	<0.50 UJ	<0.50 UJ	<0.50 UJ
CARBON TETRACHLORIDE	5	**2.0**	**0.61 J**	**0.38 J**	**0.30 J**
CHLOROBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
CHLOROETHANE	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U
CHLOROFORM	7	**3.5**	**0.86 J**	**0.95 J**	**0.76 J**
CHLOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U
CIS-1,2-DICHLOROETHENE	5	**8.3**	**4.2**	**1.8**	**0.92 J**
CIS-1,3-DICHLOROPROPENE	0.4	***<0.50 U***	***<0.50 U***	***<0.50 U***	***<0.50 U***
CYCLOHEXANE	NL	<0.50 U	<0.50 U	<0.50 U	<0.50 U
DIBROMOCHLOROMETHANE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
DICHLORODIFLUOROMETHANE	5	<1.0 U	**0.29 J**	<1.0 U	<1.0 U
ETHYLBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
ISOPROPYLBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
M- AND P-XYLENE	NL	<1.0 U	<1.0 U	<1.0 U	<1.0 U
METHYL ACETATE	NL	<0.75 U	<0.75 U	<0.75 U	<0.75 U
METHYL CYCLOHEXANE	NL	<0.50 U	<0.50 U	<0.50 U	<0.50 U
METHYL TERT-BUTYL ETHER	10	<0.50 U	<0.50 U	<0.50 U	<0.50 U
METHYLENE CHLORIDE	5	<2.5 U	<2.5 U	<2.5 U	<2.5 U
O-XYLENE	NL	<0.50 U	<0.50 U	<0.50 U	<0.50 U
STYRENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
TETRACHLOROETHENE	5	**1.6 J**	**6.2 J**	**0.98 J**	<0.50 UJ
TOLUENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
TRANS-1,2-DICHLOROETHENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
TRANS-1,3-DICHLOROPROPENE	0.4	***<0.50 U***	***<0.50 U***	***<0.50 U***	***<0.50 U***
TRICHLOROETHENE	5	**3800**	**1200**	**860**	**520**
TRICHLOROFLUOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U
VINYL CHLORIDE	2	<1.0 U	<1.0 U	<1.0 U	<1.0 U
XYLENES, TOTAL	5	<1.5 U	<1.5 U	<1.5 U	<1.5 U

TABLE **F**-1. ANALYTICAL DATA SUMMARY FOR
WELLS SAMPLED BY RESOLUTION CONSULTANTS
2016 OU2 GROUNDWATER INVESTIGATION

Location	NYSDEC Groundwater Guidance or Standard Value (Note 1)	RE104D1	RE104D2	RE104D3	RE120D1
Sample Date		3/15/2016	3/15/2016	3/15/2016	3/16/2016
Sample ID		RE104D1-GW-031516	RE104D2-GW-031516	RE104D3-GW-031516	RE120D1-GW-031616
Sample type code		N	N	N	N
VOC 8260C (ug/L)					
1,1,1-TRICHLOROETHANE	5	<0.50 U	<0.50 U	<0.50 U	<1.0 U
1,1,2,2-TETRACHLOROETHANE	5	<0.50 U	<0.50 U	<0.50 U	<1.0 U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5	**3.4**	<0.50 U	<0.50 U	**29 J**
1,1,2-TRICHLOROETHANE	1	<0.50 U	<0.50 U	<0.50 U	**1.3 J**
1,1-DICHLOROETHANE	5	<0.50 U	<0.50 U	<0.50 U	**2.4**
1,1-DICHLOROETHENE	5	**0.63 J**	<0.50 U	<0.50 U	**17**
1,2,4-TRICHLOROBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<1.0 U
1,2-DIBROMO-3-CHLOROPROPANE	0.04	***<0.75 U***	***<0.75 U***	***<0.75 U***	***<1.5 U***
1,2-DIBROMOETHANE	NL	<0.50 U	<0.50 U	<0.50 U	<1.0 U
1,2-DICHLOROBENZENE	3	<0.50 U	<0.50 U	<0.50 U	<1.0 U
1,2-DICHLOROETHANE	5	<0.50 U	<0.50 U	<0.50 U	<1.0 U
1,2-DICHLOROETHENE, TOTAL	5	**1.0 J**	**2.9**	<1.0 U	**3.6 J**
1,2-DICHLOROPROPANE	1	<0.50 U	<0.50 U	<0.50 U	<1.0 U
1,3-DICHLOROBENZENE	3	<0.50 U	<0.50 U	<0.50 U	<1.0 U
1,4-DICHLOROBENZENE	3	<0.50 U	<0.50 U	<0.50 U	<1.0 UJ
1,4-DIOXANE (Method 8270D_SIM)	NL	**6.8**	<0.17 U	<0.17 U	**19**
2-BUTANONE	50	<2.5 UJ	<2.5 UJ	<2.5 UJ	<5.0 U
2-HEXANONE	50	<2.5 UJ	<2.5 UJ	<2.5 UJ	<5.0 U
4-METHYL-2-PENTANONE	NL	<2.5 U	<2.5 U	<2.5 U	<5.0 U
ACETONE	50	<2.5 UJ	<2.5 UJ	<2.5 UJ	<5.0 U
BENZENE	1	<0.50 U	<0.50 U	<0.50 U	<1.0 U
BROMODICHLOROMETHANE	50	<0.50 U	<0.50 U	<0.50 U	<1.0 U
BROMOFORM	50	<0.50 U	<0.50 U	<0.50 U	<1.0 U
BROMOMETHANE	5	<1.0 U	<1.0 U	<1.0 U	<2.0 UJ
CARBON DISULFIDE	60	<0.50 UJ	<0.50 UJ	<0.50 UJ	<1.0 U
CARBON TETRACHLORIDE	5	<0.50 U	<0.50 U	<0.50 U	<1.0 U
CHLOROBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<1.0 U
CHLOROETHANE	5	<1.0 U	<1.0 U	<1.0 U	<2.0 UJ
CHLOROFORM	7	<0.50 U	**0.52 J**	<0.50 U	<1.0 U
CHLOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U	<2.0 U
CIS-1,2-DICHLOROETHENE	5	**1.0**	**2.9**	<0.50 U	**3.6**
CIS-1,3-DICHLOROPROPENE	0.4	***<0.50 U***	***<0.50 U***	***<0.50 U***	***<1.0 U***
CYCLOHEXANE	NL	<0.50 U	<0.50 U	<0.50 U	<1.0 U
DIBROMOCHLOROMETHANE	5	<0.50 U	<0.50 U	<0.50 U	<1.0 U
DICHLORODIFLUOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U	<2.0 U
ETHYLBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<1.0 U
ISOPROPYLBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<1.0 U
M- AND P-XYLENE	NL	<1.0 U	<1.0 U	<1.0 U	<2.0 U
METHYL ACETATE	NL	<0.75 U	<0.75 U	<0.75 U	<1.5 U
METHYL CYCLOHEXANE	NL	<0.50 U	<0.50 U	<0.50 U	<1.0 U
METHYL TERT-BUTYL ETHER	10	<0.50 U	<0.50 U	<0.50 U	<1.0 U
METHYLENE CHLORIDE	5	<2.5 U	<2.5 U	<2.5 U	<5.0 U
O-XYLENE	NL	<0.50 U	<0.50 U	<0.50 U	<1.0 U
STYRENE	5	<0.50 U	<0.50 U	<0.50 U	<1.0 U
TETRACHLOROETHENE	5	**1.8**	<0.50 U	<0.50 U	**2.3**
TOLUENE	5	<0.50 U	<0.50 U	<0.50 U	<1.0 U
TRANS-1,2-DICHLOROETHENE	5	<0.50 U	<0.50 U	<0.50 U	<1.0 U
TRANS-1,3-DICHLOROPROPENE	0.4	***<0.50 U***	***<0.50 U***	***<0.50 U***	***<1.0 U***
TRICHLOROETHENE	5	**100**	**8.4**	<0.50 U	**1200**
TRICHLOROFLUOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U	<2.0 U
VINYL CHLORIDE	2	<1.0 U	<1.0 U	<1.0 U	<2.0 U
XYLENES, TOTAL	5	<1.5 U	<1.5 U	<1.5 U	<3.0 U

TABLE **F**-1. ANALYTICAL DATA SUMMARY FOR
WELLS SAMPLED BY RESOLUTION CONSULTANTS
2016 OU2 GROUNDWATER INVESTIGATION

Location	NYSDEC Groundwater Guidance or Standard Value (Note 1)	RE120D2	RE120D3	RE123D1	RE123D2
Sample Date		3/16/2016	3/16/2016	3/17/2016	3/17/2016
Sample ID		RE120D2-GW-031616	RE120D3-GW-031616	RE123D1-GW-031716	RE123D2-GW-031716
Sample type code		N	N	N	N
VOC 8260C (ug/L)					
1,1,1-TRICHLOROETHANE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,1,2,2-TETRACHLOROETHANE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5	**16 J**	**1.3 J**	<0.50 UJ	<0.50 UJ
1,1,2-TRICHLOROETHANE	1	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,1-DICHLOROETHANE	5	**1.0**	<0.50 U	<0.50 U	<0.50 U
1,1-DICHLOROETHENE	5	**4.8**	<0.50 U	<0.50 U	<0.50 U
1,2,4-TRICHLOROBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,2-DIBROMO-3-CHLOROPROPANE	0.04	***<0.75 U***	***<0.75 U***	***<0.75 U***	***<0.75 U***
1,2-DIBROMOETHANE	NL	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,2-DICHLOROBENZENE	3	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,2-DICHLOROETHANE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,2-DICHLOROETHENE, TOTAL	5	**3.4**	<1.0 U	<1.0 U	<1.0 U
1,2-DICHLOROPROPANE	1	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,3-DICHLOROBENZENE	3	<0.50 U	<0.50 U	<0.50 U	<0.50 U
1,4-DICHLOROBENZENE	3	<0.50 UJ	<0.50 UJ	<0.50 UJ	<0.50 UJ
1,4-DIOXANE (Method 8270D_SIM)	NL	**9.5**	<0.17 U	**5.3**	**0.63**
2-BUTANONE	50	<2.5 U	<2.5 U	<2.5 U	<2.5 U
2-HEXANONE	50	<2.5 U	<2.5 U	<2.5 U	<2.5 U
4-METHYL-2-PENTANONE	NL	<2.5 U	<2.5 U	<2.5 U	<2.5 U
ACETONE	50	<2.5 U	<2.5 U	<2.5 U	<2.5 U
BENZENE	1	<0.50 U	<0.50 U	<0.50 U	<0.50 U
BROMODICHLOROMETHANE	50	<0.50 U	<0.50 U	<0.50 U	<0.50 U
BROMOFORM	50	<0.50 U	<0.50 U	<0.50 U	<0.50 U
BROMOMETHANE	5	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ
CARBON DISULFIDE	60	<0.50 U	<0.50 U	<0.50 U	<0.50 U
CARBON TETRACHLORIDE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
CHLOROBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
CHLOROETHANE	5	<1.0 UJ	<1.0 UJ	<1.0 UJ	<1.0 UJ
CHLOROFORM	7	<0.50 U	<0.50 U	<0.50 U	<0.50 U
CHLOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U
CIS-1,2-DICHLOROETHENE	5	**3.4**	<0.50 U	<0.50 U	<0.50 U
CIS-1,3-DICHLOROPROPENE	0.4	***<0.50 U***	***<0.50 U***	***<0.50 U***	***<0.50 U***
CYCLOHEXANE	NL	<0.50 U	<0.50 U	<0.50 U	<0.50 U
DIBROMOCHLOROMETHANE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
DICHLORODIFLUOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U
ETHYLBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
ISOPROPYLBENZENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
M- AND P-XYLENE	NL	<1.0 U	<1.0 U	<1.0 U	<1.0 U
METHYL ACETATE	NL	<0.75 U	<0.75 U	<0.75 UJ	<0.75 UJ
METHYL CYCLOHEXANE	NL	<0.50 U	<0.50 U	<0.50 U	<0.50 U
METHYL TERT-BUTYL ETHER	10	<0.50 U	<0.50 U	<0.50 U	<0.50 U
METHYLENE CHLORIDE	5	<2.5 U	<2.5 U	<2.5 U	<2.5 U
O-XYLENE	NL	<0.50 U	<0.50 U	<0.50 U	<0.50 U
STYRENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
TETRACHLOROETHENE	5	**2.0**	<0.50 U	<0.50 U	**0.81 J**
TOLUENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
TRANS-1,2-DICHLOROETHENE	5	<0.50 U	<0.50 U	<0.50 U	<0.50 U
TRANS-1,3-DICHLOROPROPENE	0.4	***<0.50 U***	***<0.50 U***	***<0.50 U***	***<0.50 U***
TRICHLOROETHENE	5	**780**	**55**	**6.6**	**1.9**
TRICHLOROFLUOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U	<1.0 U
VINYL CHLORIDE	2	<1.0 U	<1.0 U	<1.0 U	<1.0 U
XYLENES, TOTAL	5	<1.5 U	<1.5 U	<1.5 U	<1.5 U

TABLE **F**-1. ANALYTICAL DATA SUMMARY FOR
WELLS SAMPLED BY RESOLUTION CONSULTANTS
2016 OU2 GROUNDWATER INVESTIGATION

Location	NYSDEC Groundwater Guidance or Standard Value (Note 1)	RE123D3	RE105D1	RE105D2
Sample Date		3/17/2016	3/17/2016	3/17/2016
Sample ID		RE123D3-GW-031716	RE105D1-GW-031716	RE105D2-GW-031716
Sample type code		N	N	N
VOC 8260C (ug/L)				
1,1,1-TRICHLOROETHANE	5	<0.50 U	<0.50 U	<0.50 U
1,1,2,2-TETRACHLOROETHANE	5	<0.50 U	<0.50 U	<0.50 U
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5	<0.50 UJ	**5.6 J**	**18 J**
1,1,2-TRICHLOROETHANE	1	<0.50 U	<0.50 U	**1.2**
1,1-DICHLOROETHANE	5	<0.50 U	<0.50 U	**1.4**
1,1-DICHLOROETHENE	5	<0.50 U	**0.80 J**	**6.4**
1,2,4-TRICHLOROBENZENE	5	<0.50 U	<0.50 U	<0.50 U
1,2-DIBROMO-3-CHLOROPROPANE	0.04	***<0.75 U***	***<0.75 U***	***<0.75 U***
1,2-DIBROMOETHANE	NL	<0.50 U	<0.50 U	<0.50 U
1,2-DICHLOROBENZENE	3	<0.50 U	<0.50 U	<0.50 U
1,2-DICHLOROETHANE	5	<0.50 U	<0.50 U	<0.50 U
1,2-DICHLOROETHENE, TOTAL	5	<1.0 U	**1.4 J**	**3.7**
1,2-DICHLOROPROPANE	1	<0.50 U	<0.50 U	<0.50 U
1,3-DICHLOROBENZENE	3	<0.50 U	<0.50 U	<0.50 U
1,4-DICHLOROBENZENE	3	<0.50 UJ	<0.50 UJ	<0.50 UJ
1,4-DIOXANE (Method 8270D_SIM)	NL	**0.21 J**	**6.7**	**7.5**
2-BUTANONE	50	<2.5 U	<2.5 U	<2.5 U
2-HEXANONE	50	<2.5 U	<2.5 U	<2.5 U
4-METHYL-2-PENTANONE	NL	<2.5 U	<2.5 U	<2.5 U
ACETONE	50	<2.5 U	<2.5 U	<2.5 U
BENZENE	1	<0.50 U	<0.50 U	<0.50 U
BROMODICHLOROMETHANE	50	<0.50 U	<0.50 U	<0.50 U
BROMOFORM	50	<0.50 U	<0.50 U	<0.50 U
BROMOMETHANE	5	<1.0 UJ	<1.0 UJ	<1.0 UJ
CARBON DISULFIDE	60	<0.50 U	<0.50 U	<0.50 U
CARBON TETRACHLORIDE	5	<0.50 U	<0.50 U	**3.0**
CHLOROBENZENE	5	<0.50 U	<0.50 U	<0.50 U
CHLOROETHANE	5	<1.0 UJ	<1.0 UJ	<1.0 UJ
CHLOROFORM	7	<0.50 U	<0.50 U	**1.8**
CHLOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U
CIS-1,2-DICHLOROETHENE	5	<0.50 U	**1.4**	**3.7**
CIS-1,3-DICHLOROPROPENE	0.4	***<0.50 U***	***<0.50 U***	***<0.50 U***
CYCLOHEXANE	NL	<0.50 U	<0.50 U	<0.50 U
DIBROMOCHLOROMETHANE	5	<0.50 U	<0.50 U	<0.50 U
DICHLORODIFLUOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U
ETHYLBENZENE	5	<0.50 U	<0.50 U	<0.50 U
ISOPROPYLBENZENE	5	<0.50 U	<0.50 U	<0.50 U
M- AND P-XYLENE	NL	<1.0 U	<1.0 U	<1.0 U
METHYL ACETATE	NL	<0.75 UJ	<0.75 UJ	<0.75 UJ
METHYL CYCLOHEXANE	NL	<0.50 U	<0.50 U	<0.50 U
METHYL TERT-BUTYL ETHER	10	<0.50 U	<0.50 U	<0.50 U
METHYLENE CHLORIDE	5	<2.5 U	<2.5 U	<2.5 U
O-XYLENE	NL	<0.50 U	<0.50 U	<0.50 U
STYRENE	5	<0.50 U	<0.50 U	<0.50 U
TETRACHLOROETHENE	5	<0.50 U	**0.41 J**	**2.0**
TOLUENE	5	<0.50 U	<0.50 U	<0.50 U
TRANS-1,2-DICHLOROETHENE	5	<0.50 U	<0.50 U	<0.50 U
TRANS-1,3-DICHLOROPROPENE	0.4	***<0.50 U***	***<0.50 U***	***<0.50 U***
TRICHLOROETHENE	5	<0.50 U	**130**	**1800**
TRICHLOROFLUOROMETHANE	5	<1.0 U	<1.0 U	<1.0 U
VINYL CHLORIDE	2	<1.0 U	<1.0 U	<1.0 U
XYLENES, TOTAL	5	<1.5 U	<1.5 U	<1.5 U

Notes:

1 New York State Department of Environmental Conservation Division of Water Technical and Operation Guidance series (6 NYCRR 700-706, Part 703.5 summarized in TOGS 1.1.1)
Ambient water quality standards and groundwater effluent limitations, class GA; NL = Not Listed

Bold = Detected; ***Bold and Italics*** =Not detected exceeds NYS Groundwater Standards or guidance value

Yellow highlighted values exceed Groundwater Standards or guidance value

Sample type codes: N - normal environmental sample, FD - field duplicate

U = Nondetected result. The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

UJ = The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte.

J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

M = the matrix spike or matrix spike duplicate did not meet recovery or precision requirements.