2015 OU2 GROUNDWATER INVESTIGATION
BPOW5-4, RE117D1, RE117D2 (VPB151)
BPOW5-5, BPOW5-6, RE118D1 (VPB152)
BPOW5-7, RE119D1 (VPB153)
INSTALLATION REPORT

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP)
SITE 1 OU2
BETHPAGE, NY

Prepared for:

Department of the Navy
Naval Facilities Engineering Command, Atlantic
9324 Virginia Avenue
Building Z-144
Norfolk, Virginia 23511

January 2016

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List of Acronyms and Abbreviations

AOC	Area of Concern
bgs	below ground surface
COR	Continuously Operating Reference
EPA	Environmental Protection Agency, United States
ft	feet
GOCO	Government-Owned Contractor-Operated
GPS	Global Positioning System
IDW	Investigation Derived Waste
IR	Installation Restoration
Katahdin	Katahdin Analytical Services
MCL	Maximum Contaminant Level
NAD	North American Datum
NAVD	North American Vertical Datum
NAVFAC	Naval Facilities Engineering Command
NG	Northrop Grumman
NTU	nephlometric turbidity units
NWIRP	Naval Weapons Industrial Reserve Plant
NYSDEC	New York State Department of Environmental Conservation
OU	Operable Unit
PCBs	Polychlorinated Biphenyls
POTW	Publicly Owned Treatment Works
ppb	parts per billion
PPE	Personal Protective Equipment
PVC	Polyvinylchloride
SAP	Sampling and Analysis Plan
SFWD	South Farmingdale Water District
SVOC	Semivolatile Organic Compounds
TCE	Trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
UFP	United Federal Programs
US	United States
VOC	Volatile Organic Compounds
VPB	Vertical Profile Boring

1.0 PROJECT BACKGROUND

Resolution Consultants has prepared this Data Summary Report for the Naval Facilities Engineering Command (NAVFAC), Mid-Atlantic under contract task order WE15 Contract N62470-11-D-8013. This report describes the installation of eight monitoring wells (specifically at the Vertical Profile Boring [VPB] 151, 152 and 153 locations), three sampling events and one quarterly groundwater monitoring event in 2015 for the Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage Operable Unit (OU) 2 Site 1 offsite plume. NWIRP Bethpage is located in east-central Nassau County, Long Island, New York, approximately 30 miles east of New York City (Figure 1).

1.1 Scope and Objectives

This report provides information on the installation of BPOW5-4, BPOW5-5, BPOW5-6, BPOW5-7, RE117D1, RE117D2, RE118D1 and RE119D1. The purpose of the monitoring wells is to ascertain subsurface conditions and contaminant levels upgradient of South Farmingdale Water District (SFWD) wells N-8664 and N-8665. The purpose of outpost wells BPOW5-4, BPOW5-5, BPOW5-6, and BPOW5-7 is to provide early warning of plume migration toward the SFWD wellfield. The locations of BPOW5-4, BPOW5-5, BPOW5-6, BPOW5-7, RE117D1, RE117D2, RE118D1, RE119D1, VPBs and monitoring well locations are shown in Figure 2.

The field investigation included completing eight monitoring wells, well development, soil/groundwater analysis, groundwater grab sampling, and surveying. Field tasks were conducted in 2015 in accordance with the *United Federal Programs Sampling and Analysis Plan (UFP SAP)*, Bethpage, New York (Resolution Consultants, 2013a). In addition, the work adhered to the following UFP SAP Addendums: *Groundwater Sampling Using Low Stress (Low Flow) Purging and Sampling Protocol* (Resolution Consultants, 2013b) and *Installation of Vertical Profile Borings and Monitoring Wells* (Resolution Consultants, 2013c).

Documentation of these activities is included in Appendix A of this report.

1.2 Site History

NWIRP Bethpage is in the Hamlet of Bethpage, Town of Oyster Bay, New York. Since its inception in 1941, the plant's primary mission was the research, prototyping, testing, design, engineering, fabrication, and primary assembly of military aircraft. The facilities at NWIRP included four plants used for assembly and prototype testing, a group of quality control laboratories, two warehouse

complexes (north and south), a salvage storage area, water recharge basins, the Industrial Wastewater Treatment Plant, and several smaller support buildings.

The Navy's property originally totaled 109.5 acres and was formerly a Government-Owned Contractor-Operated (GOCO) facility that was operated by Northrop Grumman (NG) until September 1998. Prior to 2002, the NWIRP property was bordered on the north, west, and south by current or former NG facilities, and on the east by a residential neighborhood. By March 2008, approximately 100 acres of NWIRP property were transferred to Nassau County in three separate actions. The remaining 9 acres and access easements were retained by the Navy to continue remedial efforts at Installation Restoration (IR) Site 1 – Former Drum Marshalling Area and Site 4 – Former Underground Storage Tanks (Area of Concern [AOC] 22). A parcel of land connecting the two sites was also retained. Currently, the 9-acre parcel of NWIRP is bordered on the east by the residential neighborhood and on the north, south, and west by Steel Equities; however, a small portion is still owned by Nassau County. Access to the NWIRP is from South Oyster Bay Road.

1.3 Geology and Hydrogeology

Overburden at the site consists of well over 1,000 feet (ft) of unconsolidated deposits overlying crystalline bedrock of the Hartland Formation. Overburden is divided into four geologic units: the upper Pleistocene deposits, the Magothy Formation, the clay member of the Raritan Formation ("Raritan Clay") and the Lloyd Sand member of the Raritan Formation ("Lloyd Sand") (Geraghty and Miller, 1994).

The upper Pleistocene ranges in thickness from approximately 50 to 100 ft and consists of till and outwash deposits of medium to coarse sand and gravel with lenses of fine sand, silt and clay (Smolensky and Feldman, 1990); these deposits form the Upper Glacial Aquifer. Directly underlying this unit is the Magothy Formation with a thickness of 650 to 900 ft and lower extent of 700 to 1000 ft below ground surface (bgs) observed onsite. The Magothy is characterized by fine to medium sands and silts interbedded with zones of clays, silty sands and sandy clays. Sand and gravel lenses are found in some areas between depths of 600 and 880 ft bgs; these deposits form the main producing zones of the Magothy Aquifer.

Investigations performed by the Navy since 2012 indicate that the bottom of the Magothy (top of the Raritan Clay) can extend to depths of 700 to greater than 1,000 ft bgs. The top of the Raritan Clay deepens to the south-southeast, as evidenced by clay depths of 1,000 ft bgs (or more) in borings installed offsite. The Raritan Clay Unit is of continental origin and consists of clay, silty clay,

clayey silt, and fine silty sand. This member acts as a confining layer over the Lloyd Sand Unit. The Lloyd Sand Unit is also of continental origin, having been deposited in a large fresh water lacustrine environment. The material consists of fine to coarse-grained sands, gravel, inter-bedded clay, and silty sand. These deposits form the Lloyd Aquifer.

The Upper Glacial Aquifer and the Magothy Aquifer comprise the aquifers of interest at the NWIRP. Regionally, these formations are generally considered to form a common, interconnected aquifer as the coarse nature of each unit near their contact and the lack of any regionally confining clay unit allows for the unrestricted flow of groundwater between the formations.

The Magothy Aquifer is the major source of public water in Nassau County. The most productive water bearing zones are the discontinuous lenses of sand and gravel that occur within the siltier matrix. The major water-bearing zones are coarse sand and gravel lenses located in the lower portion of the Magothy. The Magothy Aquifer is commonly regarded to function overall as an unconfined aquifer at shallow depths and a confined aquifer at deeper depths. The drilling program at the NWIRP has revealed that clay zones beneath the facility are common but laterally discontinuous. No confining clay units of facility-wide extent have been encountered. This is also the case for borings installed offsite.

Groundwater is encountered at a depth of approximately 50 ft bgs at the facility. Historically, because of pumping and recharge at the facility, groundwater depths have been measured to range from 40 to 60 ft bgs. The groundwater flow in the area is to the south-southeast.

2.0 FIELD PROGRAM

Eight monitoring wells were installed in the vicinity of VPB 151, VPB 152 and VPB 153 between February and June 2015. Field investigation activities consisted of drilling, well installation, well development, sampling, soil/groundwater analysis, and surveying. Drilling during this investigation was performed by Delta Well and Pump Company of Ronkonkoma, New York. A description of these tasks is provided below.

2.1 Drilling and Well Construction

Monitoring wells BPOW5-4, BPOW5-5, BPOW5-6, BPOW5-7, RE117D1, RE117D2, RE118D1 and RE119D1 were installed using mud rotary drilling techniques. Well locations are shown on Figure 2 and construction details are summarized in Table 1. Boring logs with lithologic descriptions of the well screen interval are included in the Appendix A. Data Summary Reports for VPB151 (Resolution Consultants, 2015a), VPB152 (Resolution Consultants, 2014) and adjacent VPB153 (Resolution Consultants, 2015b) document the installation of these VPBs including detailed lithologic descriptions, continuous gamma plots and multiple Volatile Organic Compound (VOC) samples over the entire boring length.

Prior to installing each monitoring well, the results of the groundwater samples, the geophysical logs, lithology and field data from the vertical profile borings were analyzed. Screen intervals of outpost wells were determined based on this analysis and also to coincide with the screened intervals for SFWD wells N-8664 and N-8665. Screen intervals of monitoring wells were selected to target intervals with the highest VOC concentrations as measured in the hydropunch grab samples, and coincident intervals with the highest apparent permeability based on the gamma logs. During the monitoring well installation, split spoon samples were collected every 5 ft in the screen interval. One soil sample per monitoring well was analyzed for Total Organic Carbon (TOC) via United States (US) Environmental Protection Agency (EPA) series SW-846 method 9060A by Katahdin Analytical Services (Katahdin). Data validation of TOC data was performed by Resolution Consultants. Data validation packages and analytical data tables are included in Appendix A.

Wells were constructed of 4-inch diameter, Schedule 80, National Sanitation Foundation-approved polyvinylchloride (PVC) riser pipe and .010-slot well screen. Wells were completed at the surface with a 12-inch diameter steel curb box. Well risers were set below grade and fit with lockable J plugs. Detailed monitoring well construction diagrams are included in Appendix A.

2.2 Well Development

Following installation, all monitoring wells were developed to evacuate silts and other fine-grained materials and to establish the filter pack to promote a hydraulic connection between the well and the surrounding aquifer. Well development was not initiated until at least 24 hours after well installation.

Monitoring well screens were developed using a combination of air lifting, manual surging, and pumping with a submersible pump. Turbidity was monitored during development to determine stabilization. In compliance with New York State Department of Environmental Conservation (NYSDEC) policy, wells were developed until turbidity was less than 50 nephlometric turbidity units (NTUs), if possible. Table 2 summarizes total pumped volume from air and pump development and final turbidity. Well development logs are included in Appendix A.

2.3 Sampling

Following development, wells were allowed to stabilize for at least 2 weeks prior to groundwater sampling in accordance with low flow sampling procedures. Wells were purged using a bladder pump with a drop tube intake placed at the approximate midpoint of the screened interval. The following water quality parameters were continuously measured: water temperature, pH, conductivity, oxidation-reduction potential, dissolved oxygen and turbidity. Groundwater analytical samples were collected when water quality parameters stabilized. Samples were analyzed for VOCs via method 8260B and 1,4-dioxane via Method 8270C by Katahdin. All development and purge water was managed as investigation derived waste (IDW). Groundwater sample logs, data validation packages are included in Appendix A.

Monitoring wells BPOW5-4, RE117D1 and RE117D2 were sampled on May 20, 2015. Due to a detection of TCE above the maximum contaminant level (MCL) of 5 ug/L in monitoring well RE117D1, the well was re-sampled on June 9, 2015 and June 25, 2015. Results confirmed that TCE concentrations were just above the MCL. TCE concentration ranged from 7.6 to 8.4 ug/L. Monitoring wells BPOW5-5, BPOW5-6, RE117D1 and RE118D1 were included in the June quarterly sampling event as part of the Navy's ongoing Environmental Restoration Program. Monitoring wells BPOW5-7 and RE119D1 were sampled on August 12, 2015.

All monitoring results are included in Table 3. Stabilized field parameters are summarized in Table 4.

2.4 Decontamination and Investigation Derived Waste (IDW)

Resolution Consultants utilized dedicated and disposable sampling equipment when possible to avoid the potential for cross-contamination of samples. The sampling equipment included dedicated plastic scoops, disposable Teflon or polyethylene tubing, disposable gloves, and laboratory supplied sample bottles. Hand held equipment and split spoons were decontaminated using Liquinox and water wash, a potable water rinse, followed by a distilled water rinse. Water was collected in 5-gallon pails or 55-gallon drums. Non dedicated sampling equipment was decontaminated as outlined in the *UFP SAP Addendum - Groundwater Sampling Using Low Stress (Low Flow) Purging and Sampling Protocol* (Resolution Consultants, 2013b).

As part of the IDW management practices and in accordance with the SAP, the investigation waste (consisting of soil cuttings, drilling muds, IDW fluids, and personal protective equipment [PPE]) generated during the groundwater monitoring well installation and sampling was containerized and staged at NWIRP Bethpage.

IDW solids were containerized in roll offs. Representative samples from each roll off were submitted to Katahdin for analysis of:

- Target Compound List (TCL) VOCs
- TCL Semi-volatile Organic Compounds (SVOCs)
- Toxicity Characteristic Leaching Procedure (TCLP) Metals
- Polychlorinated Biphenyls (PCBs)
- Total petroleum hydrocarbons
- Corrosivity
- Ignitability
- Reactive Cyanide
- Reactive Sulfide
- Paint Filter

IDW fluid generated during well development and purging was containerized in frac tanks and stored at NWIRP Bethpage for characterization and ultimate disposal to the Publicly Owned

Treatment Works (POTW), in accordance with the facilities existing discharge permit. A representative water sample was collected from each frac tank and submitted to Katahdin for analysis of VOCs via Method SW 624, pH via Method SW 9040B, PCBs via Method 8082 and Total Metals via Method SW 846. All analytical criteria were met for disposal of water.

2.5 Surveying

A survey of the monitoring well locations was conducted at the end of fieldwork by C. T. Male, Inc., of Latham, NY, under the direct supervision of Resolution Consultants. The location was tied into the existing base map developed for this investigation. The survey elevation is referenced to the North American Vertical Datum (NAVD) 1988 and has a vertical accuracy of 0.01 foot. Vertical control is based on observations of the Continuously Operating Reference (COR) Stations Queens and Central Islip. The horizontal location is referenced to the North American Datum (NAD) 1983 (2011) N.Y. Long Island Zone 3104 and has an accuracy of 0.1 foot. Local horizontal and vertical control is based on Global Positioning System (GPS) observations using the NYSNet Real Time Network.

A table of survey data (latitude/longitude, northing/easting, elevations of ground, rim and PVC) and a survey map is included in Appendix A.

3.0 REFERENCES

Geraghty and Miller, Inc., 1994. *Remedial Investigation Report, Grumman Aerospace Corporation, Bethpage, New York*. Revised September 1994.

Naval Facilities Engineering Command (NAVFAC), 2003. *Record of Decision Naval Weapons Industrial Reserve Plant Bethpage, New York, Operable Unit 2 – Groundwater*, NYS Registry: 1-30-003B. April.

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Smolensky, D., and Feldman, S., 1990. *Geohydrology of the Bethpage-Hicksville-Levittown Area, Long Island, New York, U.S*. Geological Survey Water-Resourced Investigations Report 88-4135, 25 pp.

Tables

TABLE 1
MONITORING WELL CONSTRUCTION SUMMARY
2015 OU2 GROUNDWATER INVESTIGATION
NWIRP BETHPAGE, NY

MONITORING WELL	WELL COMPLETION DATE	GROUND ELEVATION (msl)	PVC (INNER CASING) (msl)	WELL DEPTH (ft bgs)	CASING DEPTH (ft bgs)	SCREEN INTERVAL (ft bgs)	SUMP DEPTH INTERVAL (ft bgs)	BORING DEPTH (ft bgs)
BPOW5-4	4/10/2015	54.49	53.88	575	54	545 - 570	570 - 575	587
BPOW5-5	4/6/2015	57.97	57.58	545	54	515 - 540	540 - 545	560.5
BPOW5-6	5/7/2015	58.21	57.72	615	53	585 - 610	610 - 615	628
BPOW5-7	6/22/2015	56.20	55.92	555	53	525 - 550	550 - 555	570
RE117D1	3/27/2015	54.24	53.81	760	54	730 - 755	755 - 760	772
RE117D2	3/12/2015	54.11	53.59	810	57	780 - 805	805 - 810	822
RE118D1	4/21/2015	57.99	57.61	795	52	765 - 790	790 - 795	808
RE119D1	6/5/2015	56.13	55.61	745	53.6	715 - 740	740 - 745	755

MSL - mean sea level
ft bgs - feet below ground surface

TABLE 2
MONITORING WELL DEVELOPMENT SUMMARY
2015 OU2 GROUNDWATER INVESTIGATION
NWIRP BETHPAGE, NY

MONITORING WELL	AIR DEVELOPMENT		PUMP DEVELOPMENT			APPROX. TOTAL DEVELOPMENT VOLUME (GAL)	FINAL TURBIDITY (NTUs)
	DATE	APPROX. VOLUME (GAL)	DATE	FINAL PUMP DEPTH (FT BGS)	APPROX. VOLUME (GAL)		
BPOW5-4	4/16/15	5,000	4/21/15 & 4/22/15	545-570	6,000	11,000	4.41
BPOW5-5	5/14/2015	6,000	5/19/2015	515-540	6,000	12,000	0.37
BPOW5-6	5/18/15	6,000	5/22/2015, 5/27/2015	585-610	6,000	12,000	0.19
BPOW5-7	6/26/2015	7,000	6/29/2015	525-550	7,000	14,000	58.28
RE117D1	4/16/15-4/17/15	5,000	4/23/15-4/24/15	730 - 755	6,000	11,000	46.91
RE117D2	4/20/2015	7,000	4/29/15 - 4/30/15	780-805	9,000	16,000	27.31
RE118D1	5/15/15	6,500	5/20/15 - 5/21/15	765-790	8,000	14,500	41.75
RE119D1	6/25/2015	6,000	6/30/15-7/1/15	715-740	8,500	14,500	27.13

GAL - gallon
FT BGS - feet below ground surface
NTUs - Nephelometric Turbidity Units

TABLE 3. ANALYTICAL DATA SUMMARY
2015 OU2 GROUNDWATER INVESTIGATION
NWIRP BETHPAGE, NY

Location	NYSDEC Groundwater Guidance or Standard Value (Note 1)	BPOW5-4	RE117D1	RE117D1	RE117D2
Sample Date		5/20/2015	5/20/2015	5/20/2015	5/20/2015
Sample ID		BPOW5-4-GW-052015	RE117DI-GW-052015	DUP-GW-052015	RE117D2-GW-052015
Sample type code		N	N	FD	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	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
1,1,2-TRICHLOROETHANE	1	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
1,1-DICHLOROETHANE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
1,1-DICHLOROETHENE	5	< 0.50 U	< 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	< 1.0 UJ	< 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 U	< 0.50 U	< 0.50 U	< 0.50 U
1,4-DIOXANE (Method 8270D_SIM)	NL	**0.68**	< 0.18 U	< 0.17 U	< 0.17 U
2-BUTANONE	50	**1.4 J**	< 2.5 U	< 2.5 U	**1.4 J**
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 U	< 1.0 U	< 1.0 U	< 1.0 U
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	< 0.50 U	< 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	UR	< 1.0 U	< 1.0 U	UR
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	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
TOLUENE	5	**3.4**	**3.5**	**3.4**	**5.1**
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	< 0.50 U	**8.4**	**8.7**	< 0.50 U
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 UJ	< 1.5 U	< 1.5 U	< 1.5 U

TABLE 3. ANALYTICAL DATA SUMMARY
2015 OU2 GROUNDWATER INVESTIGATION
NWIRP BETHPAGE, NY

Location	NYSDEC Groundwater Guidance or Standard Value (Note 1)	RE117D1	RE118D1	BPOW5-5	BPOW5-6
Sample Date		6/9/2015	6/24/2015	6/24/2015	6/24/2015
Sample ID		RE117DI-GW-060915	RE118D1-GW-062415	BPOW5-5-GW-062415	BPOW5-6-GW-062415
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	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
1,1,2-TRICHLOROETHANE	1	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
1,1-DICHLOROETHANE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
1,1-DICHLOROETHENE	5	< 0.50 U	< 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	< 1.0 U	< 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 U	< 0.50 U	< 0.50 U	< 0.50 U
1,4-DIOXANE (Method 8270D_SIM)	NL	< 0.17 U	< 0.18 U	< 0.18 U	< 0.17 U
2-BUTANONE	50	< 2.5 U	< 2.5 U	< 2.5 U	**12**
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	**2.7 J**	**8.0**	< 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 U	< 1.0 U	< 1.0 U	< 1.0 U
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	< 0.50 U	< 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 UJ	< 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	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
TOLUENE	5	1.3	**0.38 J**	< 0.50 U	**0.74 J**
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	7.6	< 0.50 U	< 0.50 U	**0.45 J**
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 3. ANALYTICAL DATA SUMMARY
2015 OU2 GROUNDWATER INVESTIGATION
NWIRP BETHPAGE, NY

Location	NYSDEC Groundwater Guidance or Standard Value (Note 1)	RE117D1	BPOW5-7	BPOW5-7	RE119D1
Sample Date		6/25/2015	8/12/2015	8/12/2015	8/12/2015
Sample ID		RE117D1-GW-062515	BPOW5-7-GW-081215	GW-DUP-081215	RE119D1-GW-081215
Sample type code		N	N	FD	N
VOC 8260C (ug/L)					
1,1,1-TRICHLOROETHANE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
1,1,2,2-TETRACHLOROETHANE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 U
1,1,2-TRICHLOROETHANE	1	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
1,1-DICHLOROETHANE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
1,1-DICHLOROETHENE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
1,2,4-TRICHLOROBENZENE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
1,2-DIBROMO-3-CHLOROPROPANE	0.04	*< 0.75 U*	*< 0.75 U*	*< 0.75 U*	*< 0.75 UJ*
1,2-DIBROMOETHANE	NL	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
1,2-DICHLOROBENZENE	3	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
1,2-DICHLOROETHANE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
1,2-DICHLOROETHENE, TOTAL	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ
1,2-DICHLOROPROPANE	1	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
1,3-DICHLOROBENZENE	3	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
1,4-DICHLOROBENZENE	3	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
1,4-DIOXANE (Method 8270D_SIM)	NL	< 0.17 U	< 0.17 U	< 0.18 U	< 0.17 U
2-BUTANONE	50	2.1 J	3.6 J	< 2.5 U	< 2.5 U
2-HEXANONE	50	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 UJ
4-METHYL-2-PENTANONE	NL	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 UJ
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 UJ
BROMODICHLOROMETHANE	50	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
BROMOFORM	50	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
BROMOMETHANE	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
CARBON DISULFIDE	60	< 0.50 U	< 0.50 UJ	< 0.50 UJ	< 0.50 UJ
CARBON TETRACHLORIDE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
CHLOROBENZENE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
CHLOROETHANE	5	< 1.0 UJ	< 1.0 U	< 1.0 U	< 1.0 UJ
CHLOROFORM	7	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
CHLOROMETHANE	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 U
CIS-1,2-DICHLOROETHENE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
CIS-1,3-DICHLOROPROPENE	0.4	*< 0.50 U*	*< 0.50 U*	*< 0.50 U*	*< 0.50 UJ*
CYCLOHEXANE	NL	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
DIBROMOCHLOROMETHANE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
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 UJ
ISOPROPYLBENZENE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
M- AND P-XYLENE	NL	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ
METHYL ACETATE	NL	< 0.75 U	< 0.75 U	< 0.75 U	< 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 UJ
METHYLENE CHLORIDE	5	< 2.5 U	< 2.5 U	< 2.5 U	< 2.5 UJ
O-XYLENE	NL	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
STYRENE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
TETRACHLOROETHENE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
TOLUENE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
TRANS-1,2-DICHLOROETHENE	5	< 0.50 U	< 0.50 U	< 0.50 U	< 0.50 UJ
TRANS-1,3-DICHLOROPROPENE	0.4	*< 0.50 U*	*< 0.50 U*	*< 0.50 U*	*< 0.50 UJ*
TRICHLOROETHENE	5	7.8	< 0.50 U	< 0.50 U	< 0.50 UJ
TRICHLOROFLUOROMETHANE	5	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ
VINYL CHLORIDE	2	< 1.0 U	< 1.0 U	< 1.0 U	< 1.0 UJ
XYLENES, TOTAL	5	< 1.5 U	< 1.5 U	< 1.5 U	< 1.5 UJ

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.

UR = The analyte was not detected above the reported sample quantitation limit. However, the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

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.

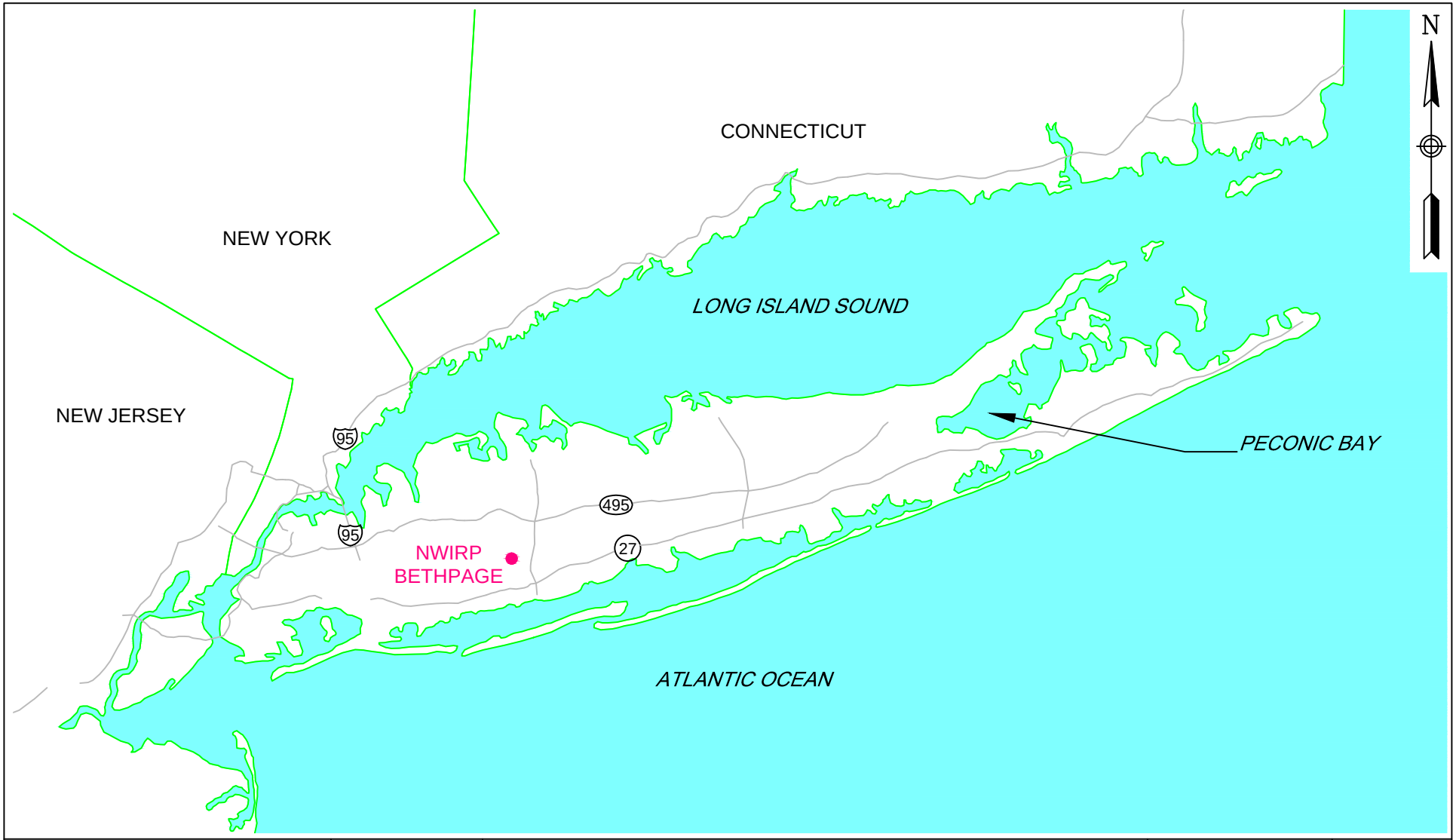
TABLE 4.
STABILIZED FIELD PARAMETERS
2015 OU2 GROUNDWATER INVESTIGATION
NWIRP BETHPAGE, NY

Well	Date	Temperature (°C)	pH	Specific Conductance (µS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Depth to water (ft bgs)	Flow rate (ml/min)
BPOW5-4	5/20/2015	15.77	4.69	0.167	3.64	104.8	1.09	23.58	525
BPOW5-5	6/24/2015	16.00	4.14	0.319	2.49	218.6	3.94	27.30	775
BPOW5-6	6/24/2015	20.92	5.09	0.115	1.39	220.2	37.6	28.00	200
BPOW5-7	8/12/2015	19.28	5.27	0.043	0.18	155.2	98.3	24.89	400
RE117D1	5/20/2015	16.52	5.01	0.023	2.71	206.9	46.4	23.65	500
RE117D1	6/9/2015	19.1	4.83	0.031	2.75	130.1	10.5	24.4	500
RE117D1	6/25/2015	16.67	3.27	0.029	3.11	450.6	7.46	25.14	800
RE117D2	5/20/2015	16.31	4.44	0.025	0.53	250.9	10	22.45	600
RE118D1	6/24/2015	15.61	7.90	0.036	1.63	378.7	10.1	27.53	600
RE119D1	8/12/2015	15.71	4.64	0.025	0.52	108.8	48.8	25.57	600

°C - degrees Celsius
µS/cm - Microsiemens per Centimeter
mg/L - milligrams per liter
mV - Millivolts
NTU - Nephelometric Turbidity Unit
ft bgs - feet below ground surface
ml/min - mililiters per minute

Figures

112G00622\0510\112G00622CM01.DWG 08/02/10 MKB



0 15 30

SCALE IN MILES

NAVFAC

GENERAL LOCATION MAP
NWIRP BETHPAGE
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D-8013	WE15
APPROVED BY --	DATE --
APPROVED BY --	DATE --
FIGURE NO. 1	REV 0

F:\Projects\Navy\Bethpage WXE08\7.0_Deliverables\7.2_CADDGIS_files\Bethpage\MAP DOCS\MXD\MISC\Location Maps\F2 BPOW5s 2015 12 08 R1.mxd

Former Northrop Grumman Site

Old Bethpage

Bethpage

Plainedge

Levittown

North Massapequa

North Wantagh

Inset: BPOW5-4, BPOW5-5, BPOW5-6, BPOW5-7, RE117D1, RE117D2, RE118D1, and RE119D1 Location

BPOW5-5
BPOW5-6
RE118D1

BPOW5-4
RE117D1
RE117D2

BPOW5-7
RE119D1

SFWD N-8664

SFWD N-8665

0 375 750 Feet

0 750 1,500 3,000 Feet

Legend

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

BPOW5-4, BPOW5-5, BPOW5-6, BPOW5-7, RE117D1, RE117D2, RE118D1, AND RE119D1 LOCATION MAP
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

CONTRACT NUMBER	CTO NUMBER
N62470-11-D8013	WE15
APPROVED BY: PS	DATE: 1/19/2016
APPROVED BY: —	DATE: —
FIGURE NO.: 2	REV: 0

Appendix A

BPOW5-4, BPOW5-5, BPOW5-6, BPOW5-7,

RE117D1, RE117D2, RE118D1, RE119D1

Section 1

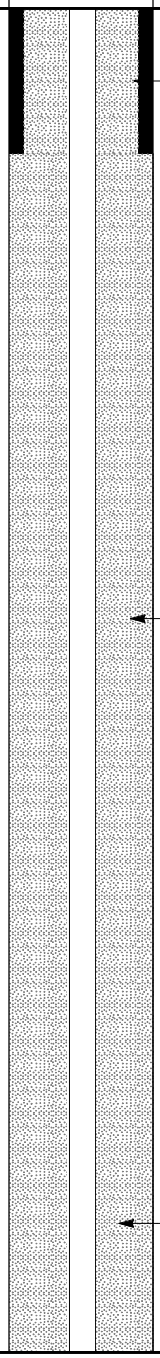
Boring Logs

Resolution Consultants

Boring Log

BORING #: BPOW5-4
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Varricchio
Location: Lawrence Road and Susan Ct, Seaford, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 54.49	**Well Screen Interval (ft):** 545-570
Start Date: 4/3/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 4/10/2015	**Northing:** 196471.55 **Easting:** 1125307.44	**Total Depth (ft):** 587.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0					0-548 ft bgs: See VPB151 for Descriptions		10" Diameter Steel Casing Bentonite Grout 4" Diameter Schedule 80 PVC Riser
50							
100							
150							
200							
250							
300							
350							
400							
450							
500							

Resolution Consultants

Boring Log

BORING #: BPOW5-4
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Varricchio
Location: Lawrence Road and Susan Ct, Seaford, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 54.49	**Well Screen Interval (ft):** 545-570
Start Date: 4/3/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 4/10/2015	**Northing:** 196471.55 **Easting:** 1125307.44	**Total Depth (ft):** 587.0

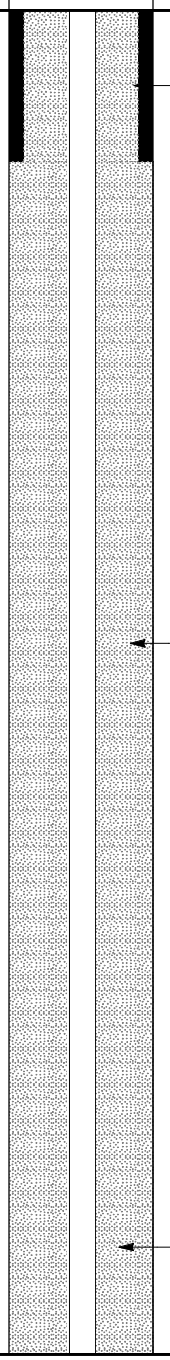
DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
500					0-548 ft bgs: See VPB151 for Descriptions *(continued)*		4" Diameter Schedule 80 PVC Riser *(continued)*
502							
504							
506							
508							
510							
512							#0 Filter Sand
514							
516							
518							
520							
522							
524							
526							
528							
530							
532							#1 Filter Sand
534							
536							
538							
540							
542							
544							
546							
548	0		SP		Grey (10YR 5/1) poorly graded medium SAND		
550							
552							
554	0		SP-CL		Grey (10YR 5/1) interbedded well graded medium SAND and lean Clay with trace silt		
556							
558	0		SP		Grey (10YR 5/1) poorly graded medium SAND		4" Diameter Schedule 80 PVC, 10 Slot Well Screen (545-570 ft bgs)
560							
562							
564	0		SP		Grey (10YR 6/1) poorly graded medium SAND		
566							
568	0		SP		Grey (10YR 5/1) poorly graded medium SAND		
570							
572							Sump
574							
576							
578							
580							
582							#1 Sand to bottom
584							
586							
					End of boring at 587.0 ft. bgs.		

Resolution Consultants

Boring Log

BORING #: BPOW5-5
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: Pineneck Road, Seaford, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 57.97	**Well Screen Interval (ft):** 515-540
Start Date: 3/26/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 4/6/2015	**Northing:** 197284.98 **Easting:** 1126291.45	**Total Depth (ft):** 560.5

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0 50 100 150 200 250 300 350 400 450					0-518 ft bgs: See VPB152 for Descriptions		10" Diameter Steel Casing Bentonite Grout 4" Diameter Schedule 80 PVC Riser

Resolution Consultants

Boring Log

BORING #: BPOW5-5
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: Pineneck Road, Seaford, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 57.97	**Well Screen Interval (ft):** 515-540
Start Date: 3/26/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 4/6/2015	**Northing:** 197284.98 **Easting:** 1126291.45	**Total Depth (ft):** 560.5

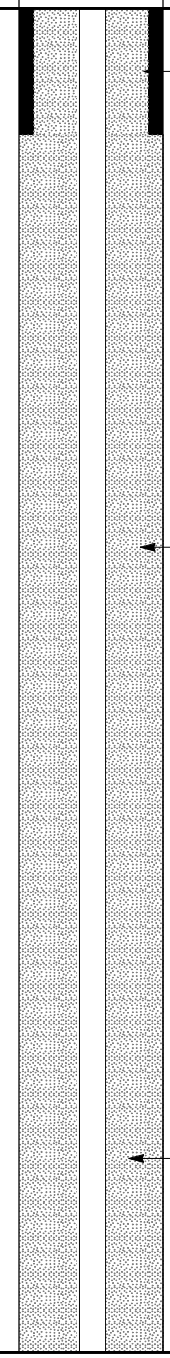
DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
482					0-518 ft bgs: See VPB152 for Descriptions *(continued)*		4" Diameter Schedule 80 PVC Riser *(continued)*
484							
486							
488							
490							
492							#0 Filter Sand
494							
496							
498							
500							
502							
504							
506							#1 Filter Sand
508							
510							
512							
514							
516							
518	0.1		SM		Grey (7.5YR 6/1) SILTY SAND, medium Sand, little fine sand, silt (20%)		
520							
522							
524	0.1		OH		Black LIGNITE, laminated, friable interbedded with microlaminated fine Sand; bottom 2 inches composed of a clay layer forming a sharp contact with medium sand.		
526							
528			SM		Grey (7.5YR 6/1) SILTY SAND		4" Diameter Schedule 80 PVC, 10 Slot Well Screen (515-540 ft bgs)
530	0.1		SM/CL		Grey SILTY SAND interbedded with laminated Lignite, clay		
532							
534	0		SM		Light grey (7.5YR 5/1) SILTY SAND, fine to medium Sand, muscovite flakes, one layer of lignite		
536							
538	0.1		SM		Light grey (7.5yr 5/1) SILTY SAND, fine to medium Sand, one pale black band of lignite, and 0.5 inch band of friable lignite, silt (20%), 1 pyrite concretion		
540							
542							Sump
544							
546							
548							
550							
552							#1 Sand to bottom
554							
556							
558							
560					End of boring at 560.5 ft. bgs.		

Resolution Consultants

Boring Log

BORING #: BPOW5-6
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: Pineneck Road, Seaford, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 58.21	**Well Screen Interval (ft):** 585-610
Start Date: 5/1/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 5/7/2015	**Northing:** 197327.15 **Easting:** 1126285.56	**Total Depth (ft):** 628.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0					0-588 ft bgs; See VPB152 for Descriptions		10" Diameter Steel Casing Bentonite Grout 4" Diameter Schedule 80 PVC Riser
50							
100							
150							
200							
250							
300							
350							
400							
450							
500							
550							

Resolution Consultants

Boring Log

BORING #: BPOW5-6
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: Pineneck Road, Seaford, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 58.21	**Well Screen Interval (ft):** 585-610
Start Date: 5/1/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 5/7/2015	**Northing:** 197327.15 **Easting:** 1126285.56	**Total Depth (ft):** 628.0

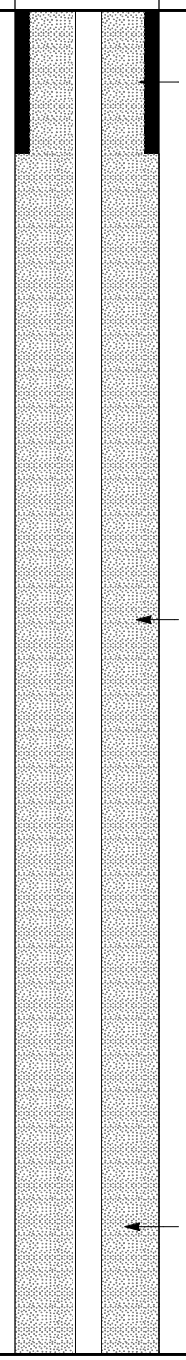
DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
566					0-588 ft bgs; See VPB152 for Descriptions *(continued)*		4" Diameter Schedule 80 PVC Riser *(continued)*
568							
570							
572							#0 Filter Sand
574							
576							
578							
580							#1 Filter Sand
582							
584							
586							
588	0.1		SP		Grey (10YR 6/1) poorly graded SAND, medium Sand, little coarse sand, one inch layer of microlaminated lignite		
590							
592							
594	0		SP		Grey (10YR 6/5) poorly graded SAND, medium Sand		
596							
598	0		SM		Grey (10YR 6/5) SILTY SAND, fine to medium Sand, muscovite flakes, two microlayers fo black friable lignite		4" Diameter Schedule 80 PVC, 10 Slot Well Screen (585-610 ft bgs)
600							
602							
604	0		SP-SM		Grey (10YR 6/5) poorly graded SAND with Silt, medium sand		
606							
608	0.1		SP-SM		Grey (10YR 6/5) poorly graded SAND with Silt, medium sand		
610							Sump
612							
614							
616							
618							
620							
622							#1 Sand to bottom
624							
626							
628					End of boring at 628.0 ft. bgs.		

Resolution Consultants

Boring Log

BORING #: BPOW5-7
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: Joseph Road and William Road, Massaqequa, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 56.20	**Well Screen Interval (ft):** 525-550
Start Date: 6/17/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 6/22/2015	**Northing:** 197274.15 **Easting:** 1128702.39	**Total Depth (ft):** 570.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0					0-528 ft bgs: See VPB153 for Descriptions		10" Diameter Steel Casing Bentonite Grout 4" Diameter Schedule 80 PVC Riser
50							
100							
150							
200							
250							
300							
350							
400							
450							
500							

Resolution Consultants

Boring Log

BORING #: BPOW5-7
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: Joseph Road and William Road, Massaqequa, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 56.20	**Well Screen Interval (ft):** 525-550
Start Date: 6/17/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 6/22/2015	**Northing:** 197274.15 **Easting:** 1128702.39	**Total Depth (ft):** 570.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
500					0-528 ft bgs: See VPB153 for Descriptions *(continued)*		4" Diameter Schedule 80 PVC Riser *(continued)*
502							
504							
506							
508							
510							#0 Filter Sand
512							
514							
516							
518							
520							#1 Filter Sand
522							
524							
526							
528	0		SM		Grey (7.5YR 5/1) SILTY SAND, fine to medium Sand, 30% silt		
530			CL		Grey (7.5YR 5/1) lean CLAY, interbedded Sand and Clay layers, clay layers up to 1/2 inch thick		
532							
534	0		SM		Grey (7.5YR 5/1) SILTY SAND, fine to medium Sand, little silt (20%)		
536			CL		Grey (7.5YR 5/1) lean CLAY, interbedded with Lignite		
538	0				Grey poorly graded SAND with Silt, few silt		4" Diameter Schedule 80 PVC, 10 Slot Well Screen (525-550 ft bgs)
540			SP-SM				
542							
544	0		SM		Grey (7.5YR 5/1) SILTY SAND, medium Sand, pyrite concretions, little silt (20%)		
546			OH		Black LIGNITE, friable, interbedded with medium to coarse Sand		
548	0		SP		Grey (7.5YR 5/1) poorly graded SAND, medium Sand		
550							
552							Sump
554							
556							
558							
560							
562							#1 Sand to bottom
564							
566							
568							
570					End of boring at 570.0 ft. bgs.		

Resolution Consultants

Boring Log

BORING #: RE117D1
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Varricchio
Location: Lawrence Road and Susan Ct, Seaford, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 54.24	**Well Screen Interval (ft):** 730-755
Start Date: 3/19/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 3/27/2015	**Northing:** 196462.44 **Easting:** 1125318.92	**Total Depth (ft):** 772.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0					0-730 ft bgs, See VPB151 for Descriptions		10" Diameter Steel Casing
50							
100							
150							
200							Bentonite Grout
250							
300							
350							
400							
450							
500							
550							4" Diameter Schedule 80 PVC Riser
600							
650							

Resolution Consultants

Boring Log

BORING #: RE117D1
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Varricchio
Location: Lawrence Road and Susan Ct, Seaford, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 54.24	**Well Screen Interval (ft):** 730-755
Start Date: 3/19/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 3/27/2015	**Northing:** 196462.44 **Easting:** 1125318.92	**Total Depth (ft):** 772.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
670					0-730 ft bgs, See VPB151 for Descriptions *(continued)*		4" Diameter Schedule 80 PVC Riser *(continued)*
672							
674							
676							
678							
680							
682							
684							#0 Filter Sand
686							
688							
690							
692							
694							
696							
698							
700							
702							
704							
706							
708							
710							
712							#1 Filter Sand
714							
716							
718							
720							
722							
724							
726							
728							
730	0		SW		Grey (10YR 6/1) fine to coarse well graded SAND, trace fine subrounded Gravel		
732							
734							
736	0		SW		Grey (10YR 6/1) fine to coarse well graded SAND, few fine subrounded Gravel		
738							
740	0		GW		Light grey (10YR 7/2) well graded fine to coarse subrounded GRAVEL with some well graded fine to coarse Sand		
742							4" Diameter Schedule 80 PVC, 10 Slot Well Screen (730-755 ft bgs)
744							
746	0		GW-SW		Grey (10YR 6/1) fine to coarse well graded subrounded GRAVEL and fine to coarse well graded Sand		
748							
750	0		GW		Grey (10YR 6/1) fine to coarse well graded subrounded GRAVEL with some well graded fine to coarse Sand		
752							
754							
756							
758							Sump
760							
762							
764							
766							#1 Sand to bottom
768							
770							
772					End of boring at 772.0 ft. bgs.		

Resolution Consultants

Boring Log

BORING #: RE117D2
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Varricchio
Location: Lawrence Road and Susan Ct, Seaford, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 54.11	**Well Screen Interval (ft):** 780-805
Start Date: 2/26/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 3/12/2015	**Northing:** 196455.23 **Easting:** 1125332.7	**Total Depth (ft):** 822.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0					0-783 ft bgs: See VPB151 for Descriptions		10" Diameter Steel Casing
50							
100							
150							
200							Bentonite Grout
250							
300							
350							
400							
450							
500							
550							4" Diameter Schedule 80 PVC Riser
600							
650							
700							

Resolution Consultants

Boring Log

BORING #: RE117D2
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Varricchio
Location: Lawrence Road and Susan Ct, Seaford, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 54.11	**Well Screen Interval (ft):** 780-805
Start Date: 2/26/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 3/12/2015	**Northing:** 196455.23 **Easting:** 1125332.7	**Total Depth (ft):** 822.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
730					0-783 ft bgs: See VPB151 for Descriptions *(continued)*		4" Diameter Schedule 80 PVC Riser *(continued)*
732							
734							
736							
738							
740							
742							
744							
746							#0 Filter Sand
748							
750							
752							
754							
756							
758							
760							
762							
764							
766							
768							#1 Filter Sand
770							
772							
774							
776							
778							
780							
782							
784	0		SC		Gray (10YR 5/1) fine SAND with some fat Clay, little medium to coarse subangular sand and fine subangular gravel		
786							
788	0		SP-SC		White (10YR 8/1) poorly graded fine SAND with few Clay		
790							
792							4" Diameter Schedule 80 PVC, 10 Slot Well Screen (780-805 ft bgs)
794	0		SP-SC		White (10YR 8/1) poorly graded fine SAND with few Clay		
796							
798	0		CH		Dark grey (10YR 4/1) poorly sorted fine sandy fat CLAY		
800			SC		Dark grey (10YR 4/1) poorly sorted fine clayey SAND		
802							
804	0		SP		Grey (10YR 6/1) poorly graded fine SAND with trace Clay		
806							
808							Sump
810							
812							
814							
816							#1 Sand to bottom
818							
820							
822					End of boring at 822.0 ft. bgs.		

Resolution Consultants

Boring Log

BORING #: RE118D1
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: Pineneck Road, Seaford, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 57.99	**Well Screen Interval (ft):** 765-790
Start Date: 4/6/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 4/21/2015	**Northing:** 197298.81 **Easting:** 1126290.8	**Total Depth (ft):** 808.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0					0-773 ft bgs; See VPB152 for Descriptions		10" Diameter Steel Casing
50							
100							
150							
200							
250							Bentonite Grout
300							
350							
400							
450							
500							
550							
600							4" Diameter Schedule 80 PVC Riser
650							
700							

Resolution Consultants

Boring Log

BORING #: RE118D1
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: Pineneck Road, Seaford, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 57.99	**Well Screen Interval (ft):** 765-790
Start Date: 4/6/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 4/21/2015	**Northing:** 197298.81 **Easting:** 1126290.8	**Total Depth (ft):** 808.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
740					0-773 ft bgs; See VPB152 for Descriptions *(continued)*		4" Diameter Schedule 80 PVC Riser *(continued)*
742							
744							
746							
748							
750							#0 Filter Sand
752							
754							
756							
758							
760							#1 Filter Sand
762							
764							
766							
768							
770							
772							
774	0		GP		White (10YR 8/1) poorly graded fine GRAVEL		
776			SP-SC		White (10YR 8/1) poorly graded SAND with Clay, medium sand, little fine sand, four bands (0.25 inches) orange sand; 15% fines.		
778	0.1		SC		Light grey (10YR 7/1) CLAYEY SAND; fine to medium Sand, laminated		4" Diameter Schedule 80 PVC, 10 Slot Well Screen (765-790 ft bgs)
780							
782							
784	0.2		GP		White (10YR 8/1) poorly graded GRAVEL, subrounded to subangular fine Gravel		
786			SC		Light grey (10YR 7/1) CLAYEY SAND; subangular fine to coarse Sand, medium sand ~60%, 20% clay (fines)		
788	0.1		SC		Light grey (10YR 7/1) CLAYEY SAND, medium Sand, little fine sand, 20% clay (fines)		
790							
792							Sump
794	0.1		CH		White (10YR 8/1), light grey (10YR 7/1), and dark grey (10YR 4/1) fat CLAY; laminated; multi-colored bands		
796							
798							
800							
802							#1 Sand to bottom
804							
806							
808					End of boring at 808.0 ft. bgs.		

Resolution Consultants

Boring Log

BORING #: RE119D1
Sheet 1 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: Joseph Road and William Road, Massapequa, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 56.13	**Well Screen Interval (ft):** 715-740
Start Date: 6/3/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 6/5/2015	**Northing:** 197245.89 **Easting:** 1128694.84	**Total Depth (ft):** 755.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
0					0-718 ft bgs: See VPB153 for Descriptions		10" Diameter Steel Casing
50							
100							
150							
200							
250							Bentonite Grout
300							
350							
400							
450							
500							
550							
600							4" Diameter Schedule 80 PVC Riser
650							

Resolution Consultants

Boring Log

BORING #: RE119D1
Sheet 2 of 2

Client: Department of the Navy, Naval Facilities Engineering Command, Mid-Atlantic		**Logged By:** V. Thayer
Location: Joseph Road and William Road, Massapequa, NY		**Drilling Company:** DELTA WELL AND PUMP COMPANY
Project #: 60266526	**Ground Elevation (msl):** 56.13	**Well Screen Interval (ft):** 715-740
Start Date: 6/3/2015	**Drilling Method:** Auger (0-50' bgs) Mud Rotary (>50' bgs)	**Water Level (ft):**
Finish Date: 6/5/2015	**Northing:** 197245.89 **Easting:** 1128694.84	**Total Depth (ft):** 755.0

DEPTH (ft)	PID (ppm)	Formation	USCS	GRAPHIC LOG	MATERIAL DESCRIPTION	Well Completion	Well Construction
690					0-718 ft bgs: See VPB153 for Descriptions *(continued)*		4" Diameter Schedule 80 PVC Riser *(continued)*
692							
694							
696							
698							
700							#0 Filter Sand
702							
704							
706							
708							
710							#1 Filter Sand
712							
714							
716							
718	0		CH		Grey (7.5YR) Fat Clay		
720							
722							
724	0		CH		Grey (7.5YR) Fat Clay		
726							
728	0		CH		Grey (7.5YR) SANDY CLAY, little medium Sand		4" Diameter Schedule 80 PVC, 10 Slot Well Screen (715-740 ft bgs)
730							
732							
734	0		SM		Grey (7.5YR 5/1) SILTY SAND, fine to medium Sand		
736			CH		Dark grey (7.5YR 4/1) fat CLAY		
738	0		CH		Grey (7.5YR) fat CLAY, micro-laminated, Lignite layer		
740							
742							Sump
744							
746							
748							
750							#1 Sand to bottom
752							
754							
					End of boring at 755.0 ft. bgs.		

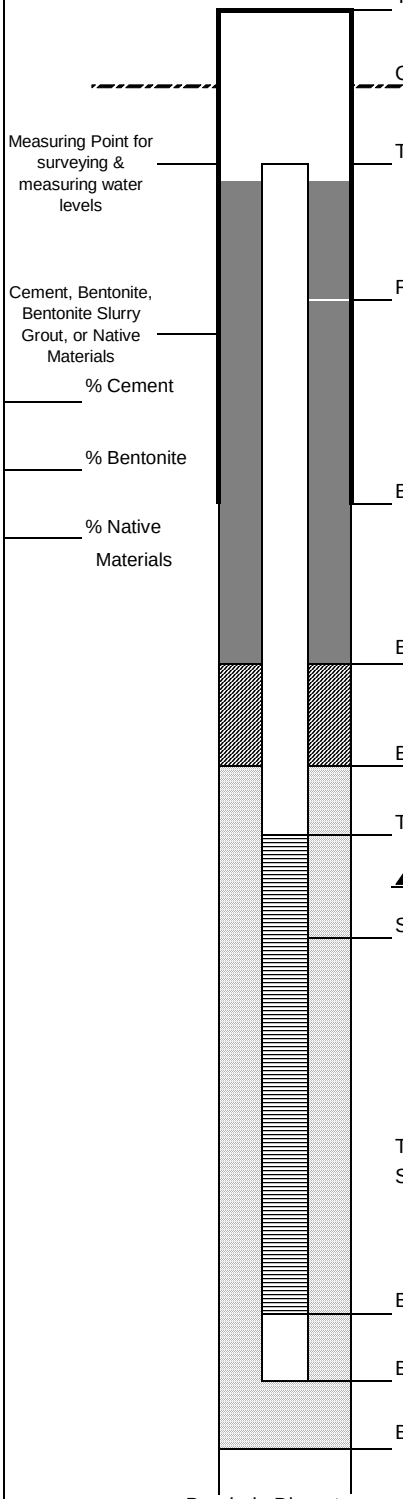
Section 2

Monitoring Well Construction Logs

RESOLUTION CONSULTANTS

Client: NAVFAC	Project Number: 60266526	***WELL ID: BPOW5-4***	
Site Location: NWIRP BETHPAGE, NY			
Well Location: Lawrence Rd and Susan Ct, Seaford, NY		Date Installed: 4/3/2015 - 4/10/2015	
Method: MUD ROTARY		Inspector: V. VARRICCHIO	
Coords: Northing: 196471.55	Easting: 1125307.44	Contractor: DELTA WELL & PUMP	

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum
Top of 12 inch diameter Steel Curb Box		54.47
Ground Surface (G.S.)	0.00	54.49
Top of Riser Pipe fit with locking j-plug	0.61	53.88
Riser Pipe:		
Length: 545 feet		
Inside Diameter (ID): 4 inch		
Type of Material: PVC		
Bottom of Steel Surface Casing	54.0	0.5
Bottom of Bentonite Grout	504.0	-449.5
Bottom of 0 Filter Sand/Top of #1 Filter Sand	520	-465.5
Top of Screen	545	-490.5
▲ Stabilized Water Level		
Screen:		
Length: 25 feet		
Inside Diameter (ID): 4 inch		
Slot Size: 10		
Type of Material: PVC		
Type/Size of Sand: #1		
Sand Pack Thickness: 67 feet		
Bottom of Screen	570	-515.5
Bottom of Sump:	575	-520.5
Bottom of Borehole	587	-532.5

Borehole Diameter: 10 inch

Approved:

Signature

Date

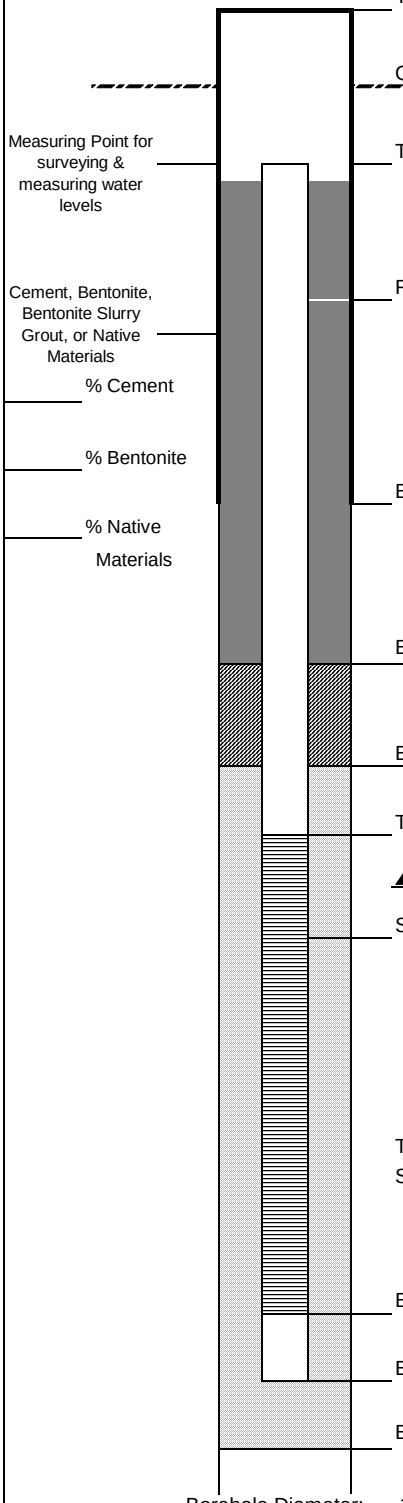
Describe Measuring Point:

Ground Surface

RESOLUTION CONSULTANTS

Client: NAVFAC	Project Number: 60266526	***WELL ID: BPOW5-5***	
Site Location: NWIRP BETHPAGE, NY			
Well Location: Pineneck Rd., Seaford, NY		Date Installed: 4/1/2015 - 4/6/2015	
Method: MUD ROTARY		Inspector: V. THAYER	
Coords: Northing: 197284.98 Easting: 1126291.45		Contractor: DELTA WELL & PUMP	

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum
Top of 12 inch diameter Steel Curb Box	0.01	57.96
Ground Surface (G.S.)	0.00	57.97
Top of Riser Pipe fit with locking j-plug	0.39	57.58
Riser Pipe:		
Length: 515 feet		
Inside Diameter (ID): 4 inch		
Type of Material: PVC		
Bottom of Steel Surface Casing	54.0	4.0
Bottom of Bentonite Grout	487.0	-429.0
Bottom of 0 Filter Sand/Top of #1 Filter Sand	497	
Top of Screen	515	-457.0
▲ Stabilized Water Level		
Screen:		
Length: 25 feet		
Inside Diameter (ID): 4 inch		
Slot Size: 10		
Type of Material: PVC		
Type/Size of Sand: #1		
Sand Pack Thickness: 63.5 feet		
Bottom of Screen	540	-482.0
Bottom of Sump:	545	-487.0
Bottom of Borehole	560.5	-502.5

Borehole Diameter: 10 inch

Approved:

Describe Measuring Point:

Ground Surface

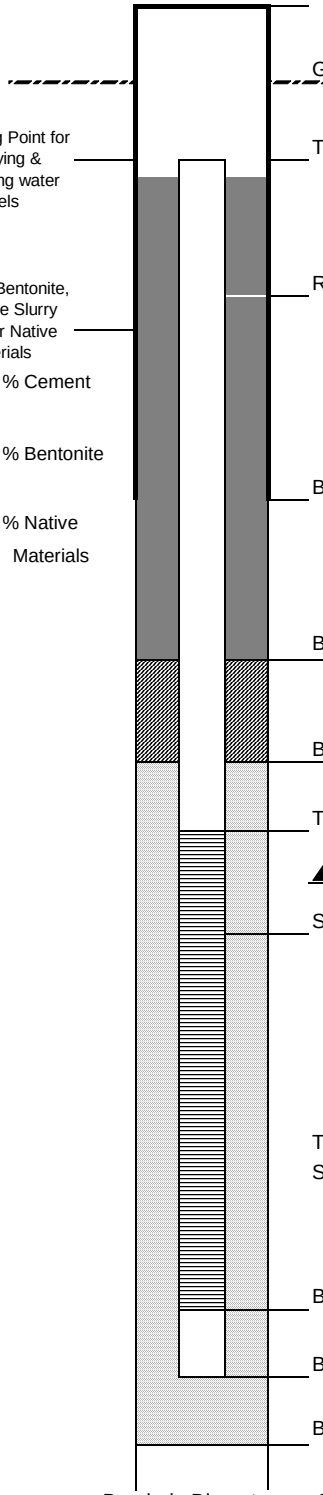
Signature

Date

RESOLUTION CONSULTANTS

Client: NAVFAC	Project Number: 60266526	***WELL ID: BPOW5-6***	
Site Location: NWIRP BETHPAGE, NY			
Well Location: Pineneck Rd., Seaford, NY		Date Installed: 5/6/2015 - 5/7/2015	
Method: MUD ROTARY		Inspector: V. THAYER	
Coords: Northing: 197327.15	Easting: 1126285.56	Contractor: DELTA WELL & PUMP	

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum
Top of 12 inch diameter Steel Curb Box	0.06	58.27
Ground Surface (G.S.)	0.00	58.21
Top of Riser Pipe fit with locking j-plug	0.49	57.72
Riser Pipe:		
Length: 585 feet		
Inside Diameter (ID): 4 inch		
Type of Material: PVC		
Bottom of Steel Surface Casing	53.0	5.2
Bottom of Bentonite Grout	567.0	-508.8
Bottom of 0 Filter Sand/Top of #1 Filter Sand	577	-518.8
Top of Screen	585	-526.8
▲ Stabilized Water Level		
Screen:		
Length: 25 feet		
Inside Diameter (ID): 4 inch		
Slot Size: 10		
Type of Material: PVC		
Type/Size of Sand: #1		
Sand Pack Thickness: 51 feet		
Bottom of Screen	610	-551.8
Bottom of Sump:	615	-556.8
Bottom of Borehole	628.0	-569.8

Borehole Diameter: 10 inch

Approved:

Describe Measuring Point:

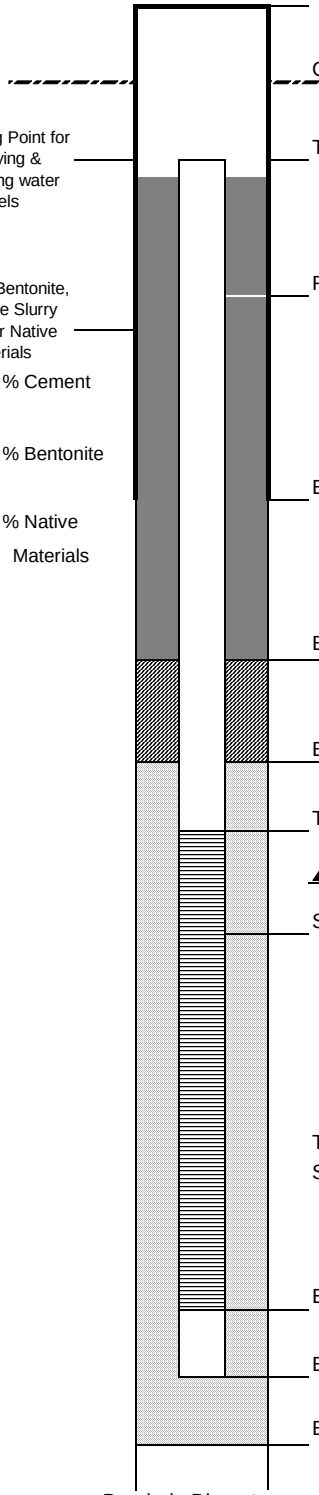
Ground Surface

Signature

Date

RESOLUTION CONSULTANTS	Client: NAVFAC	Project Number: 60266526	***WELL ID: BPOW5-7***
	Site Location: NWIRP BETHPAGE, NY		
	Well Location: Joseph Rd and Willian Rd, Massapequa, NY		Date Installed: 6/17/2015 - 6/22/2015
	Method: MUD ROTARY		Inspector: V. THAYER
	Coords: Northing: 197274.15 Easting: 1128702.39		Contractor: DELTA WELL & PUMP

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum
Top of 12 inch diameter Steel Curb Box	0.09	56.29
Ground Surface (G.S.)	0.00	56.2
Top of Riser Pipe fit with locking j-plug	0.28	55.92
Measuring Point for surveying & measuring water levels		
Riser Pipe:		
Length: 525 feet		
Inside Diameter (ID): 4 inch		
Type of Material: PVC		
Cement, Bentonite, Bentonite Slurry Grout, or Native Materials		
% Cement		
% Bentonite		
% Native Materials		
Bottom of Steel Surface Casing	53.3	2.9
Bottom of Bentonite Grout	505.0	-448.8
Bottom of 0 Filter Sand/Top of #1 Filter Sand	515	-458.8
Top of Screen	525	-468.8
▲ Stabilized Water Level		
Screen:		
Length: 25 feet		
Inside Diameter (ID): 4 inch		
Slot Size: 10		
Type of Material: PVC		
Type/Size of Sand: #1		
Sand Pack Thickness: 55 feet		
Bottom of Screen	550	-493.8
Bottom of Tail Pipe:	555	-498.8
Bottom of Borehole	570	-513.8

Borehole Diameter: 10 inch

Approved:

Signature

Date

Describe Measuring Point:

Ground Surface

RESOLUTION CONSULTANTS

Client: NAVFAC	Project Number: 60266526	***WELL ID: RE117D1***	
Site Location: NWIRP BETHPAGE, NY			
Well Location: Lawrence Rd and Susan Ct, Seaford, NY		Date Installed:	3/19/2015 - 3/27/2015
Method: MUD ROTARY		Inspector:	V. VARRICCHIO
Coords: Northing: 196462.44	Easting: 1125318.92	Contractor:	DELTA WELL & PUMP

MONITORING WELL CONSTRUCTION DETAIL

	Depth from G.S. (feet)	Elevation(feet) Datum
Top of 12 inch diameter Steel Curb Box	0.05	54.29
Ground Surface (G.S.)	0.00	54.24
Top of Riser Pipe fit with locking j-plug	0.43	53.81
Riser Pipe:		
Length: 730 feet		
Inside Diameter (ID): 4 inch		
Type of Material: PVC		
Bottom of Steel Surface Casing	54.0	0.2
Bottom of Bentonite Grout	675.0	-620.8
Bottom of 0 Filter Sand/Top of #1 Filter Sand	695	-640.8
Top of Screen	730	-675.8
▲ Stabilized Water Level		
Screen:		
Length: 25 feet		
Inside Diameter (ID): 4 inch		
Slot Size: 10		
Type of Material: PVC		
Type/Size of Sand: #1		
Sand Pack Thickness: 77 feet		
Bottom of Screen	755	-700.8
Bottom of Sump:	760	-705.8
Bottom of Borehole	772	-717.8

Borehole Diameter: 10 inch

Approved:

Describe Measuring Point:

Ground Surface

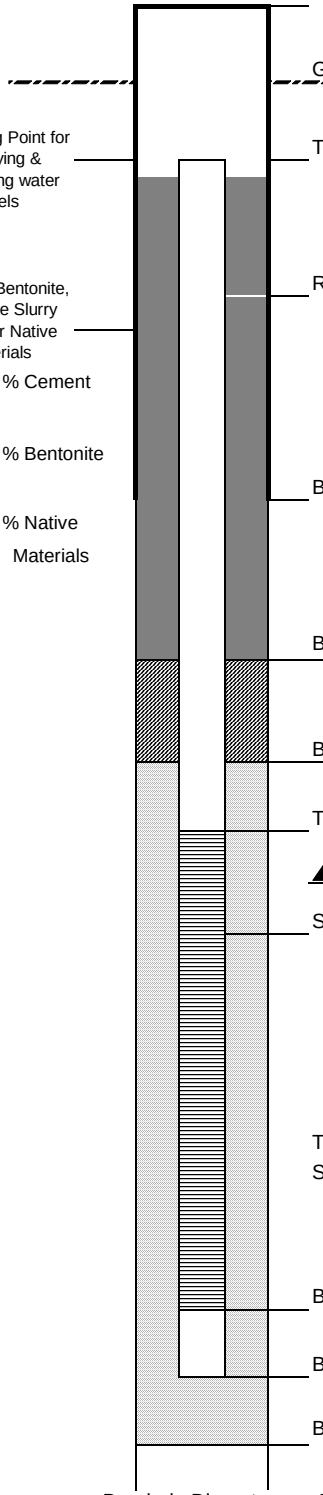
Signature

Date

RESOLUTION CONSULTANTS

Client: NAVFAC	Project Number: 60266526	***WELL ID: RE117D2***	
Site Location: NWIRP BETHPAGE, NY			
Well Location: Lawrence Rd and Susan Ct, Seaford, NY		Date Installed:	2/26/2015 - 3/12/2015
Method: MUD ROTARY		Inspector:	V. VARRICCHIO
Coords: Northing: 196455.23	Easting: 1125332.7	Contractor:	DELTA WELL & PUMP

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum
Top of 12 inch diameter Steel Curb Box	0.01	54.12
Ground Surface (G.S.)	0.00	54.11
Top of Riser Pipe fit with locking j-plug	0.52	53.59
Riser Pipe:		
Length: 780 feet		
Inside Diameter (ID): 4 inch		
Type of Material: PVC		
Bottom of Steel Surface Casing	57.0	-2.9
Bottom of Bentonite Grout	735.0	-680.9
Bottom of 0 Filter Sand/Top of #1 Filter Sand	755	-700.9
Top of Screen	780	-725.9
▲ Stabilized Water Level		
Screen:		
Length: 25 feet		
Inside Diameter (ID): 4 inch		
Slot Size: 10		
Type of Material: PVC		
Type/Size of Sand: #1		
Sand Pack Thickness: 67 feet		
Bottom of Screen	805	-750.9
Bottom of Sump:	810	-755.9
Bottom of Borehole	822	-767.9

Borehole Diameter: 10 inch

Approved:

Describe Measuring Point:

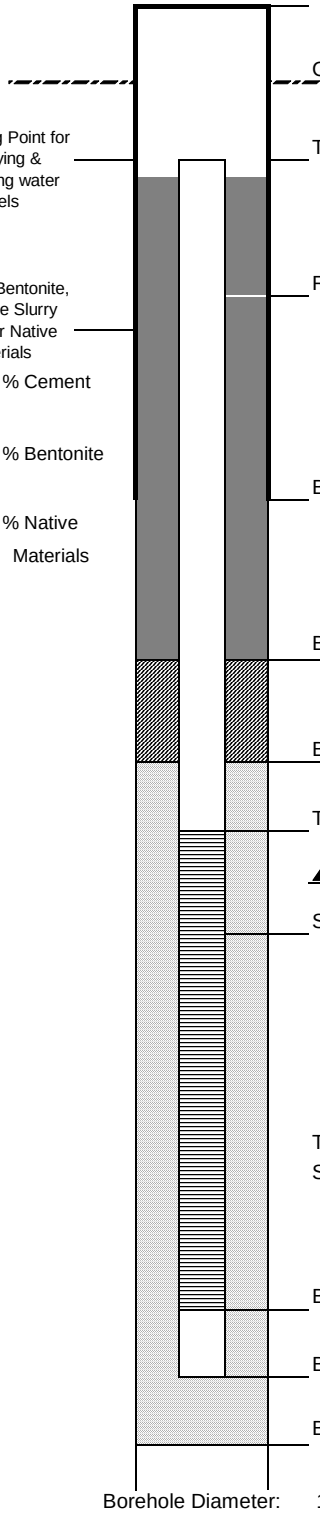
Ground Surface

Signature

Date

RESOLUTION CONSULTANTS	Client: NAVFAC	Project Number: 60266526	***WELL ID: RE118D1***
	Site Location: NWIRP BETHPAGE, NY		
	Well Location: Pineneck Rd., Seaford, NY		Date Installed: 4/6/2015 - 4/21/2015
	Method: MUD ROTARY		Inspector: V. THAYER
	Coords: Northing: 197298.81	Easting: 1126290.8	Contractor: DELTA WELL & PUMP

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum
Top of 12 inch diameter Steel Curb Box	0.01	58
Ground Surface (G.S.)	0.00	57.99
Top of Riser Pipe fit with locking j-plug	0.38	57.61
Riser Pipe:		
Length: 765 feet		
Inside Diameter (ID): 4 inch		
Type of Material: PVC		
Bottom of Steel Surface Casing	52.0	6.0
Bottom of Bentonite Grout	745.0	-687.0
Bottom of 0 Filter Sand/Top of #1 Filter Sand	755	
Top of Screen	765	-707.0
▲ Stabilized Water Level		
Screen:		
Length: 25 feet		
Inside Diameter (ID): 4 inch		
Slot Size: 10		
Type of Material: PVC		
Type/Size of Sand: #1		
Sand Pack Thickness: 53 feet		
Bottom of Screen	790	-732.0
Bottom of Sump:	795	-737.0
Bottom of Borehole	808	-750.0

Borehole Diameter: 10 inch

Approved:

Signature

Date

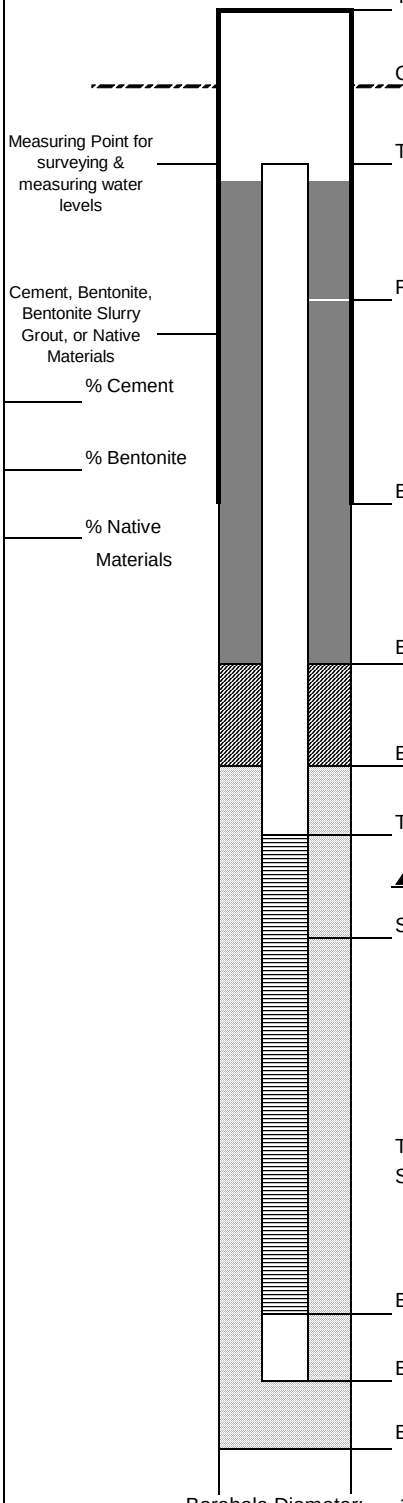
Describe Measuring Point:

Ground Surface

RESOLUTION CONSULTANTS

Client: NAVFAC	Project Number: 60266526	***WELL ID: RE119D1***	
Site Location: NWIRP BETHPAGE, NY			
Well Location: Joseph Rd and William Rd, Massapequa, NY		Date Installed: 6/3/2015 - 6/5/2015	
Method: MUD ROTARY		Inspector: V. THAYER	
Coords: Northing: 197245.89 Easting: 1128694.84		Contractor: DELTA WELL & PUMP	

MONITORING WELL CONSTRUCTION DETAIL



	Depth from G.S. (feet)	Elevation(feet) Datum
Top of 12 inch diameter Steel Curb Box	0.08	56.21
Ground Surface (G.S.)	0.00	56.13
Top of Riser Pipe fit with locking j-plug	0.52	55.61
Riser Pipe:		
Length: 715 feet		
Inside Diameter (ID): 4 inch		
Type of Material: PVC		
Bottom of Steel Surface Casing	53.6	2.5
Bottom of Bentonite Grout	695.0	-638.9
Bottom of 0 Filter Sand/Top of #1 Filter Sand	705	
Top of Screen	715	-658.9
▲ Stabilized Water Level		
Screen:		
Length: 25 feet		
Inside Diameter (ID): 4 inch		
Slot Size: 10		
Type of Material: PVC		
Type/Size of Sand: #1		
Sand Pack Thickness: 50 feet		
Bottom of Screen	740	-683.9
Bottom of Tail Pipe:	745	-688.9
Bottom of Borehole	755	-698.9

Borehole Diameter: 10 inch

Approved:

Describe Measuring Point:

Ground Surface

Signature

Date

Section 3

Groundwater Sample Log Sheets

RESOLUTION CONSULTANTS

Well ID: RE 11701

Low Flow Ground Water Sample Collection Record

Client: Navy NWIRP Bethpage | Date: 5/20/15 | Time: Start 945 am/pm | Finish 1350 am/pm
Project No: 60266526
Site Location: Susan County
Weather Conds: ~65°F, mostly cloudy, breezy | Collector(s): Paul Karchy, Jessica Ehlin

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 760 c. Length of Water Column _____ (a-b)

Casing Diameter/Material: 4-inch PVC

b. Water Table Depth 23.50 d. Calculated System Volume (see back) 25ft screen = 62L / 16.3gal

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump with drop tube assembly

b. Acceptance Criteria defined (see workplan)

- Temperature	± 3%	- D.O.	± 10% (values >0.5 mg/L)	Turbidity	± 10%
- pH	± 0.1 unit	- ORP	± 10mV		
- Sp. Cond.	± 3%	- Drawdown	< 0.3'	Remove a minimum 1 screen volume	

c. Field Testing Equipment used:

	Make	Model	Serial Number
	YSI	556 MPS	13J100663 / 06187Y
	Hanna	HI 98703	080211Y
	Geotech		

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
1135									→	Start pumping
1140	~2.5	16.27	5.58	0.034	4.50	109.0	113	500	23.69	cloudy/none
1145	~5	16.31	5.56	0.032	3.47	100.8	125	500	23.70	" "
1150	~7.5	16.11	5.54	0.031	3.31	99.7	114	500	23.70	" "
1155	~10	16.19	5.58	0.031	3.14	101.6		400	23.70	" "
1200	~12	15.92	5.62	0.030	2.96	107.0		500	23.70	" "
1205	~14.5	15.82	5.39	0.026	3.02	119.6		500	23.70	" "

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

3. SAMPLE COLLECTION:

Method: Geotech bladder pump with drop tube assembly

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
RE117D1-GW-052015	40-mL vial	3	HCl	VOCs	1345
RE117D1-GW-052015	1-L amber	2	none	1,4-Dioxane	1345

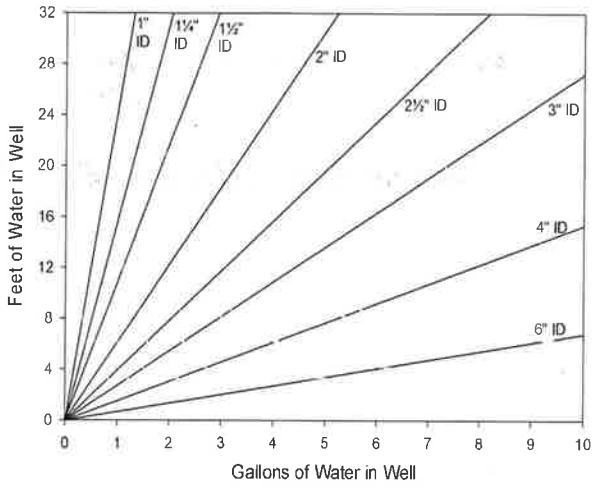
Comments: hit bottom 20ft to long
DUP-GW-052015 was collected off this location sampled @ same time, wrote 1415 on labels & chain

Signature: J Ehlin Date: 5/20/15

Purge Volume Calculation

RE117D1

pg 2 of 2



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

1 screen volume

15 ft = 37.1 L / 9.8 G
20 ft = 49.6 L / 13.1 G
25 ft = 61.7 L / 16.3 G

Well ID:

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
1210	~17	15.70	5.13	0.023	3.19	137.8		500	23.70	cloudy / none
1215	~19.5	15.38	4.97	0.023	3.13	157.2	68.4	500	23.70	cloudy / none
1220	~22	15.43	5.06	0.023	3.09	158.3		500	23.70	" "
1225	~24.5	15.35	5.02	0.023	3.02	165.3		500	23.70	" "
1230	~27	15.26	5.01	0.023	3.00	170.7	86.1	500	23.70	" "
1235	~29.5	15.26	5.00	0.022	2.96	174.2		500	23.70	" "
1240	~32	15.38	5.03	0.022	2.93	177.2	60.8	500	23.67	slightly cloudy / none
1245	~34.5	15.50	5.08	0.022	2.81	178.6		500	23.65	" " "
1250	~37	15.44	5.03	0.022	2.79	184.8		500	23.65	" " "
1255	~39.5	15.39	5.02	0.022	2.81	187.9	54.4	500	23.65	" " "
1300	~42	15.71	5.04	0.022	2.75	189.9		500	23.65	" " "
1305	~44.5	15.87	5.03	0.022	2.75	192.7	50.5	500	23.65	" " "
1315	~49.5	16.64	5.08	0.023	2.73	194.3	47.5	500	23.65	" " "
1320	~52	16.69	5.07	"	2.71	198.1	52.0	500	"	" " "
1325	~54.5	16.53	5.03	"	2.72	201.7		"	"	" " "
1330	~57	16.52	5.02	"	2.73	203.5	44.1	"	"	" " "
1335	~59.5	"	5.01	0.022	2.71	206.2	45.2	"	"	" " "
1340	~62	"	"	0.023	"	206.9	46.4	"	"	" " "

RESOLUTION CONSULTANTS

Well ID: 117D2

pg 1 of 2

Low Flow Ground Water Sample Collection Record

Client: Navy NWIRP Bethpage | Date: 5 / 20 / 15 | Time: Start 945 am/pm | Finish 1725 am/pm

Project No: 60266526

Site Location: Susan Court

Weather Conds: partly sunny 65-75° windy | Collector(s): Jessica Eblin, Paul Karegh

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 805 | c. Length of Water Column _____ (a-b) | Casing Diameter/Material 4-inch PVC

b. Water Table Depth 22.29 | d. Calculated System Volume (see back) 25ft screen = 62L/16.3gal

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump with drop tube assembly

b. Acceptance Criteria defined (see workplan)

- Temperature	± 3%	- D.O.	± 10% (values >0.5 mg/L)	Turbidity	± 10%
- pH	± 0.1 unit	- ORP	± 10mV		
- Sp. Cond.	± 3%	- Drawdown	< 0.3'	Remove a minimum 1 screen volume	

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	m	
Hanna	HI 98703	U80211X

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
1430								→	22.25	start pumping
1435	~2.5	19.81	5.21	0.031	8.30	148.9	91.8	500	22.40	cloudy/none
1440	~5	19.63	5.02	0.029	7.13	163.0		500	22.35	" "
1500	~10	19.91	4.89	0.027	2.91	192.1	109	200	22.35	" "
1600	~20	Trouble with flow rate on pump, replaced bladder & started again								
1610	~22	16.08	4.40	0.024	1.12	228.7	577	400	22.35	cloudy/none
1615	~25	16.10	4.28	0.023	0.94	235.0	222	600	22.45	" "

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Geotech bladder pump with drop tube assembly

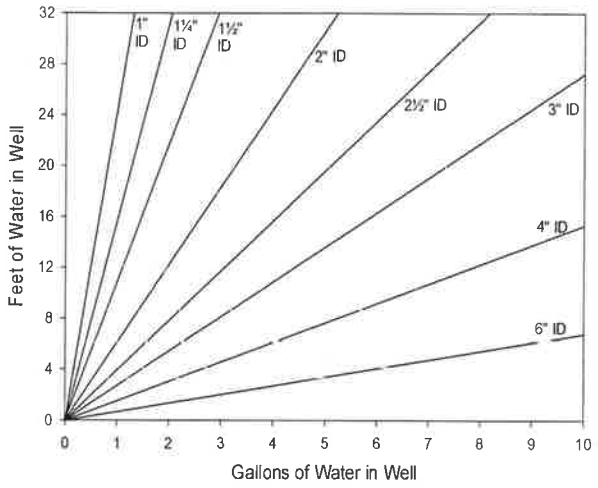
Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
	40-mL vial	3	HCl	VOCs	1720
	1-L amber	2	none	1,4-Dioxane	1720

Comments

Signature 45ft top long | Date 5/20/15

RE117D2
pg 2 of 2

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

1 screen volume

15 ft = 37.1 L / 9.8 G
20 ft = 49.6 L / 13.1 G
25 ft = 61.7 L / 16.3 G

Well ID:

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
1620	~27.5	16.04	4.30	0.023	0.71	238.8		500	22.45	cloudy / none
1625	~30.5	15.84	4.28	0.023	0.63	244.2	99.0	600	22.45	" / "
1630	~33.5	15.66	4.18	0.024	1.09	251.2	45.1	600	22.45	slightly cloudy / none
1635	~36.5	15.81	4.31	0.024	1.25	247.6	28.6	600	22.45	clear / none
1640	~39.5	15.72	4.33	0.024	1.01	249.4	26.8	600	"	" / "
1645	~42.5	15.64	4.34	0.024	0.84	250.3	21.9	600	"	" / "
1650	~45.5	15.73	4.35	0.024	0.74	250.9	23.0	600	"	" / "
1655	~48.5	15.92	4.41	0.025	0.66	249.3	17.3	600	"	" / "
1700	~51.5	16.08	4.43	"	0.64	249.1	14.6	"	"	" / "
1705	~54.5	15.96	4.38	"	0.60	253.9	13.1	"	"	" / "
1710	~57.5	16.20	4.42	"	0.56	251.8	11.8	"	"	" / "
1715	~60.5	16.31	4.44	"	0.53	250.9	10.0	"	"	" / "

RESOLUTION CONSULTANTS

Well ID: BPOW5-4

Low Flow Ground Water Sample Collection Record

Client: Navy NWIRP Bethpage | Date: 5/20/15 | Time: Start 745 am/pm | Finish 1330 am/pm
Project No: 60266526
Site Location: Susan Court
Weather Conds: Partly sunny, 70-75° | Collector(s): Paul Kareth, Jessica Ehlin

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 575 c. Length of Water Column _____ (a-b)

Casing Diameter/Material: 4-inch PVC

b. Water Table Depth 23.85 d. Calculated System Volume (see back) 25ft screen = 62 L / 16.3 gal

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump with drop tube assembly

b. Acceptance Criteria defined (see workplan)

- Temperature	± 3%	- D.O.	± 10% (values >0.5 mg/L)	Turbidity	± 10%
- pH	± 0.1 unit	- ORP	± 10mV		
- Sp. Cond.	± 3%	- Drawdown	< 0.3'	Remove a minimum 1 screen volume	

c. Field Testing Equipment used:

	Make	Model	Serial Number
	YSI	556	754458
	Hanna	HI98703	08021X

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
1105										
1140	19 L	16.45	4.69	0.163	7.75	145.8	3.16	525	23.67	
1145		15.56	4.69	0.165	7.37	138.1				
1150		16.32	4.70	0.166	6.92	129.8	1.64	525	23.65	
1155		16.20	4.70	0.167	6.43	125.4				
1200		16.17	4.70	0.168	5.92	122.3	1.71			
1205		15.89	4.70	0.167	5.43	120.2		525	23.66	

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.
hit shear limit

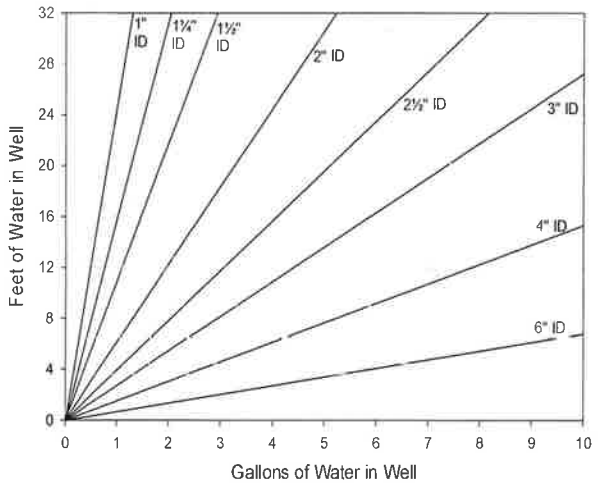
3. SAMPLE COLLECTION: Method: Geotech bladder pump with drop tube assembly

Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time	
BPOW5-4-GW-052015	40-mL vial	3	HCl	VOCs	1310	MS/MSD
BPOW5-4-GW-052015	1-L amber	2	none	1,4-Dioxane	1310	

Comments hit bottom ~40 ft extra tubing

Signature _____ Date _____

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

1 screen volume

15 ft = 37.1 L / 9.8 G
20 ft = 49.6 L / 13.1 G
25 ft = 61.7 L / 16.3 G

Well ID: BPOW5-4 @ 11:05

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
1210	37.84 L 10 gal	15.73	4.69	0.167	5.27	119.7				
1215		15.50	4.69	0.166	4.95	118.8	0.74			
1220		15.53	4.69	0.166	4.44	119.5		525	23.63	
1225		15.29	4.68	0.167	3.83	115.3				
1230		15.20	4.68	0.166	3.33	112.9	1.00			
1235		15.24	4.68	0.166	4.17	121.2				
1240		15.38	4.69	0.166	4.44	128.2				
1245	15 gal	15.53	4.70	0.166	4.76	128.3	0.73	525	23.59	
1250		15.46	4.69	0.166	4.46	119.8				
1255	16.5 gal	15.47	4.69	0.167	4.18	111.5		525	23.60	
1300		15.58	4.69	0.166	3.95	108.2				
1305	18 gal	15.37	4.69	0.167	3.64	104.8	1.09		23.58	2 hours
										1310 Sample

RESOLUTION CONSULTANTS

Well ID: RE117-D1

1 OF 2

Low Flow Ground Water Sample Collection Record

Client: Navy NWIRP Bethpage
Project No: 60266526
Site Location: SUSAN CT
Weather Conds: 70s, CLOUDY
Date: 6/1 09 /15
Time: Start 0900 am/pm
Finish 1300 am/pm
Collector(s): GH / SW

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length 760'
c. Length of Water Column 25' (a-b) → LENGTH OF SCREEN
Casing Diameter/Material 4-inch PVC
b. Water Table Depth 24.55
d. Calculated System Volume (see back) 16 GALLONS

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump with drop tube assembly

b. Acceptance Criteria defined (see workplan)

- Temperature ± 3%
- pH ± 0.1 unit
- Sp. Cond. ± 3%
- D.O. ± 10% (values >0.5 mg/L)
- ORP ± 10mV
- Drawdown < 0.3'
- Turbidity ± 10%

Remove a minimum 1 screen volume

c. Field Testing Equipment used:

	Make	Model	Serial Number
	YSI	556 MPS	U50816X
	HANNA TURB METER	HI98703	U75311X

Time (24hr)	Volume Removed (Liters)	Temp. (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
0920	–	21.01	5.55	0.109	8.60	83.2	114	500	24.55	CLOUDY / NONE
0930	5	17.28	5.34	0.042	4.41	105.2	125	450	24.40	" "
0940	8	17.40	5.54	0.040	3.58	89.6	98.8	450	24.38	" "
0950	12	17.42	5.47	0.037	3.36	84.5	59.2	450	24.38	SL. CLOUDY / NONE
1000	16	18.02	4.81	0.031	3.25	113.2	23.7	450	24.38	CLEAR / NONE
1010	20	17.95	4.73	0.032	3.08	118.3	21.2	400	24.40	" "
1020	24	17.24	4.73	0.032	2.85	128.2	16.2	400	24.40	" "

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Geotech bladder pump with drop tube assembly

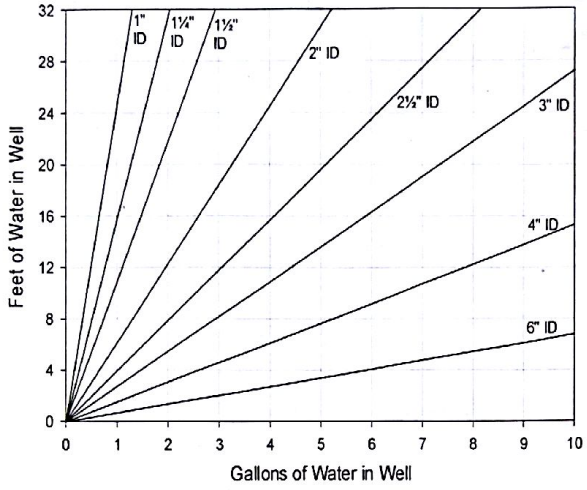
Sample ID	Container Type	No. of Containers	Preservation	Analysis Req.	Time
RE117D1-GW-060915	40-mL vial	3	HCl	VOCs	1225
" " "	1-L amber	2	none	1,4-Dioxane	1225

Comments

Signature

Date 6-09-15

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

1 screen volume (4" DIAm)
15 ft = 37.1 L / 9.8 G
20 ft = 49.6 L / 13.1 G
25 ft = 61.7 L / 16.3 G

Well ID:

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
1030	28	17.01	4.67	0.031	2.74	131.2	14.1	500	24.45	Clear / none
1040	32	16.99	4.66	0.031	2.73	131.6	14.3	500	24.45	" "
1050	37	17.12	4.68	0.031	2.68	129.4	12.3	500	24.35	" "
1100	OUT OF GAS			—	—	—	—	—	—	—
1130	38	21.29	4.84	0.031	2.34	151.0	12.4	500	24.20	" "
1140	45	18.32	4.78	0.031	2.26	153.6	11.0	550	24.15	"
1150	52	18.68	4.74	0.031	2.66	152.3	8.75	550	24.40	"
1200	57	18.89	4.80	0.031	2.71	141.2	9.75	500	24.40	"
1210	62	19.10	4.83	0.031	2.75	130.1	10.5	500	24.40	"

RESOLUTION CONSULTANTS

Well ID: BPOW 5-5

Low Flow Ground Water Sample Collection Record

Client: Navy NWIRP Bethpage
Project No: 60266526
Site Location: Pinnacle + Peters
Weather Conds: 80s F clear

Date: 6 / 24 /15
Time: Start 855 am/pm
Finish 1045 am/pm
Collector(s): JC

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length: 545 ft
b. Water Table Depth: 27.05 ft
c. Length of Water Column: ~~767.95~~ 517.95 ft
d. Calculated System Volume (see back) 16.3 gal

Casing Diameter/Material: 4-inch PVC

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump with drop tube assembly

b. Acceptance Criteria defined (see workplan)
- Temperature ± 3%
- pH ± 0.1 unit
- Sp. Cond. ± 3%
- D.O. ± 10% (values >0.5 mg/L)
- ORP ± 10mV
- Drawdown <0.3'
- Turbidity ± 10%
- Remove a minimum 1 screen volume

c. Field Testing Equipment used: Make / Model / Serial Number

Time (24hr)	Volume Removed (liters)	Temp (°C)	pH	Sp. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color / Odor
905		16.10	4.26	0.132	9.32	359.6	-	800	27.12	clear / none
915		15.85	4.16	0.148	7.17	237.9	336	775	27.14	cloudy / none
925		15.69	4.18	0.326	5.96	268.0	49.3	775	27.18	"
930	5 gal	15.68	4.09	0.324	5.06	285.6	20.1	775	27.22	"
940		15.81	4.09	0.318	4.10	288.3	8.71	775	27.26	clearing / none
950	10 gal	15.93	4.10	0.318	3.19	228.1	3.14	775	27.27	"
1000		15.95	4.15	0.319	3.31	215.7	3.01	775	27.29	"

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☐	☐
Has required turbidity been reached	☐	☐	☐
Have parameters stabilized	☐	☐	☐

If no or N/A - Explain below.

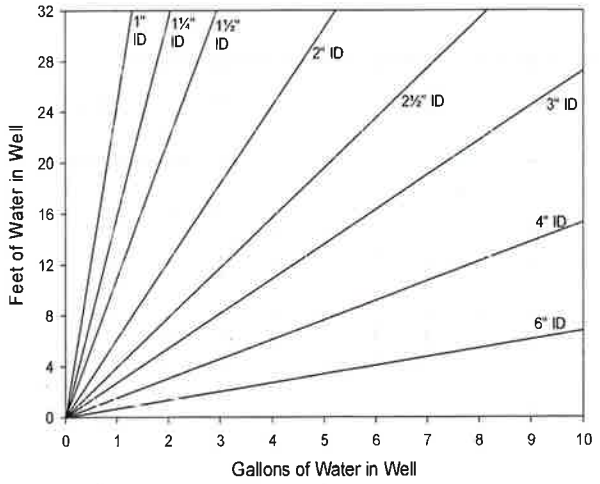
3. SAMPLE COLLECTION: Method: Geotech bladder pump with drop tube assembly

Sample ID	Container type	No. of containers	Preservation	Analysis Req.	Time
BPOW5-5-GW-06242015	40-mL vials	3	HCl	VOCs	1025
BPOW5-5-GW-06242015	1-L amber	2	none	1,4-Dioxane	1025

Comments: Tagged bottom with tubing

Signature:

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

1 screen volume

15 ft = 37.1 L / 9.8 G
20 ft = 49.6 L / 13.1 G
25 ft = 61.7 L / 16.3 G

Well ID: BPOW 5-5

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
1010	15 gal	15.95	4.16	0.319	2.57	215.4	—	775	27.30	"
1015		16.02	4.15	0.319	2.56	214.8	3.94	775	27.30	"
1020	17 gal	16.00	4.14	0.319	2.49	218.6	—	775	27.30	"
1025										Sample Co

RESOLUTION CONSULTANTS

Well ID: BPOW5-6

Low Flow Ground Water Sample Collection Record

Client: Navy NWIRP Bethpage
Project No: 60266526
Site Location: Bethpage / BPOW5-6
Weather Conds: 76°F sunny

Date: 6/24/15
Time: Start 0830 am/pm
Finish 1100 am/pm
Collector(s):

585-610' => SCREEN

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length: 615 ft
b. Water Table Depth: 27.69 ft
c. Length of Water Column: 587.31 ft
d. Calculated System Volume (see back) 16.3 GALLONS

Casing Diameter/Material: 4-inch PVC

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump with drop tube assembly

b. Acceptance Criteria defined (see workplan)
- Temperature ± 3%
- pH ± 0.1 unit
- Sp. Cond. ± 3%
- D.O. ± 10% (values >0.5 mg/L)
- ORP ± 10mV
- Drawdown <0.3'
- Turbidity ± 10%
- Remove a minimum 1 screen volume

c. Field Testing Equipment used:

	Make	Model	Serial Number
	YSI	556 MPS	RFW247220
	HANNA	H1 98703	6398

Time (24hr)	Volume Removed (liters)	Temp (°C)	pH	Sp. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color / Odor
0845	1	18.06	6.44	0.136	13.27	200.2	2.31	300	27.69	CLEAR/NONE
0855	2	15.56	5.19	0.132	5.25	248.4	2.24	300	27.69	"
0900		15.21	4.63	0.125	2.19	269.9	3.15	400	27.82	"
0910		14.81	4.81	0.122	3.84	254.6	2.68	450	27.89	"
0920		15.18	5.41	0.164	1.69	221.4	916	300	27.93	turbid/none
0940		22.22	6.85	0.447	2.37	121.8	>1,100	200	27.94	cloudy/none
1050		21.69	6.92	0.477	0.13	106.0	>1,100	300	27.96	"

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☐	☒	☐
Has required turbidity been reached	☒	☐	☐
Have parameters stabilized	☐	☐	☒

(continued on back)

If no or N/A - Explain below. Max purge time of 2 hours (per the SAP) reached

3. SAMPLE COLLECTION:

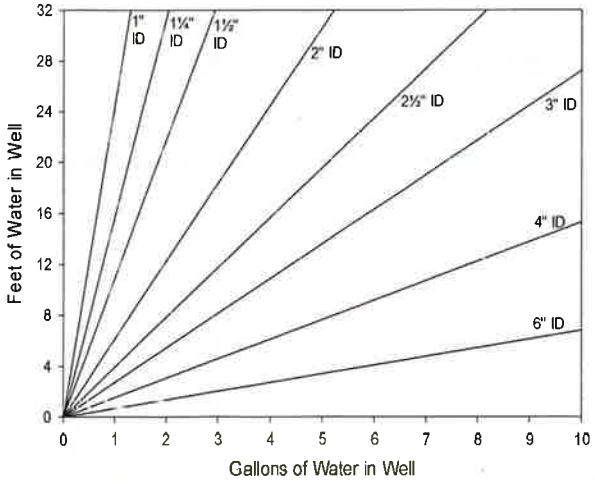
Method: Geotech bladder pump with drop tube assembly

Sample ID	Container type	No. of containers	Preservation	Analysis Req.	Time
BPOW5-6-GW-062415	40-mL vials	3	HCl	VOCs	1100
BPOW5-6-GW-062415	1-L amber	2	none	1,4-Dioxane	1100

Comments

Signature

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

1 screen volume

15 ft = 37.1 L / 9.8 G
20 ft = 49.6 L / 13.1 G
25 ft = 61.7 L / 16.3 G

Well ID: BPOW 5-6

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
1000		18.56	6.61	0.213	2.61	157.0	>1,100	400	27.97	Cloudy / none
1010	99	16.24	5.34	0.122	1.02	161.5	960	600	28.00	"
1020		20.89	5.14	0.116	3.35	223.3	685	200	28.00	"
1030		21.02	5.10	0.114	2.17	221.5	51.6	400	28.00	"
1040		21.98	5.08	0.114	2.18	219.1	49.1	200	28.00	"
1050		21.64	5.07	0.115	2.70	218.6	46.9	200	28.01	"
1100	33	20.92	5.04	0.115	1.39	220.2	37.6	200	28.00	Clear / none

RESOLUTION CONSULTANTS

Well ID: RE118D1

1 of 2

Low Flow Ground Water Sample Collection Record

Client: Navy NWIRP Bethpage
Project No: 60266526
Site Location: PINENECK
Weather Conds: 80s, SUNNY

Date: 6 / 24 /15
Time: Start 0820 am/pm
Finish 1030 am/pm

Collector(s): S. WRIGHT

1. WATER LEVEL DATA: (measured from Top of Casing) 765-790' → SCREEN

a. Total Well Length: 795 ft
b. Water Table Depth: 27.30 ft
c. Length of Water Column: 767.70 ft
d. Calculated System Volume (see back) 16.3 GAL

Casing Diameter/Material: 4-inch PVC

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump with drop tube assembly

b. Acceptance Criteria defined (see workplan)
- Temperature ± 3%
- pH ± 0.1 unit
- Sp. Cond. ± 3%
- D.O. ± 10% (values >0.5 mg/L)
- ORP ± 10mV
- Drawdown <0.3'
- Turbidity ± 10%
- Remove a minimum 1 screen volume

c. Field Testing Equipment used: Make / Model / Serial Number

Time (24hr)	Volume Removed (liters)	Temp (°C)	pH	Sp. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color / Odor
0820	—	19.37	6.72	0.055	5.92	307.1	106	400	27.30	CLOUDY / NONE
0830		16.88	7.01	0.045	3.66	386.6	105	400	27.30	" "
0840		16.21	8.10	0.039	2.40	434.8	97.7	400	27.30	" "
0850		16.07	8.00	0.036	2.03	409.0	85.4	400	27.30	" "
0900		16.80	7.62	0.034	7.02	365.7	66.4	500	27.30	" "
0910	5GAL	15.49	8.15	0.036	8.83	425.6	50.0	500	27.30	" "
0920		15.57	8.04	0.036	3.15	407.3	27.0	600	27.40	CLEAR / NONE

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☑	☐	☐
Has required turbidity been reached	☑	☐	☐
Have parameters stabilized	☑	☐	☐

If no or N/A - Explain below.

(continued on back)

3. SAMPLE COLLECTION: Method: Geotech bladder pump with drop tube assembly

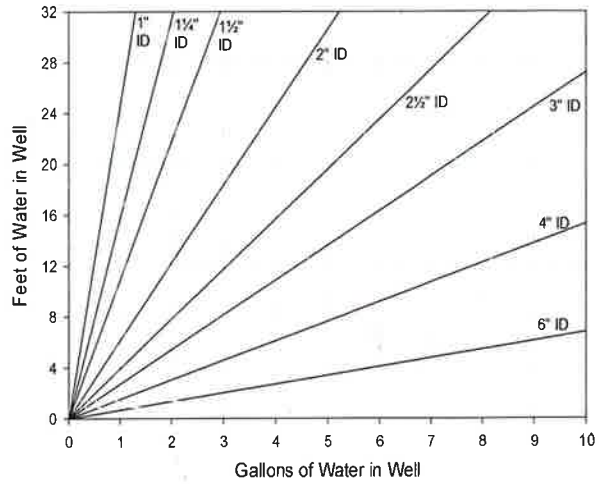
Sample ID	Container type	No. of containers	Preservation	Analysis Req.	Time
RE118D1-GW-06242015	40-mL vials	3	HCl	VOCs	1030
" "	1-L amber	2	none	1,4-Dioxane	1030

Comments

Signature

RE118D1
2 of 2

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

1 screen volume

15 ft = 37.1 L / 9.8 G
20 ft = 49.6 L / 13.1 G
25 ft = 61.7 L / 16.3 G

Well ID: RE118 D1

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
0930		15.69	7.96	0.036	5.06	381.5	24.5	600	27.50	CLEAR / NONE
0940	9 GAL	15.58	7.95	0.036	2.29	387.2	20.2	600	27.50	" "
0950		15.66	7.93	0.036	1.99	381.4	16.5	600	27.50	" "
1000		15.70	7.90	0.036	1.70	375.1	16.2	600	27.52	" "
1010		15.69	7.91	0.036	1.64	376.7	14.8	600	27.52	" "
1070		15.67	7.90	0.036	1.63	376.9	10.1	600	27.52	" "
1025		15.61	7.90	0.036	1.63	378.7	—	600	27.53	" "
1070										Sample #1

RESOLUTION CONSULTANTS

Well ID: RE11701

Low Flow Ground Water Sample Collection Record

Client: Navy NWIRP Bethpage
Project No: 60266526
Site Location: Susan Ct.
Weather Conds: High 80°F, P cloudy

Date: 6 / 25 /15
Time: Start 1215 am/pm
Finish _____ am/pm
Collector(s): JC / GH

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length: 575 ft
b. Water Table Depth: 25.18 ft
c. Length of Water Column: 549.82 ft
d. Calculated System Volume (see back) 16.3
Casing Diameter/Material 4-inch PVC

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump with drop tube assembly

b. Acceptance Criteria defined (see workplan)
- Temperature ± 3%
- pH ± 0.1 unit
- Sp. Cond. ± 3%
- D.O. ± 10% (values >0.5 mg/L)
- ORP ± 10mV
- Drawdown <0.3'
- Turbidity ± 10%
- Remove a minimum 1 screen volume

c. Field Testing Equipment used: Make Model Serial Number

Time (24hr)	Volume Removed (liters)	Temp (°C)	pH	Sp. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color / Odor
1225		17.96	3.61	0.041	4.61	395.0	155	600	25.21	cloudy / none
1235		17.77	3.35	0.039	2.82	416.8	152	600	25.20	"
1245		17.17	2.41	0.030	3.08	471.6	68.3	600	25.19	"
1255	5 gallons	17.10	2.14	0.030	3.14	494.5	46.9	600	25.18	"
1305		17.39	2.25	0.030	3.03	493.9	32.9	600	25.18	"
1315		17.28	3.06	0.050	2.89	462.5	24.7	900	25.18	"
1325	10 gal	17.35	3.17	0.030	3.00	454.5	15.0	900	25.19	"

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☒	☐	☐
Has required turbidity been reached	☒	☐	☐
Have parameters stabilized	☒	☐	☐

If no or N/A - Explain below.

3. SAMPLE COLLECTION:

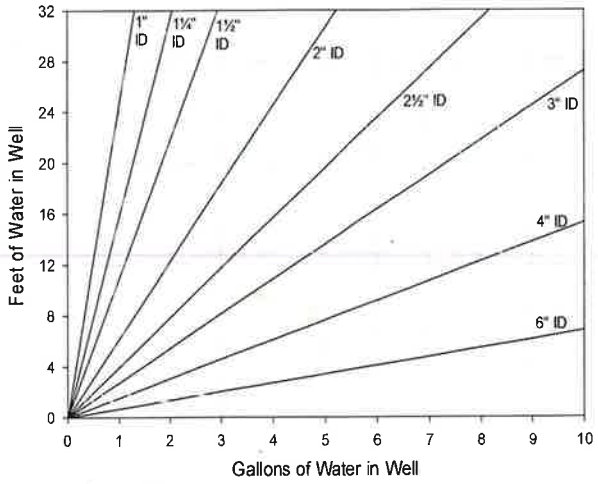
Method: Geotech bladder pump with drop tube assembly

Sample ID	Container type	No. of containers	Preservation	Analysis Req.	Time
RE11701-GW-06252015	40-mL vials	3	HCl	VOCs	1410
RE11701-GW-06252015	1-L amber	2	none	1,4-Dioxane	1418

Comments

Signature

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

1 screen volume

15 ft = 37.1 L / 9.8 G
20 ft = 49.6 L / 13.1 G
25 ft = 61.7 L / 16.3 G

Well ID: RE117D1

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
1335		16.92	3.10	0.030	—	—	14.0	800	25.15	Clear/none
1345		16.78	2.91	0.029	3.12	467.2	9.57	800	25.15	"
1355	15 gal	16.71	3.21	0.030	3.08	448.5	8.82	800	25.15	"
1405		16.47	3.27	0.029	3.11	450.6	7.46	800	25.14	"
1410										Sample

Well ID: RE119-D1
715-746' screen

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: Navy NWIRP Bethpage
Project No: 60266526
Site Location: Joseph Williams Rd (Massapequa)
Weather Conds:

Date: 8/12/15
Time: Start 1000 am/pm
Finish 1145 am/pm
Collector(s): G. Hicks

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length: _____ ft
b. Water Table Depth: 25.60 @ 0915 ft
c. Length of Water Column: _____ ft
d. Calculated System Volume (see back) _____

Casing Diameter/Material: 4-inch PVC

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump with drop tube assembly

b. Acceptance Criteria defined (see workplan)
- Temperature ± 3%
- pH ± 0.1 unit
- Sp. Cond. ± 3%
- D.O. ± 10% (values >0.5 mg/L)
- ORP ± 10mV
- Drawdown <0.3'
- Turbidity ± 10%
- Remove a minimum 1 screen volume

c. Field Testing Equipment used:

Make	Model	Serial Number
YSI	556 MPS	14J101207
HANNA	HI 98703	986362

Time (24hr)	Volume Removed (liters)	Temp (°C)	pH	Sp. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color / Odor
1015		15.88	5.01	0.038	2.73	113.9		650	25.57	Slightly cloudy/none
1020		15.69	5.09	.035	1.95	117.2		700	25.57	Slightly cloudy
1025		15.64	4.98	.032	1.60	116.2		650	25.57	Slightly cloudy
1030		15.53	4.76	.030	1.28	115.8		650	25.57	Slightly cloudy, shiny particles
10:35		15.57	4.61	.029	.97	115.5		700	25.57	Slightly, cloudy shiny particles
10:40		15.63	4.5	.028	.85	115.4	391	650	25.57	Slightly cloudy shiny particles
10:45		15.45	4.47	.027	.80	114.9	300	500	25.57	Slightly cloudy/shimmer

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☒	☐	☐
Has required turbidity been reached	☒	☐	☐
Have parameters stabilized	☒	☐	☐

If no or N/A - Explain below.

3. SAMPLE COLLECTION:

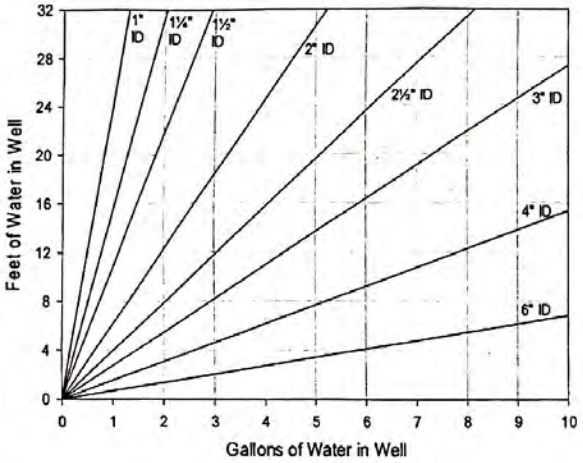
Method: Geotech bladder pump with drop tube assembly

Sample ID	Container type	No. of containers	Preservation	Analysis Req.	Time
RE119D1-GW-081215	40-mL vials	3	HCl	VOCs	1145
RE119D1-GW-081215	1-L amber	2	none	1,4-Dioxane	1145
RE11901-GW-MSMSD-081215	1L amber	4	none	1,4 Dioxane	1145
RE11901-GW-MSMSD-081215	40mL vial	6	HCl	VOCs	1145

Comments

Signature

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

1 screen volume

15 ft = 37.1 L / 9.8 G
20 ft = 49.6 L / 13.1 G
25 ft = 61.7 L / 16.3 G

Well ID:

(continued from front)

Time (24 hr)	Volume Removed ~~(Liters)~~	Temp (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
10:50		15.5	4.42	.027	.74	114.6	256	700	25.57	Slightly cloudy/shimmer
11:00		15.11	4.4	.026	.70	114.4	169	750	25.57	Slightly cloudy/shimmer
11:05		15.56	4.42	.026	.79	115.8	176	700	25.57	Slightly cloudy/shimmer
11:10		15.5	4.47	.026	.67	114.8	122	700	25.57	Slightly cloudy/shimmer
11:15		15.5	4.52	.026	.63	112.1	90	700mL	25.57	Slightly Cloudy/shimmer
11:20		15.62	4.49	.025	.59	112.5	73.3	600	~~25.57~~ 25.57	Slightly cloudy/shimmer
11:25		15.68	4.48	.025	.56	112.1	64.2	650	25.57	Slightly Cloudy/shimmer
11:30		15.62	4.53	.025	.58	111.5	65.9	650	25.57	Slightly Cloudy/shimmer
11:35		15.63	4.56	.025	.60	111.2	58.5	600	25.57	more clear
11:40		15.6	4.59	.025	.58	110.7	60.1	600	25.57	more clear
11:45	1Bag	15.71	4.64	.025	.52	108.8	48.8	600	25.57	clear a little cloudy

Well ID: BPOW5-7

RESOLUTION CONSULTANTS

Low Flow Ground Water Sample Collection Record

Client: Navy NWIRP Bethpage
Project No: 60266526
Site Location: BPOW5-7
Weather Conds: Sunny 84°F, Slight wind 3mph NNW
Date: 8/12/15
Time: Start 11:20 am/pm
Finish _____ am/pm
Collector(s): E. Bell

1. WATER LEVEL DATA: (measured from Top of Casing)

a. Total Well Length: 555 ft
b. Water Table Depth: 25.10 ft
c. Length of Water Column: _____ ft
d. Calculated System Volume (see back) _____
Casing Diameter/Material: 4-inch PVC

2. WELL PURGE DATA

a. Purge Method: Geotech bladder pump with drop tube assembly

b. Acceptance Criteria defined (see workplan)
- Temperature ± 3%
- pH ± 0.1 unit
- Sp. Cond. ± 3%
- D.O. ± 10% (values >0.5 mg/L)
- ORP ± 10mV
- Drawdown <0.3'
- Turbidity ± 10%
- Remove a minimum 1 screen volume

c. Field Testing Equipment used:

	Make	Model	Serial Number
	Hanna	HI 98703	7863 62
	WSI	556 MPS	14C.100355

Time (24hr)	Volume Removed (liters)	Temp (°C)	pH	Sp. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color / Odor
11:25	350	19.28	5.40	.051	5.86	160.8	19.7	~~350~~ 350	25.10	Clear / None
11:35	—	19.59	5.25	.049	2.70	147.5	—	350	25.10	Slightly cloudy / None
11:40	—	19.25	5.80	.085	1.51	113.0	>1100	475	25.08	muddy, opaque / None
11:45	—	19.14	5.53	.066	.89	124.8	>1100	450	25.09	muddy, opaque / None Very Cloudy
11:00	—	19.31	5.45	.061	.78	127.4	>1100	450	25.08	muddy, nearly opaque / None Very cloudy
11:55	—	18.96	5.38	.055	.68	135.0	>1100	450	25.08	very muddy / None cloudy
12:00	—	19.09	5.32	.53	.63	139.2	>1100	475	25.05	very clearing up cloudy, slightly / None

(continued on back)

d. Acceptance criteria pass/fail

	Yes	No	N/A
Has required volume been removed	☒	☐	☐
Has required turbidity been reached	☐	☒	☐
Have parameters stabilized	☒	☐	☐

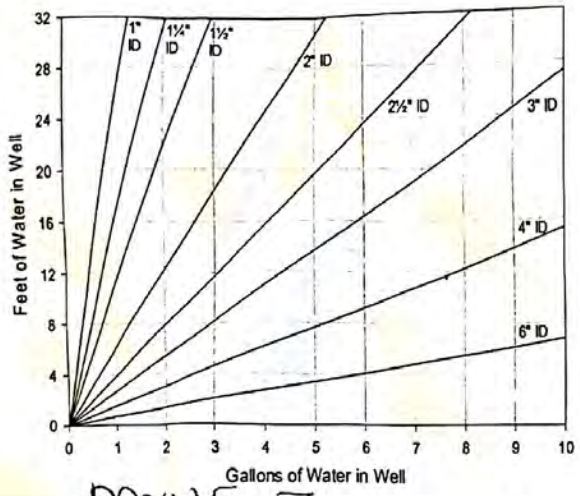
If no or N/A - Explain below.
Turbidity stable after 3hrs + 1 screen volume

3. SAMPLE COLLECTION: Method: Geotech bladder pump with drop tube assembly

Sample ID	Container type	No. of containers	Preservation	Analysis Req.	Time
BPOW5-7-GW081215	40-mL vials	3	HCl	VOCs	14:35
BPOW5-7-GW081215	1-L amber	2	none	1,4-Dioxane	14:35
GW-Dupe-081215	40-mL vials	3	HCL	VOCs	14:35
GW-Dupe-081215	1-L ambers	2	None	1,4 Dioxane	14:35

Comments:

Purge Volume Calculation



Volume / Linear Ft. of Pipe		
ID (in)	Gallon	Liter
0.25	0.0025	0.0097
0.375	0.0057	0.0217
0.5	0.0102	0.0386
0.75	0.0229	0.0869
1	0.0408	0.1544
1.25	0.0637	0.2413
1.5	0.0918	0.3475
2	0.1632	0.6178
2.5	0.2550	0.9653
3	0.3672	1.3900
4	0.6528	2.4711
6	1.4688	5.5600

1 screen volume

15 ft = 37.1 L / 9.8 G
20 ft = 49.6 L / 13.1 G
25 ft = 61.7 L / 16.3 G

Well ID: BPOW5-7

(continued from front)

Time (24 hr)	Volume Removed (Liters)	Temp (°C)	pH	Spec. Cond. (mS/cm)	DO (mg/L)	ORP (mV)	Turbidity (NTU)	Flow Rate (ml/min)	Depth to water (ft)	Color/Odor
12:05	5 GAL	19.33	5.28	.051	.59	143.4	366	500	—	Geoprobe Cleaner Slight Silt / None
12:15	—	17.96	5.16	.047	.65	160.0	317	650	25.06	Silver Light Grey / None
12:20	—	18.01	5.23	.047	.49	150.2	297	656	25.05	Cloudy Silt sized particulates / None
12:25	—	17.87	5.25	.046	.44	149.3	269	675	25.07	Cloudy / silt sized particles / None
12:30	—	18.09	5.26	.045	.39	150.0	210	525	—	Cloudy / None, No visible particulates
12:35	10 GAL	18.14	5.20	.045	.34	151.2	215	650	25.02	Cloudy Silt / None Very fine sized particules
12:40	—	18.19	5.24	.045	.33	150.7	224	625	25.02	Cloudy / None Very small visable particules
12:45	—	18.20	5.23	.045	.30	153.2	229	650	25.00	very fine visable particules / None
12:50	—	18.26	5.26	.045	.26	152.6	210	675	—	very fine particules visable / None
13:00	—	18.49	5.24	.044	.28	155.8	202	750	25.00	Cloudy no visable particules / None
13:05	—	19.13	5.28	.045	.28	152.6	204	500	25.00	Cloudy No visable particles / None
13:10	15 GAL	19.02	5.27	.045	.31	154.6	142	500	25.00	Cloudy No visable particles / None
13:25	—	19.40	5.28	.045	.35	154.7	105	500	—	Slightly cloudy / None
13:30	—	19.49	5.27	.045	.34	155.3	140	500	24.95	Slightly Cloudy / None
13:40	—	19.55	5.29	.045	.28	153.8	132	450	24.95	Slightly Cloudy / None
13:45	—	19.45	5.29	.045	.24	152.6	126	450	24.94	Slightly Cloudy / None
13:55	20 GAL	18.02	5.23	.043	.21	158.0	118	400	24.95	Slightly Cloudy / None
14:00	—	19.34	5.29	.044	.19	154.5	97.7	450	24.90	Slight Cloudy / None
14:05	—	18.90	5.25	.044	.19	156.8	109	450	24.90	Slight Cloudy / None
14:10	—	19.37	5.30	.044	.18	153.6	120	400	24.90	Slightly Cloudy / None
14:15	—	19.58	—	—	—	—	107	—	—	—
14:20	—	19.37	5.30	.044	.18	153.2	97.8	400	"	Slightly Cloudy / None
14:25	28 GAL	18.28	5.27	.043	.18	155.2	98.3	400	24.89	

Add Flow rate CPM 3 14.0/6.0

Add Flow CPM 3 15/5.0

Section 4

Analytical Data Validation

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage
Laboratory:	Katahdin Analytical
Sample Delivery Group:	SI3416
Analyses/Method:	Volatile Organic Compounds by U.S. EPA SW-846 Method 8260C 1,4-Dioxane by U.S. EPA SW-846 Method 8270D via Selective Ion Monitoring (SIM)
Validation Level:	3
Project Number:	0888812477.SA.DV
Prepared by:	Dana Miller/Resolution Consultants Completed on: 07/17/2015
Reviewed by:	Tina Cantwell/Resolution Consultants File Name: SI3416_8260C_8270D

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 20 to 21 May 2015 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants, April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants, November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants, August 2014).

Sample ID	Matrix/Sample Type	Analysis
BPOW5-4-GW-052015	Groundwater	8260C/8270D_SIM
TRIPBLANK 1-052115	Trip Blank	8260C
RE117D1-GW-052015	Groundwater	8260C/8270D_SIM
DUP-GW-052015	Field Duplicate	8260C/8270D_SIM
RE117D2-GW-052015	Groundwater	8260C/8270D_SIM

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 8260C, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry* (United States Environmental Protection Agency [U.S. EPA] 2006), *SW-846 Method 8270D, Semivolatile Organic*

Compounds by Gas Chromatograph/Mass Spectrometry (U.S. EPA 2007), *U.S. Environmental Protection Agency Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (U.S. EPA, June 2008), and Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October 2010). In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements, and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

- ✓ Data completeness (chain-of-custody)/sample integrity
- ✓ Holding times and sample preservation
- ✓ Gas chromatography/Mass spectrometer performance checks
- ✗ Initial calibration (ICAL)/continuing calibration verification (CCV)
- ✓ Laboratory blanks/trip blanks
- ✓ Surrogate spike recoveries
- ✗ Matrix spike (MS) and/or matrix spike duplicate (MSD) results
- ✗ Laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) results
- ✓ Field duplicates
- ✓ Internal standards
- ✓ Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further. The symbol (✗) indicates that a QC non-conformance resulted in the qualification of data. Any QC non-conformance that resulted in the qualification of data is discussed below.

RESULTS

Initial Calibration/Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- The ICAL percent relative standard deviation, correlation coefficient/coefficient of determination, and/or response factor method acceptance criteria were met
- The initial calibration verification standard percent recovery acceptance criteria were met
- The CCV method percent difference or percent drift and response factor acceptance criteria were met
- The retention time method acceptance criteria were met

Data qualification to the analytes associated with the specific calibration verification was as follows:

ICAL Linearity Non-conformance:

Criteria	Actions	
	Detected Results	Non-detected Results
%RSD >15% and quantitation based on mean response factor (RF)	J	UJ

Notes:
RSD = Relative standard deviation
J = Estimated
UJ = Undetected and estimated

CCV Linearity Non-conformance:

Criteria	Actions	
	Detected Results	Non-detected Results
%Difference or %Drift > 20%	J	UJ

Notes:
J = Estimated
UJ = Undetected and estimated

ICAL and CCV non-conformances are summarized in Attachment A in Tables A-1 and A-2.

Matrix Spike/Matrix Spike Duplicate Results

MS/MSDs are generated to provide information about the effect of each sample matrix on the sample preparation and the measurement methodology. MS/MSD percent recoveries (%Rs) assess the effect of the sample matrix on the accuracy of the analytical results and %Rs above the recovery control limits could indicate a potential high result bias while %Rs below the recovery QC limits could indicate a potential low result bias. The relative percent differences between the MS and MSD results are evaluated to assess sample precision. The MS/MSD %Rs and relative percent differences were reviewed for conformance with the QC acceptance criteria. Non-conformances are summarized in Attachment A in Table A-3. Data qualification to the analytes associated with the specific MS/MSD non-conformances were as follows:

MS/MSD Non-conformances:

Criteria	Action	
	Detected Compounds	Non-detected Compounds
%R>Upper Limit	J	No qualification
20% ≤ %R < Lower Limit	J	UJ
%R <20%	J	Rejected
The MS/MSD recovery control limits do not apply for the MS/MSD performed on sample locations where the analyte concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.		

Notes:
%R = Percent recovery
RPD = Relative percent difference
J = Estimated
UJ = Undetected and estimated

Laboratory Control Samples / Laboratory Control Sample Duplicate

LCS %Rs is used to monitor the overall accuracy and performance of each step during analysis, including sample preparation. The laboratory analyzed LCSs in duplicate when MS/MSDs were not reported in individual SDGs. In these instances, the laboratory determined precision between the duplicated values. Non-conformances are summarized in Attachment A in Table A-4. Data qualification to the analytes associated with the specific LCS / LCS duplicate was as follows:

Laboratory Control Sample / Laboratory Control Sample Duplicate Non-conformance:

Criteria	Action	
	Detected Compounds	Non-detected Compounds
%R or RPD > UL	J	No qualification
%R < LL	J	UJ
%R < 20%	J	Rejected

Notes:

%R	=	Percent recovery
RPD	=	Relative percent difference
UL	=	Upper limit
LL	=	Lower limit
J	=	Estimated
UJ	=	Undetected and estimated

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

Two dichlorodifluoromethane non-detect results were rejected in associated samples BPOW5-4-GW-052015 and RE117D2-GW-052015 due to %R < 20% in the LCS. Data not qualified during data review are considered usable by the project. The remaining results qualified as estimated may be high or low, but the data are usable for their intended purpose, according to U.S. EPA and Department of Defense guidelines. Laboratory analysis for this project had a completeness goal greater than 95% to account for unanticipated results that may be rejected during data validation. A total of 329 measurements were analyzed. Of this total, 327 measurements were considered valid and 2 measurements were rejected (flagged "R"). Analytical completeness was calculated to be 99.4%. Therefore, the analytical data met the project analytical completeness goal of 95%.Final data review qualifiers used to describe results and how they should be interpreted by the end data user are provided in Attachment B and Attachment C. Attachment D provides final results after data review.

ATTACHMENTS

Attachment A: Non-Conformance Summary Tables
Attachment B: Qualifier Codes and Explanations
Attachment C: Reason Codes and Explanations
Attachment D: Final Results after Data Review

Attachment A
Non-Conformance Summary Tables

Table A-1
Initial Calibration Linearity Non-Conformance

Method	Analyte	ICAL ID	%RSD	Limit	Associated Samples	Qualifier
8260C	Chloroethane	GCMS	32.49915	≤15%	BPOW5-4-GW-052015	UJ
8260C	Chloroethane	GCMS	32.49915	≤15%	TRIPBLANK 1-052115	UJ
8260C	Chloroethane	GCMS	32.49915	≤15%	RE117D1-GW-052015	UJ
8260C	Chloroethane	GCMS	32.49915	≤15%	DUP-GW-052015	UJ
8260C	Chloroethane	GCMS	32.49915	≤15%	RE117D2-GW-052015	UJ

Notes:
ICAL ID = Initial calibration identification
%RSD = Relative standard deviation
GCMS = Gas chromatography/mass spectrometer
UJ = Non-detected analyte in associated sample qualified estimated "UJ" due to potential bias

Table A-2
Continuing Calibration Verification Non-Conformance

Method	Analyte	CCV ID	%D	Limit	Associated Samples	Qualifier
8260B	Chloroethane	P1061.D	20.84107	20	TRIPBLANK 1-052115	UJ
8260B	Chloroethane	P1061.D	20.84107	20	RE117D1-GW-052015	UJ
8260B	Chloroethane	P1061.D	20.84107	20	DUP-GW-052015	UJ
8260B	Chloroethane	P1107.D	20.74386	20	BPOW5-4-GW-052015	UJ
8260B	Chloroethane	P1107.D	20.74386	20	RE117D2-GW-052015	UJ

Notes:
CCV ID = Continuing calibration verification identification
%D = Percent difference
UJ = Non-detected analyte in associated sample qualified estimated "UJ" due to potential bias

Table A-3
Matrix Spike/Matrix Spike Duplicate Non-Conformance

Spiked Sample	Analyte	Sample Result (µg/L)	Spike Added	MS %R	MSD %R	%R Limits	Qualifier
BPOW5-4-GW-052015	Xylenes, total	1.5 U	150	79.3*	107	89-116	UJ
BPOW5-4-GW-052015	1,2-Dichloroethene, total	1.0 U	100	83*	109	84-121	UJ

Notes:
µg/L = Micrograms per liter
MS = Matrix spike
MSD = Matrix spike duplicate
%R = Percent recovery
Bold* = Percent recovery less than lower control limit
U = Non-detect
UJ = Non-detected analyte in associated sample qualified estimated "UJ"

Table A-4 Laboratory Control Sample / Laboratory Control Sample Duplicate Non-Conformance						
Associated Sample	**Analyte**	**Batch**	**Sample Results (µg/L)**	**%R**	**Limits**	**Qualifier**
BPOW5-4-GW-052015	Dichlorodifluoromethane	WG163531	1.0 U	**18.2***	30-155	UR
RE117D2-GW-052015	Dichlorodifluoromethane	WG163531	1.0 U	**18.2***	30-155	UR

Notes:

µg/L = Micrograms per liter
%R = Percent recovery
Bold* = Percent recovery less than lower control limit
UR = Non-detected analyte in associated sample qualified rejected "UR"

Attachment B
Qualifier Codes and Explanations

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
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 quantitation limit necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.
R	The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Attachment C
Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
bt	Trip blank contamination
c	Calibration issue
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate relative percent difference
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration
l	Laboratory control sample
lc	Labeled compound recovery
ld	Laboratory duplicate relative percent difference
lp	Laboratory control sample/laboratory control sample duplicate relative percent difference
m	Matrix spike recovery
mc	Method compliance non-conformance
md	Matrix spike/matrix spike duplicate relative percent difference
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column relative percent difference
q	Quantitation issue
s	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	Interference check sample results (metals)

Attachment D
Final Results after Data Review

		Sample Delivery Group		SI3416		
		Lab ID		SI3416-1RA2		
		Sample ID		BPOW5-4-GW-052015		
		Sample Date		5/20/2015		
		Sample Type		Groundwater		
Method	**Analyte**	**CAS No**	**Units**	**Result**	**Qual**	**RC**
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	UJ	m
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	1.4	J	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UR	l
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	3.4		
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	UJ	m
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.68		

		Sample Delivery Group		SI3416		
		Lab ID		SI3416-2		
		Sample ID		TRIP BLANK 1-052115		
		Sample Date		5/21/2015		
		Sample Type		Trip Blank		
Method	**Analyte**	**CAS No**	**Units**	**Result**	**Qual**	**RC**
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	NA		

		Sample Delivery Group		SI3416		
		Lab ID		SI3416-3		
		Sample ID		RE117DI-GW-052015		
		Sample Date		5/20/2015		
		Sample Type		Groundwater		
Method	**Analyte**	**CAS No**	**Units**	**Result**	**Qual**	**RC**
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	3.5		
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	8.4		
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.18	U	

		Sample Delivery Group		SI3416		
		Lab ID		SI3416-4		
		Sample ID		DUP-GW-052015		
		Sample Date		5/20/2015		
		Sample Type		Field Duplicate		
Method	**Analyte**	**CAS No**	**Units**	**Result**	**Qual**	**RC**
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	3.4		
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	8.7		
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.17	U	

		Sample Delivery Group		SI3416		
		Lab ID		SI3416-5RA2		
		Sample ID		RE117D2-GW-052015		
		Sample Date		5/20/2015		
		Sample Type		Groundwater		
Method	**Analyte**	**CAS No**	**Units**	**Result**	**Qual**	**RC**
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	1.4	J	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UR	l
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	5.1		
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.17	U	

Notes:
UG_L = Micrograms per liter
NA = Not analyzed
Qual = Final qualifier (Refer to Attachment B)
RC = Reason code (Refer to Attachment C)

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Group:	SI4556	
Analyses/Method:	Volatile Organic Compounds by U.S. EPA SW-846 Method 8260C 1,4-Dioxane by U.S. EPA SW-846 Method 8270D via Selective Ion Monitoring (SIM)	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 07/30/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SI4556_8260C_8270D

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage Site on 24 and 25 June 2015 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants, April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants, November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants, August 2014).

Sample ID	Matrix/Sample Type	Analysis
BPOW5-6-GW-062415	Groundwater	8260C/8270D_SIM
BPOW5-5-GW-062415	Groundwater	8260C/8270D_SIM
RE118D1-GW-062415	Groundwater	8260C/8270D_SIM
RE108D1-GW-062415	Groundwater	8260C/8270D_SIM
RE108D2-GW-062415	Groundwater	8260C/8270D_SIM
BPOW6-5-GW-062515	Groundwater	8260C/8270D_SIM
BPOW6-6-GW-062515	Field Duplicate	8260C/8270D_SIM
RE117D1-GW-062515	Groundwater	8260C/8270D_SIM
TRIPBLANK-062515	Trip Blank	8260C

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 8260C, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry* (United States Environmental Protection Agency [U.S. EPA] 2006), *SW-846 Method 8270D, Semivolatile Organic Compounds by Gas Chromatograph/Mass Spectrometry* (U.S. EPA 2007), *U.S. Environmental Protection Agency Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (U.S. EPA, June 2008), and *Department of Defense Quality Systems Manual for Environmental Laboratories*, Version 4.2 (October 2010). In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements, and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

✓	Data completeness (chain-of-custody)/sample integrity
✓	Holding times and sample preservation
✓	Gas chromatography/Mass spectrometer performance checks
✗	Initial calibration verification (ICV)/continuing calibration verification (CCV)
✓	Laboratory blanks/trip blanks
✓	Surrogate spike recoveries
NA	Matrix spike and/or matrix spike duplicate results
✓	Laboratory control sample/laboratory control sample duplicate results
NA	Field duplicates
✓	Internal standards
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further. The symbol (✗) indicates that a QC non-conformance resulted in the qualification of data. Any QC non-conformance that resulted in the qualification of data is discussed below.

RESULTS

Initial Calibration/Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- The initial calibration percent relative standard deviation, correlation coefficient/coefficient of determination, and/or response factor method acceptance criteria were met
- The ICV standard percent recovery acceptance criteria were met
- The CCV method percent difference or percent drift and response factor acceptance criteria were met
- The retention time method acceptance criteria were met

Data qualification to the analytes associated with the specific calibration verification was as follows:

ICV Recovery Non-conformance:

Criteria	Actions	
	Detected Results	Non-detected Results
Recovery >120%	J	UJ
Recovery < 80%	J	UJ

Notes:
J = Estimated
UJ = Undetected and estimated

ICV non-conformances are summarized in Attachment A in Table A-1.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were rejected; therefore, analytical completeness was calculated to be 100 percent. Data not qualified during data review are considered usable by the project. The remaining results qualified as estimated may be high or low, but the data are usable for their intended purpose, according to U.S. EPA and Department of Defense guidelines. Final data review qualifiers used to describe results and how they should be interpreted by the end data user are provided in Attachment B and Attachment C. Attachment D provides final results after data review.

ATTACHMENTS

Attachment A: Non-Conformance Summary Tables
Attachment B: Qualifier Codes and Explanations
Attachment C: Reason Codes and Explanations
Attachment D: Final Results after Data Review

Attachment A
Non-Conformance Summary Table

Table A-1
Initial Calibration Verification Non-Conformance

Method	Analyte	ICV ID	%R	Limit	Associated Samples	Qualifier
8260C	Chloroethane	P1539A	127.5	80-120	BPOW5-6-GW-062415	UJ
8260C	Chloroethane	P1539A	127.5	80-120	BPOW5-5-GW-062415	UJ
8260C	Chloroethane	P1539A	127.5	80-120	RE118D1-GW-062415	UJ
8260C	Chloroethane	P1539A	127.5	80-120	RE108D1-GW-062415	UJ
8260C	Chloroethane	P1539A	127.5	80-120	RE108D2-GW-062415	UJ
8260C	Chloroethane	P1539A	127.5	80-120	BPOW6-5-GW-062515	UJ
8260C	Chloroethane	P1539A	127.5	80-120	BPOW6-6-GW-062515	UJ
8260C	Chloroethane	P1539A	127.5	80-120	RE117D1-GW-062515	UJ
8260C	Chloroethane	P1539A	127.5	80-120	TRIPBLANK-062515	UJ

Notes:
ICV ID = Initial calibration verification identification
%R = Percent recovery
UJ = Non-detected analyte in associated sample qualified estimated "UJ" due to potential bias

Attachment B
Qualifier Codes and Explanations

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
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 quantitation limit necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Attachment C
Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
bt	Trip blank contamination
c	Calibration issue
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate relative percent difference
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration
l	Laboratory control sample
lc	Labeled compound recovery
ld	Laboratory duplicate relative percent difference
lp	Laboratory control sample/laboratory control sample duplicate relative percent difference
m	Matrix spike recovery
mc	Method compliance non-conformance
md	Matrix spike/matrix spike duplicate relative percent difference
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column relative percent difference
q	Quantitation issue
s	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	Interference check sample results (metals)

Attachment D
Final Results after Data Review

		Sample Delivery Group		SI4556		
		Lab ID		SI4556-1		
		Sample ID		BPOW5-6-GW-062415		
		Sample Date		6/24/2015		
		Sample Type		Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	12		
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	0.74	J	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.45	J	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.17	U	

		Sample Delivery Group		SI4556		
		Lab ID		SI4556-2		
		Sample ID		BPOW5-5-GW-062415		
		Sample Date		6/24/2015		
		Sample Type		Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	8		
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.18	U	

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI4556 SI4556-3 RE118D1-GW-062415 6/24/2015 Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.7	J	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	0.38	J	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.18	U	

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI4556 SI4556-4 RE108D1-GW-062415 6/24/2015 Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	1		
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	0.34	J	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.34	J	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	1.4		
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	110		
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	5.2		

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI4556 SI4556-5 RE108D2-GW-062415 6/24/2015 Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.98	J	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	6.8		
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	1.8		
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	4.6		
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	6.6		
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	8.1		
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	1.5		
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	3.5		
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	8.1		
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	2.2		
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	3900		
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	6.1		

		Sample Delivery Group		SI4556		
		Lab ID		SI4556-6RA		
		Sample ID		BPOW6-5-GW-062515		
		Sample Date		6/25/2015		
		Sample Type		Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	0.76	J	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.17	U	

		Sample Delivery Group		SI4556		
		Lab ID		SI4556-7RA		
		Sample ID		BPOW6-6-GW-062515		
		Sample Date		6/25/2015		
		Sample Type		Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	1		
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.17	U	

		Sample Delivery Group		SI4556		
		Lab ID		SI4556-8		
		Sample ID		RE117D1-GW-062515		
		Sample Date		6/25/2015		
		Sample Type		Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.1	J	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	7.8		
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.17	U	

		Sample Delivery Group		SI4556		
		Lab ID		SI4556-9		
		Sample ID		TRIPBLANK-062515		
		Sample Date		6/24/2015		
		Sample Type		Trip Blank		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	NA		

Notes:
UG_L = Micrograms per liter
NA = Not analyzed
Qual = Final qualifier (Refer to Attachment B)
RC = Reason code (Refer to Attachment C)

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Groups:	SI1453	
Analyses/Method:	Total Organic Carbon (TOC) by U.S. EPA SW-846 Method 9060A and Standard Method 5310B for Total Organic Carbon by High-Temperature Combustion	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 04/31/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SI1453_9060A_5310B

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 9 March 2015 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants August 2014).

Sample ID	Lab ID	Matrix/Sample Type	Analysis
RE117D2-SOIL-030915-788-790	SI1453-1	Soil	9060A
RE117D2-EB-030915	SI1453-2	Equipment Blank	5310B

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 9060A, Total Organic Carbon* (U.S. EPA, 1996), *Method SM5310B, Total Organic Carbon by High-Temperature Combustion, U.S. Environmental Protection Agency (U.S. EPA) Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (NFG, January 2010, and Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 4.2 (October 2010). In

the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

✓	Data completeness (chain-of-custody)/sample integrity
✓	Holding times and sample preservation
✓	Gas chromatography/Mass spectrometer performance checks
✓	Initial calibration/continuing calibration verification
✓	Laboratory blanks/equipment blanks/field blanks/trip blanks
NA	Surrogate spike recoveries
✓	Matrix spike and/or matrix spike duplicate results
✓	Laboratory control sample laboratory control sample duplicate results
NA	Field duplicates
NA	Internal standards
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were qualified during this review. Analytical completeness was calculated to be 100% and the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Katahdin Analytical discovered a QC error in Total Organic Carbon calculations, informed us, and has implemented corrective action provided in Attachment A. Attachment B provides final results after data review.

ATTACHMENTS

Attachment A: Katahdin Analytical Corrective Action Report

Attachment B: Final Results after Data Review

Attachment A
Katahdin Analytical Corrective Action Report

KATAHDIN ANALYTICAL SERVICES, INC. – CORRECTIVE ACTION REPORT

Problem Identification (Person initiating CAR) Name: Leslie Dimond Date: 08/28/2015

Discovered by Laboratory X Discovered by Client (Complaint) Other

Details of Problem:

On August 28, 2015, a client called regarding several TOC results. They thought the results for their samples seemed to be off by a factor of ten. George Brewer looked into the matter and found that their sample results were calculated incorrectly. Calculations are set up to be performed automatically in KIMS. Each product code for a test contains information such as the method name, LOQ, LOD, MDL, limits and a specific process chain for reporting to the either the LOQ, LOD or MDL (i.e. three process chains). This process chain contains all of the calculations associated with a test including separate calculations for sample results, adjusted LOQs, LODs and MDLs, and results for QC samples. In October of 2014, a client asked why the lab was not adjusting LOQs, LODs and/or MDLs for the sample amount used, but only for an instrument dilution and total solids. The lab had felt that there wasn't really a standard weight amount, so this was not incorporated. After numerous discussions, the lab decided to change this and use 500 mg as the standard and to incorporate any different amount into the LOQ/LOD/MDL adjustment. MIS was asked to revise this TOC calculation in our Laboratory Information System (KIMS). The incorrect information was given to MIS, so the adjusted LOQ/LOD/MDL calculation was wrong.

The formula was: ADJ. LOQ/LOD/MDL = LOQ/LOD/MDL * DF * (Sample amount / 1000) * (100/TS).

During data review, sample results that are calculated automatically by KIMS, are checked at a frequency of 10% of all calculations. Sample results are checked in this manner, but adjusted limits are not necessarily checked. In December of 2014, a data reviewer noticed that some adjusted limits were not correct. This issue was reviewed with MIS, and it was discovered that the calculation was incorrect. It was corrected at this time and changed to:

ADJ. LOQ/LOD/MDL = LOQ/LOD/MDL * DF * (500 / Sample Amount) * (100/TS) (where 500 is the standard sample amount).

At the time this change was made, MIS was under the impression that the sample calculation was also incorrect and also needed to be corrected.

The formula for the sample result was: Results (ug/g) = $\frac{\text{Total carbon}}{\text{(sample amount / 1000)}}$ * (100/TS) (where 1000 is a conversion factor)

This was incorrectly changed to: Results (ug/g) = $\frac{\text{Total carbon}}{\text{(500 / Sample Amount)}}$ * TS

From December 29, 2014 to April 13, 2015, this error was often discovered during data review and manually corrected. The problem was not addressed with the MIS department. However, there were several cases where this error was not caught during data review and results were reported incorrectly. On April 13, 2015, this issue was brought to the attention of MIS and the sample calculation was corrected back to:

Results (ug/g) = $\frac{\text{Total carbon}}{\text{(sample amount / 1000)}}$ * (100/TS) (where 1000 is a conversion factor)

Blanks and LCSs were not affected by these changes because they are calculated using different calculations since total solids is not used in these situations. Duplicates and MS/MSD samples are also not affected because they use different calculations since these calculation strings involve recoveries, RPDs, etc.

Associated Non-Conformances: List logbook and page numbers

There are no non-conformances associated with this corrective action.

Root Cause Investigation & Determination (To be completed by Department Manager, Operations Manager and/or QA Officer)

Review the 6 "M's" below and investigate to determine whether one of them, or more than one, could be the cause of the problem.

Possible Causes	Details

KATAHDIN ANALYTICAL SERVICES, INC. – CORRECTIVE ACTION REPORT

Machine (Instrument)	KIMS – incorrect formulas were entered into the process chains for TOC in soil.
Method (or Process)	Katahdin's policy for data review: From the QAM: "For data that are reduced via computer, calculations are checked by the analyst (or designee) assigned to this task at a frequency designed to assure that the final data generation is valid." From SOP SD-904, Data Reduction, Review and Reporting: "All manual integrations, calculations and transcriptions are checked and 10% of all spreadsheet calculations are checked. The remainder of spreadsheet calculations is spot checked for potential anomalies." Katahdin does not have a formal process for handling calculation changes to process changes in KIMS. A verbal request is made to MIS and the change is made. Although the KIMS system does have an audit trail to track dates of changes and calculation changes, the request for these is not documented.
Materials	Not Applicable
Maintenance (Is something not working correctly?)	Not Applicable
Man (training, human error)	All personnel involved with data review are aware of the requirement to hand check 10% of the sample results. In some cases this appears to have been done and when the results did not calculate correctly, they were corrected in KIMS. There was no communication that the error may affect other batches of samples. In other sample batches, the 10% hand check must not have occurred.
Mother Nature (accidents, power issues, beyond our control)	Not Applicable

Corrective Action Plan: Name: Leslie Dimond Date: 08/28/2015

Details of Corrective Action Plan –

Querries were run through KIMS to generate lists for TOC in soil data entered into KIMS between two timeframes:

10/23/14 to 12/29/14 (incorrect LOQ/LOD/MDL adjustment) – 14 Work Orders were found in this timeframe

12/29/14 and 4/13/15 (incorrect sample calculation) - 16 Work Orders were found in this timeframe

The lab has reviewed all TOC in soil data from these time periods for accuracy. Some inaccurate data was found (as expected from the incorrect formulas). Some data was found to be correct. In these cases, MIS was able to determine, through the KIMS audit trail, that the data had been manually corrected.

A new form has been created for personnel to fill out when requesting calculation changes in KIMS. This form will ensure that MIS is clear on exactly what needs to be changed in KIMS. Through KIMS we are currently able to track formula changes (ie. the formula before and after the change) and when the change occurred. This new form will allow Katahdin to track the changes made by person requesting the change and why the change was necessary. Supervisor and QA/Management approval are required on these forms.

There also will be a mandatory retraining for all employees on Katahdin's policy for data review, stressing that 10% of all results generated from KIMS and spreadsheets need to be confirmed. Also, this retraining will stress the need for communication. If a problem is discovered with one batch of samples, then it might also be affecting other batches.

Additionally, when calculation changes are made, Katahdin must establish a time frame of 30 days or 10 workorders where

senior management or the Quality Assurance Officer must also check the new calculations.

Review & Approval of Corrective Action Plan

Supervisor Approval:	Date: 09.11.15
Operations Manager Approval: Deborah J. Nadeau	Date: 9.11.15
Quality Assurance Officer: Susie Dimond	Date: 09.11.15

Monitoring of Corrective Action (To be completed by QA Officer and/or Operations Manager): List details of follow-up

Corrective Action Effective	Return to Control – Yes No	Further Monitoring Needed/Additional Corrective Action

QA Approval: Date:

Additional Information:

Attachment B
Final Results after Data Review

			Sample Delivery Group	SI1453	
			Lab ID	SI1453-1	
			Sample ID	RE117D2-SOIL-030915-788-790	
			Sample Date	3/9/2015	
			Sample Type	Soil	
Method	Analyte	CAS No	Units	Result	Qual
9060A	TOTAL ORGANIC CARBON	-28	UG_G	110	J

Notes:
ID = Identification
UG_G = Micrograms per gram
Qual = Final qualifier
J = Estimated value

			Sample Delivery Group	SI1453	
			Lab ID	SI1453-2	
			Sample ID	RE117D2-EB-030915	
			Sample Date	3/9/2015	
			Sample Type	Equipment Blank	
Method	Analyte	CAS No	Units	Result	Qual
5310B	TOTAL ORGANIC CARBON	-28	MG_L	0.34	J

Notes:
ID = Identification
MG_L = Milligrams per liter
Qual = Final qualifier
J = Estimated value

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Groups:	SI1951	
Analyses/Method:	Total Organic Carbon (TOC) by U.S. EPA SW-846 Method 9060A and Standard Method 5310B for Total Organic Carbon by High-Temperature Combustion	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 05/12/2015 Revised on: 10/27/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SI1951_9060A_5310B

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 25 March 2015 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants August 2014).

Sample ID	Lab ID	Matrix/Sample Type	Analysis
RE117D1-SOIL-032515-740-742	SI1951-1	Soil	9060A
RE117D1-EB-032515	SI1951-2	Equipment Blank	5310B

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 9060A, Total Organic Carbon* (U.S. EPA, 1996), *Method SM5310B, Total Organic Carbon by High-Temperature Combustion, U.S. Environmental Protection Agency (U.S. EPA) Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (NFG, January 2010, and Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 4.2 (October 2010). In

the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

✓	Data completeness (chain-of-custody)/sample integrity
✓	Holding times and sample preservation
✓	Gas chromatography/Mass spectrometer performance checks
✓	Initial calibration/continuing calibration verification
✓	Laboratory blanks/equipment blanks/field blanks/trip blanks
NA	Surrogate spike recoveries
✓	Matrix spike and/or matrix spike duplicate results
✓	Laboratory control sample laboratory control sample duplicate results
NA	Field duplicates
NA	Internal standards
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were qualified during this review. Analytical completeness was calculated to be 100% and the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Katahdin Analytical discovered a QC error in Total Organic Carbon calculations, informed us, and has implemented corrective action provided in Attachment A. Attachment B provides final results after data review.

ATTACHMENTS

Attachment A: Katahdin Analytical Corrective Action Report

Attachment B: Final Results after Data Review

Attachment A
Katahdin Analytical Corrective Action Report

KATAHDIN ANALYTICAL SERVICES, INC. – CORRECTIVE ACTION REPORT

Problem Identification (Person initiating CAR) Name: Leslie Dimond Date: 08/28/2015

Discovered by Laboratory X Discovered by Client (Complaint) Other

Details of Problem:

On August 28, 2015, a client called regarding several TOC results. They thought the results for their samples seemed to be off by a factor of ten. George Brewer looked into the matter and found that their sample results were calculated incorrectly. Calculations are set up to be performed automatically in KIMS. Each product code for a test contains information such as the method name, LOQ, LOD, MDL, limits and a specific process chain for reporting to the either the LOQ, LOD or MDL (i.e. three process chains). This process chain contains all of the calculations associated with a test including separate calculations for sample results, adjusted LOQs, LODs and MDLs, and results for QC samples. In October of 2014, a client asked why the lab was not adjusting LOQs, LODs and/or MDLs for the sample amount used, but only for an instrument dilution and total solids. The lab had felt that there wasn't really a standard weight amount, so this was not incorporated. After numerous discussions, the lab decided to change this and use 500 mg as the standard and to incorporate any different amount into the LOQ/LOD/MDL adjustment. MIS was asked to revise this TOC calculation in our Laboratory Information System (KIMS). The incorrect information was given to MIS, so the adjusted LOQ/LOD/MDL calculation was wrong.

The formula was: ADJ. LOQ/LOD/MDL = LOQ/LOD/MDL * DF * (Sample amount / 1000) * (100/TS).

During data review, sample results that are calculated automatically by KIMS, are checked at a frequency of 10% of all calculations. Sample results are checked in this manner, but adjusted limits are not necessarily checked. In December of 2014, a data reviewer noticed that some adjusted limits were not correct. This issue was reviewed with MIS, and it was discovered that the calculation was incorrect. It was corrected at this time and changed to:

ADJ. LOQ/LOD/MDL = LOQ/LOD/MDL * DF * (500 / Sample Amount) * (100/TS) (where 500 is the standard sample amount).

At the time this change was made, MIS was under the impression that the sample calculation was also incorrect and also needed to be corrected.

The formula for the sample result was: Results (ug/g) = $\frac{\text{Total carbon}}{\text{(sample amount / 1000)}}$ * (100/TS) (where 1000 is a conversion factor)

This was incorrectly changed to: Results (ug/g) = $\frac{\text{Total carbon}}{\text{(500 / Sample Amount)}}$ * TS

From December 29, 2014 to April 13, 2015, this error was often discovered during data review and manually corrected. The problem was not addressed with the MIS department. However, there were several cases where this error was not caught during data review and results were reported incorrectly. On April 13, 2015, this issue was brought to the attention of MIS and the sample calculation was corrected back to:

Results (ug/g) = $\frac{\text{Total carbon}}{\text{(sample amount / 1000)}}$ * (100/TS) (where 1000 is a conversion factor)

Blanks and LCSs were not affected by these changes because they are calculated using different calculations since total solids is not used in these situations. Duplicates and MS/MSD samples are also not affected because they use different calculations since these calculation strings involve recoveries, RPDs, etc.

Associated Non-Conformances: List logbook and page numbers

There are no non-conformances associated with this corrective action.

Root Cause Investigation & Determination (To be completed by Department Manager, Operations Manager and/or QA Officer)

Review the 6 "M's" below and investigate to determine whether one of them, or more than one, could be the cause of the problem.

Possible Causes	Details

KATAHDIN ANALYTICAL SERVICES, INC. – CORRECTIVE ACTION REPORT

Machine (Instrument)	KIMS – incorrect formulas were entered into the process chains for TOC in soil.
Method (or Process)	Katahdin's policy for data review: From the QAM: "For data that are reduced via computer, calculations are checked by the analyst (or designee) assigned to this task at a frequency designed to assure that the final data generation is valid." From SOP SD-904, Data Reduction, Review and Reporting: "All manual integrations, calculations and transcriptions are checked and 10% of all spreadsheet calculations are checked. The remainder of spreadsheet calculations is spot checked for potential anomalies." Katahdin does not have a formal process for handling calculation changes to process changes in KIMS. A verbal request is made to MIS and the change is made. Although the KIMS system does have an audit trail to track dates of changes and calculation changes, the request for these is not documented.
Materials	Not Applicable
Maintenance (Is something not working correctly?)	Not Applicable
Man (training, human error)	All personnel involved with data review are aware of the requirement to hand check 10% of the sample results. In some cases this appears to have been done and when the results did not calculate correctly, they were corrected in KIMS. There was no communication that the error may affect other batches of samples. In other sample batches, the 10% hand check must not have occurred.
Mother Nature (accidents, power issues, beyond our control)	Not Applicable

Corrective Action Plan: Name: Leslie Dimond Date: 08/28/2015

Details of Corrective Action Plan –

Querries were run through KIMS to generate lists for TOC in soil data entered into KIMS between two timeframes:

10/23/14 to 12/29/14 (incorrect LOQ/LOD/MDL adjustment) – 14 Work Orders were found in this timeframe

12/29/14 and 4/13/15 (incorrect sample calculation) - 16 Work Orders were found in this timeframe

The lab has reviewed all TOC in soil data from these time periods for accuracy. Some inaccurate data was found (as expected from the incorrect formulas). Some data was found to be correct. In these cases, MIS was able to determine, through the KIMS audit trail, that the data had been manually corrected.

A new form has been created for personnel to fill out when requesting calculation changes in KIMS. This form will ensure that MIS is clear on exactly what needs to be changed in KIMS. Through KIMS we are currently able to track formula changes (ie. the formula before and after the change) and when the change occurred. This new form will allow Katahdin to track the changes made by person requesting the change and why the change was necessary. Supervisor and QA/Management approval are required on these forms.

There also will be a mandatory retraining for all employees on Katahdin's policy for data review, stressing that 10% of all results generated from KIMS and spreadsheets need to be confirmed. Also, this retraining will stress the need for communication. If a problem is discovered with one batch of samples, then it might also be affecting other batches.

Additionally, when calculation changes are made, Katahdin must establish a time frame of 30 days or 10 workorders where

senior management or the Quality Assurance Officer must also check the new calculations.

Review & Approval of Corrective Action Plan

Supervisor Approval:	Date: 09.11.15
Operations Manager Approval: Deborah J. Nadeau	Date: 9.11.15
Quality Assurance Officer: Susie Dimond	Date: 09.11.15

Monitoring of Corrective Action (To be completed by QA Officer and/or Operations Manager): List details of follow-up

Corrective Action Effective	Return to Control – Yes No	Further Monitoring Needed/Additional Corrective Action

QA Approval: Date:

Additional Information:

Attachment B
Final Results after Data Review

			Sample Delivery Group	SI1951	
			Lab ID	SI1951-1	
			Sample ID	RE117D1-SOIL-032515-740-742	
			Sample Date	3/25/2015	
			Sample Type	Soil	
Method	Analyte	CAS No	Units	Result	Qual
9060A	TOTAL ORGANIC CARBON	-28	UG_G	290	J

Notes:

UG_G	=	Micrograms per gram
Qual	=	Final qualifier
J	=	Laboratory qualifier — The analyte concentration was less than the laboratory's quantitation limit.

			Sample Delivery Group	SI1951	
			Lab ID	SI1951-2	
			Sample ID	RE117D1-EB-032515	
			Sample Date	3/25/2015	
			Sample Type	Equipment Blank	
Method	Analyte	CAS No	Units	Result	Qual
5310B	TOTAL ORGANIC CARBON	-28	MG_L	0.38	J

Notes:

ID = Identification
MG_L = Milligrams per liter
Qual = Final qualifier
J = Estimated value

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Groups:	SI2158	
Analyses/Method:	Total Organic Carbon (TOC) by U.S. EPA SW-846 Method 9060A and Standard Method 5310B for Total Organic Carbon by High-Temperature Combustion	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 05/24/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SI2158_9060A_5310B

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 31 March 2015 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants August 2014).

Sample ID	Lab ID	Matrix/Sample Type	Analysis
BPOW5-5-SOIL-033115-518-520	SI2158-1	Soil	9060A
BPOW5-5-SOIL-D-033115	SI2158-2	Field Duplicate	9060A
BPOW5-5-ERB-033115	SI2158-3	Equipment Blank	5310B

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 9060A, Total Organic Carbon* (U.S. EPA, 1996), *Method SM5310B, Total Organic Carbon by High-Temperature Combustion, U.S. Environmental Protection Agency (U.S. EPA) Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (NFG, January 2010, and Department of Defense

(DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 4.2 (October 2010). In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

✓	Data completeness (chain-of-custody)/sample integrity
✓	Holding times and sample preservation
✓	Gas chromatography/Mass spectrometer performance checks
✓	Initial calibration/continuing calibration verification
✓	Laboratory blanks/equipment blanks/field blanks/trip blanks
NA	Surrogate spike recoveries
✓	Matrix spike and/or matrix spike duplicate results
✓	Laboratory control sample laboratory control sample duplicate results
✓	Field duplicates
NA	Internal standards
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were qualified during this review. Analytical completeness was calculated to be 100% and the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Attachment A provides final results after data review.

ATTACHMENTS

Attachment A: Final Results after Data Review

Attachment A
Final Results after Data Review

			Sample Delivery Group	SI2158		SI2158		SI2158	
			Lab ID	SI2158-1		SI2158-2		SI2158-3	
			Sample ID	BPOW7-2-SOIL-033115-518-520		BPOW7-2-SOIL-D-033115		BPOW5-5-ERB-033115	
			Sample Date	3/31/2015		3/31/2015		3/31/2015	
			Sample Type	Soil		Field Duplicate		Equipment Blank	
Method	Analyte	CAS No	Units	Result	Qual	Result	Qual	Result	Qual
5310B	TOTAL ORGANIC CARBON	-28	MG_L	NA		NA		0.32	J
9060A	TOTAL ORGANIC CARBON	-28	UG_G	2100		2300		NA	

Notes:

ID	=	Identification
MG_L	=	Milligrams per liter
UG_G	=	Micrograms per gram
NA	=	Not analyzed
Qual	=	Final qualifier

Final Qualifier:

J	=	The analyte was positively identified. The numerical value is the estimated concentration of the analyte in the sample.

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Groups:	SI2243	
Analyses/Method:	Total Organic Carbon (TOC) by U.S. EPA SW-846 Method 9060A and Standard Method 5310B for Total Organic Carbon by High-Temperature Combustion	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 06/17/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SI2243_9060A_5310B

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 8 April 2015 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants August 2014).

Sample ID	Lab ID	Matrix/Sample Type	Analysis
BPOW5-4-040815-553-555	SI2243-1	Soil	9060A
BPOW5-4-EB-040815	SI2243-2	Equipment Blank	5310B

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 9060A, Total Organic Carbon* (U.S. EPA, 1996), *Method SM5310B, Total Organic Carbon by High-Temperature Combustion, U.S. Environmental Protection Agency (U.S. EPA) Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (NFG, January 2010, and Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 4.2 (October 2010). In

the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

✓	Data completeness (chain-of-custody)/sample integrity
✓	Holding times and sample preservation
✓	Gas chromatography/Mass spectrometer performance checks
✓	Initial calibration/continuing calibration verification
✓	Laboratory blanks/equipment blanks/field blanks/trip blanks
NA	Surrogate spike recoveries
NA	Matrix spike and/or matrix spike duplicate results
✓	Laboratory control sample laboratory control sample duplicate results
NA	Field duplicates
NA	Internal standards
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were qualified during this review. Analytical completeness was calculated to be 100% and the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Attachment A provides final results after data review.

ATTACHMENTS

Attachment A: Final Results after Data Review

Attachment A
Final Results after Data Review

			Sample Delivery Group	SI2243		SI2243	
			Lab ID	SI2243-1		SI2243-2	
			Sample ID	BPOW5-4-040815-553-555		BPOW5-4-EB-040815	
			Sample Date	4/8/2015		4/8/2015	
			Sample Type	Soil		Equipment Blank	
Method	Analyte	CAS No	Units	Result	Qual	Result	Qual
2540G	TS	-29	PCT	80		NA	
5310B	TOC	-28	MG_L	NA		0.33	J
9060	TOC	-28	UG_G	5600		NA	

Notes:

TS = Total solids
TOC = Total organic carbon
PCT = Percent
MG_L = Milligrams per liter
UG_G = Micrograms per gram
Qual = Final qualifier
NA = Not analyzed

Final Qualifier:

J = The analyte was positively identified. The numerical value is the estimated concentration of the analyte in the sample.

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Groups:	SI2602	
Analyses/Method:	Total Organic Carbon (TOC) by U.S. EPA SW-846 Method 9060A and Standard Method 5310B for Total Organic Carbon by High-Temperature Combustion	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 06/24/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SI2602_9060A_5310B

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 20 April 2015 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants August 2014).

Sample ID	Lab ID	Matrix/Sample Type	Analysis
118D1-SOIL-042015-773-775	SI2602-1	Soil	9060A
118D1-SOIL-D-042015	SI2602-2	Field Duplicate	9060A
118D1-ERB-042015	SI2602-3	Equipment Blank	5310B

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 9060A, Total Organic Carbon* (U.S. EPA, 1996), *Method SM5310B, Total Organic Carbon by High-Temperature Combustion, U.S. Environmental Protection Agency (U.S. EPA) Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (NFG, January 2010, and Department of Defense

(DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 4.2 (October 2010). In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

✓	Data completeness (chain-of-custody)/sample integrity
✓	Holding times and sample preservation
✓	Gas chromatography/Mass spectrometer performance checks
✓	Initial calibration/continuing calibration verification
✓	Laboratory blanks/equipment blanks/field blanks/trip blanks
NA	Surrogate spike recoveries
NA	Matrix spike and/or matrix spike duplicate results
✓	Laboratory control sample laboratory control sample duplicate results
✓	Field duplicates
NA	Internal standards
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were qualified during this review. Analytical completeness was calculated to be 100% and the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Attachment A provides final results after data review.

ATTACHMENTS

Attachment A: Final Results after Data Review

Attachment A
Final Results after Data Review

				Sample Delivery Group	SI2602			SI2602			SI2602		
				Lab ID	SI2602-1			SI2602-2			SI2602-3		
				Sample ID	118D1-SOIL-042015-773-775			118D1-SOIL-D-042015			118D1-ERB-042015		
				Sample Date	4/20/2015			4/20/2015			4/20/2015		
				Sample Type	Soil			Field Duplicate			Equipment Blank		
Method	Analyte	CAS No.	Units		Result	Qual	RC	Result	Qual	RC	Result	Qual	RC
5310B	TOTAL ORGANIC CARBON	-28	MG_L		NA			NA			0.5	J	
9060A	TOTAL ORGANIC CARBON	-28	UG_G		140	J		210	J		NA		

Notes:

PCT = Percent
MG_L = Milligrams per liter
UG_G = Micrograms per gram
NA = Not analyzed
Qual = Final qualifier
RC = Reason code

Final Qualifiers:

J = The analyte was positively identified. The numerical value is the estimated concentration of the analyte in the sample.

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Groups:	SI2994	
Analyses/Method:	Total Organic Carbon (TOC) by U.S. EPA SW-846 Method 9060A and Standard Method 5310B for Total Organic Carbon by High-Temperature Combustion	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 06/30/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SI2994_9060A_5310B

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 5 May 2015 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants August 2014).

Sample ID	Lab ID	Matrix/Sample Type	Analysis
BPOW5-6-SOIL-050515-603-605	SI2994-2	Soil	9060A
BPOW5-6-FD-SOIL-050515-603-605	SI2994-3	Field Duplicate	9060A
BPOW5-6-EB-050515	SI2994-1	Equipment Blank	5310B

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 9060A, Total Organic Carbon* (U.S. EPA, 1996), *Method SM5310B, Total Organic Carbon by High-Temperature Combustion, U.S. Environmental Protection Agency (U.S. EPA) Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review* (NFG, January 2010, and Department of Defense

(DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 4.2 (October 2010). In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

✓	Data completeness (chain-of-custody)/sample integrity
✓	Holding times and sample preservation
✓	Gas chromatography/Mass spectrometer performance checks
✓	Initial calibration/continuing calibration verification
✓	Laboratory blanks/equipment blanks/field blanks/trip blanks
NA	Surrogate spike recoveries
✓	Matrix spike and/or matrix spike duplicate results
✓	Laboratory control sample laboratory control sample duplicate results
✓	Field duplicates
NA	Internal standards
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were qualified during this review. Analytical completeness was calculated to be 100% and the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Attachment A provides final results after data review.

ATTACHMENTS

Attachment A: Final Results after Data Review

Attachment A
Final Results after Data Review

			Sample Delivery Group	SI2994		SI2994		SI2994	
			Lab ID	SI2994-1		SI2994-2		SI2994-3	
			Sample ID	BP0W5-6-EB-050515		BPOW5-6-SOIL-050515-603-605		BPOW5-6-FD-SOIL-050515-603-605	
			Sample Date	5/5/2015		5/5/2015		5/5/2015	
			Sample Type	Equipment Blank		Soil		Field Duplicate	
Method	Analyte	CAS No.	Units	Result	Qual	Result	Qual	Result	Qual
5310B	TOTAL ORGANIC CARBON	-28	MG_L	0.25	J	NA		NA	
9060A	TOTAL ORGANIC CARBON	-28	UG_G	NA		860		1000	

Notes:

ID = Identification
MG_L = Milligrams per liter
UG_G = Micrograms per gram
NA = Not analyzed
Qual = Final qualifier

Final Qualifier:

J = The analyte was positively identified. The numerical value is the estimated concentration of the analyte in the sample.

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Group:	SI4000	
Analyses/Method:	Volatile Organic Compounds by U.S. EPA SW-846 Method 8260C 1,4-Dioxane by U.S. EPA SW-846 Method 8270D via Selective Ion Monitoring (SIM)	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 07/21/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SI4000_8260C_8270D

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 9 June 2015 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants August 2014).

Sample ID	Matrix/Sample Type	Analysis
RE117D1-GW-060915	Groundwater	8260C / 8270D_SIM
RE117D1-TB-060915	Trip Blank	8260C

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 8260C, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry* (U.S. EPA, 2006), *SW-846 Method 8270D, Semivolatile Organic Compounds by Gas Chromatograph/Mass Spectrometry* (U.S. EPA, 2007), *U.S. Environmental Protection Agency* (U.S. EPA) *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008), and Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October

2010). In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

✓	Data completeness (chain-of-custody)/sample integrity
✓	Holding times and sample preservation
✓	Gas chromatography/Mass spectrometer performance checks
✗	Initial calibration/continuing calibration verification
✓	Laboratory blanks/trip blanks
✓	Surrogate spike recoveries
NA	Matrix spike and/or matrix spike duplicate results
✓	Laboratory control sample/laboratory control sample duplicate results
NA	Field duplicates
✓	Internal standards
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further. The symbol (✗) indicates that a QC non-conformance resulted in the qualification of data. Any QC non-conformance that resulted in the qualification of data is discussed below.

RESULTS

Initial Calibration/Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- the initial calibration percent relative standard deviation, correlation coefficient/coefficient of determination, and/or response factor method acceptance criteria were met;
- the initial calibration verification standard percent recovery acceptance criteria were met;
- the continuing calibration verification (CCV) standard method percent difference or percent drift and response factor acceptance criteria were met; and

- the retention time method acceptance criteria were met.

Data qualification to the analytes associated with the specific initial calibration (ICAL) was as

ICAL Linearity Non-conformance:

Criteria	Actions	
	Detected Results	Non-detected Results
%RSD >15% and quantitation based on mean response factor	J	UJ

Notes:
%RSD = Relative standard deviation
J = Estimated
UJ = Undetected and estimated

Data qualification to the analytes associated with the specific CCV was as follows:

CCV Non-conformance:

Criteria	Actions	
	Detected Results	Non-detected Results
%Difference or %Drift > 20%	J	UJ

Notes:
J = Estimated
UJ = Undetected and estimated

ICAL and CCV non-conformances are summarized in Attachment A in Table's A-1 and A-2.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were rejected; therefore, analytical completeness was calculated to be 100 percent. Data not qualified during data review are considered usable by the project. The remaining results qualified as estimated may be high or low, but the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Final data review qualifiers used to describe results and how they should be interpreted by the end data

user are provided in Attachment B and Attachment C. Attachment D provides final results after data review.

ATTACHMENTS

Attachment A: Non-Conformance Summary Tables
Attachment B: Qualifier Codes and Explanations
Attachment C: Reason Codes and Explanations
Attachment D: Final Results after Data Review

Attachment A
Non-Conformance Summary Table

Table A-1
Initial Calibration Linearity Non-Conformance

Method	Analyte	Instrument ID / Date	%RSD	Limit	Associated Samples	Qualifier
8260C	Chloroethane	GCMS-T 06/11/2015	28.31610	≤15%	RE117D1-GW-060915 RE117D1-TB-060915	UJ

Notes:
RSD = Relative standard deviation
UJ = Non-detected analyte in associated sample qualified estimated "UJ" due to potential bias

Table A-2
Continuing Calibration Verification Non-Conformance

Method	Analyte	Calibration ID	%D	%D Limit	Associated Samples	Qualifier
8260C	Dichlorodifluoromethane	T3830.D	-21.1533	20	RE117D1-GW-060915 RE117D1-TB-060915	UJ

Notes:
%D = Percent difference
UJ = Non-detected analyte in associated sample qualified estimated "UJ" due to potential bias

Attachment B
Qualifier Codes and Explanations

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
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 quantitation limit necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Attachment C
Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
bt	Trip blank contamination
c	Calibration issue
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate relative percent difference
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration
l	Laboratory control sample
lc	Labeled compound recovery
ld	Laboratory duplicate relative percent difference
lp	Laboratory control sample/laboratory control sample duplicate relative percent difference
m	Matrix spike recovery
mc	Method compliance non-conformance
md	Matrix spike/matrix spike duplicate relative percent difference
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column relative percent difference
q	Quantitation issue
s	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	Interference check sample results (metals)

Attachment D
Final Results after Data Review

		Sample Delivery Group		SI4000		
		Lab ID		SI4000-1RA		
		Sample ID		RE117DI-GW-060915		
		Sample Date		6/9/2015		
		Sample Type		Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UJ	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	1.3		
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	7.6		
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	0.17	U	

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI4000 SI4000-2RA RE117DI-TB-060915 6/9/2015 Trip Blank		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	U	
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	c
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	UJ	c
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270D_SIM	1,4-DIOXANE	123-91-1	UG_L	NA		

Notes:

UG_L = Micrograms per liter
NA = Not analyzed
Qual = Final qualifier (Refer to Attachment B)
RC = Reason code (Refer to Attachment C)

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Group:	SI6082	
Analyses/Method:	Volatile Organic Compounds by U.S. EPA SW-846 Method 8260C 1,4-Dioxane by U.S. EPA SW-846 Method 8270D via Selective Ion Monitoring (SIM)	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 09/04/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SI6082_8260C_8270D

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 12 August 2015 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants August 2014).

Sample ID	Matrix/Sample Type	Analysis
GW-DUP-081215	Field Duplicate	8260C / 8270D_SIM
BPOW5-7-GW-081215	Groundwater	8260C / 8270D_SIM
BPOW5-7-TB-081215	Trip Blank	8260C

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 8260C, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry* (U.S. EPA, 2006), *SW-846 Method 8270D, Semivolatile Organic Compounds by Gas Chromatograph/Mass Spectrometry* (U.S. EPA, 2007), *U.S. Environmental Protection Agency* (U.S. EPA) *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008), and Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October

2010). In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

- ✓ Data completeness (chain-of-custody)/sample integrity
- ✓ Holding times and sample preservation
- ✓ Gas chromatography/Mass spectrometer performance checks
- ✗ Initial calibration/continuing calibration verification
- ✓ Laboratory blanks/trip blanks
- ✓ Surrogate spike recoveries
- ✓ Matrix spike and/or matrix spike duplicate results
- ✓ Laboratory control sample/laboratory control sample duplicate results
- ✓ Field duplicates
- ✓ Internal standards
- ✓ Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further. The symbol (✗) indicates that a QC non-conformance resulted in the qualification of data. Any QC non-conformance that resulted in the qualification of data is discussed below.

RESULTS

Initial Calibration/Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- the initial calibration percent relative standard deviation, correlation coefficient/coefficient of determination, and/or response factor method acceptance criteria were met;
- the initial calibration verification (ICV) standard percent recovery acceptance criteria were met;
- the continuing calibration verification standard method percent difference or percent drift and response factor acceptance criteria were met; and

- the retention time method acceptance criteria were met.

Data qualification to the analytes associated with the specific ICV was as follows:

ICV Recovery Non-conformance:

Criteria	Actions	
	Detected Results	Non-detected Results
Recovery >120%	J	UJ
Recovery < 80%	J	UJ

Notes:
J = Estimated
UJ = Undetected and estimated

ICV non-conformances are summarized in Attachment A in Table A-1.

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were rejected; therefore, analytical completeness was calculated to be 100 percent. Data not qualified during data review are considered usable by the project. The remaining results qualified as estimated may be high or low, but the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Final data review qualifiers used to describe results and how they should be interpreted by the end data user are provided in Attachment B and Attachment C. Attachment D provides final results after data review.

ATTACHMENTS

Attachment A: Non-Conformance Summary Tables
Attachment B: Qualifier Codes and Explanations
Attachment C: Reason Codes and Explanations
Attachment D: Final Results after Data Review

Attachment A
Non-Conformance Summary Table

Table A-1 Initial Calibration Verification Non-Conformance						
Method	Analyte	ICV ID	%R	Limit	Associated Samples	Qualifier
8260C	Carbon Disulfide	WG168597-7	122.47	80-120	BPOW5-7-TB-081215 BPOW5-7-GW-08215 GW-DUP-081215	UJ

Notes:
%R = Percent recovery
UJ = Non-detected analyte in associated sample qualified estimated "UJ" due to potential bias

Attachment B
Qualifier Codes and Explanations

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
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 quantitation limit necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Attachment C
Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
bt	Trip blank contamination
c	Calibration issue
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate relative percent difference
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration
l	Laboratory control sample
lc	Labeled compound recovery
ld	Laboratory duplicate relative percent difference
lp	Laboratory control sample/laboratory control sample duplicate relative percent difference
m	Matrix spike recovery
mc	Method compliance non-conformance
md	Matrix spike/matrix spike duplicate relative percent difference
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column relative percent difference
q	Quantitation issue
s	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	Interference check sample results (metals)

Attachment D
Final Results after Data Review

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI6082 SI6082-1RA BPOW5-7-GW-081215 8/12/2015 Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	3.6	J	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	U	
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270C_SIM	1,4-DIOXANE	123-91-1	UG_L	0.17	U	

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI6082 SI6082-2 GW-DUP-081215 8/12/2015 Field Duplicate		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	U	
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270C_SIM	1,4-DIOXANE	123-91-1	UG_L	0.18	U	

		Sample Delivery Group Lab ID Sample ID Sample Date Sample Type		SI6082 SI6082-3 BPOW5-7-TB-081215 8/12/2015 Trip Blank		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	U	
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270C_SIM	1,4-DIOXANE	123-91-1	UG_L	NA		

Notes:

UG_L = Micrograms per Liter
NA = Not analyzed
Qual = Final qualifier (Refer to Attachment B)
RC = Reason code (Refer to Attachment C)

DATA VALIDATION REPORT

Project:	Regional Groundwater Investigation — NWIRP Bethpage	
Laboratory:	Katahdin Analytical	
Sample Delivery Group:	SI6083	
Analyses/Method:	Volatile Organic Compounds by U.S. EPA SW-846 Method 8260C 1,4-Dioxane by U.S. EPA SW-846 Method 8270D via Selective Ion Monitoring (SIM)	
Validation Level:	3	
Project Number:	0888812477.SA.DV	
Prepared by:	Dana Miller/Resolution Consultants	Completed on: 09/04/2015
Reviewed by:	Tina Cantwell/Resolution Consultants	File Name: SI6082_8260C_8270D

SUMMARY

This report summarizes data review findings for samples listed below, collected by Resolution Consultants from the Regional Groundwater Investigation — NWIRP Bethpage site on 12 August 2015 in accordance with the following Sampling and Analysis Plans:

- *Sampling and Analysis Plan, Bethpage, New York.* (Resolution Consultants April 2013).
- *UFP SAP Addendum, Installation of Vertical Profile Borings and Monitoring Wells, Operable Unit 2, NWIRP Bethpage, New York.* (Resolution Consultants November 2013).
- *UFP SAP Addendum, Inclusion of Additional Target Analytes for Volatile Organics Analyses, NWIRP Bethpage OU2, Bethpage, New York*. (Resolution Consultants August 2014).

Sample ID	Matrix/Sample Type	Analysis
RE119D1-GW-081215	Groundwater	8260C / 8270D_SIM
RE119D1-TB-081215	Trip Blank	8260C

Data validation activities were conducted using the following guidance documents: *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846, specifically Method 8260C, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry* (U.S. EPA, 2006), *SW-846 Method 8270D, Semivolatile Organic Compounds by Gas Chromatograph/Mass Spectrometry* (U.S. EPA, 2007), *U.S. Environmental Protection Agency* (U.S. EPA) *Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review* (June 2008), and Department of Defense Quality Systems Manual for Environmental Laboratories, Version 4.2 (October

2010). In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters (where applicable to the method):

✓	Data completeness (chain-of-custody)/sample integrity
✓	Holding times and sample preservation
✓	Gas chromatography/Mass spectrometer performance checks
✗	Initial calibration/continuing calibration verification
✓	Laboratory blanks/trip blanks
✓	Surrogate spike recoveries
✓	Matrix spike and/or matrix spike duplicate results
✓	Laboratory control sample/laboratory control sample duplicate results
NA	Field duplicates
✓	Internal standards
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. NA indicates that the parameter was not included as part of this data set or was not applicable to this validation and therefore not reviewed. Acceptable data parameters for which all criteria were met and no qualification was performed and non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further. The symbol (✗) indicates that a QC non-conformance resulted in the qualification of data. Any QC non-conformance that resulted in the qualification of data is discussed below.

RESULTS

Initial Calibration/Continuing Calibration Verification

Calibration data were reviewed for conformance with the QC acceptance criteria to ensure that:

- the initial calibration percent relative standard deviation, correlation coefficient/coefficient of determination, and/or response factor method acceptance criteria were met;
- the initial calibration verification (ICV) standard percent recovery acceptance criteria were met;

- the continuing calibration verification standard method percent difference or percent drift and response factor acceptance criteria were met; and

- the retention time method acceptance criteria were met.

Data qualification to the analytes associated with the specific ICV was as follows:

ICV Recovery Non-conformance:

Criteria	Actions	
	Detected Results	Non-detected Results
Recovery >120%	J	UJ
Recovery < 80%	J	UJ

Notes:
J = Estimated
UJ = Undetected and estimated

ICV non-conformances are summarized in Attachment A in Table A-1.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results

MS/MSDs are generated to provide information about the effect of each sample matrix on the sample preparation and the measurement methodology. MS/MSD percent recoveries (%Rs) assess the effect of the sample matrix on the accuracy of the analytical results and %Rs above the laboratory control limit could indicate a potential high result bias while %Rs below QC limits could indicate a potential low result bias. The relative percent differences (RPDs) between the MS and MSD results are evaluated to assess sample precision. The MS/MSD %Rs and RPDs were reviewed for conformance with the QC acceptance criteria. Non-conformances are summarized in Attachment A in Table A-2. Data qualification to the analytes associated with the specific MS/MSD non-conformances were as follows:

MS/MSD Non-conformances Chart:

Criteria	Action	
	Detected Compounds	Non-detected Compounds
%R>Upper Limit	J	No qualification
20% $\leq$ %R < Lower Limit	J	UJ
%R <20%	J	Rejected

Notes:
%R = Percent recovery
RPD = Relative percent difference
J = Estimated
UJ = Undetected and estimated

Qualifications Actions

The data was reviewed independently from the laboratory to assess data quality. All compounds detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were rejected; therefore, analytical completeness was calculated to be 100 percent. Data not qualified during data review are considered usable by the project. The remaining results qualified as estimated may be high or low, but the data are usable for their intended purpose, according to U.S. Environmental Protection Agency and Department of Defense guidelines. Final data review qualifiers used to describe results and how they should be interpreted by the end data user are provided in Attachment B and Attachment C. Attachment D provides final results after data review.

ATTACHMENTS

Attachment A: Non-Conformance Summary Tables
Attachment B: Qualifier Codes and Explanations
Attachment C: Reason Codes and Explanations
Attachment D: Final Results after Data Review

Attachment A
Non-Conformance Summary Table

Table A-1
Initial Calibration Verification Non-Conformance

Method	Analyte	ICV ID	%R	Limit	Associated Samples	Qualifier
8260C	CARBON DISULFIDE	WG168597-7	122.47	80-120	RE119D1-GW-081215 RE119D1-TB-081215	UJ

Notes:
%R = Percent recovery
UJ = Non-detected analyte in associated sample qualified estimated "UJ" due to potential bias

Table A-2
Matrix Spike / Matrix Spike Duplicate Non-Conformance

Spiked Sample	Analyte	Sample Result (µg/L)	Spike Added (µg/L)	MS %R	MSD %R	%R Limits	Qualifier
RE119D1-GW-081215	ETHYLBENZENE	0.50	50.0	41.2	107	75-125	UJ
RE119D1-GW-081215	STYRENE	0.50	50.0	43	115	65-135	UJ
RE119D1-GW-081215	CIS-1,3-DICHLOROPROPENE	0.50	50.0	39.8	107	70-130	UJ
RE119D1-GW-081215	TRANS-1,3-DICHLOROPROPENE	0.50	50.0	42.2	110	55-140	UJ
RE119D1-GW-081215	1,4-DICHLOROBENZENE	0.50	50.0	38.4	102	75-125	UJ
RE119D1-GW-081215	1,2-DIBROMOETHANE	0.50	50.0	40.8	103	82-120	UJ
RE119D1-GW-081215	1,2-DICHLOROETHANE	0.50	50.0	45	105	70-130	UJ
RE119D1-GW-081215	4-METHYL-2-PENTANONE	2.5	50.0	37.6	107	60-135	UJ
RE119D1-GW-081215	M- AND P-XYLENE	1.0	100	42.9	112	75-130	UJ
RE119D1-GW-081215	TOLUENE	0.50	50.0	42	110	75-120	UJ
RE119D1-GW-081215	CHLOROBENZENE	0.50	50.0	43.2	108	80-120	UJ
RE119D1-GW-081215	CYCLOHEXANE	0.50	50.0	43.4	112	71-133	UJ
RE119D1-GW-081215	1,2,4-TRICHLOROBENZENE	0.50	50.0	37	102	65-135	UJ
RE119D1-GW-081215	DIBROMOCHLOROMETHANE	0.50	50.0	43.4	107	60-135	UJ
RE119D1-GW-081215	TETRACHLOROETHENE	0.50	50.0	41.8	100	45-150	UJ
RE119D1-GW-081215	XYLENES, TOTAL	1.5	150	42.1	112	89-116	UJ
RE119D1-GW-081215	CIS-1,2-DICHLOROETHENE	0.50	50.0	41.8	100	70-125	UJ
RE119D1-GW-081215	TRANS-1,2-DICHLOROETHENE	0.50	50.0	49.2	114	60-140	UJ
RE119D1-GW-081215	METHYL TERT-BUTYL ETHER	0.50	100	54	106	65-125	UJ
RE119D1-GW-081215	1,2-DICHLOROETHENE, TOTAL	1.0	100	45.4	107	84-121	UJ
RE119D1-GW-081215	1,3-DICHLOROBENZENE	0.50	50.0	39.8	105	75-125	UJ
RE119D1-GW-081215	CARBON TETRACHLORIDE	0.50	50.0	43.8	112	65-140	UJ
RE119D1-GW-081215	2-HEXANONE	2.5	50.0	36.4	104	55-130	UJ
RE119D1-GW-081215	CHLOROFORM	0.50	50.0	43.2	105	65-130	UJ
RE119D1-GW-081215	BENZENE	0.50	50.0	43.6	109	80-120	UJ
RE119D1-GW-081215	1,1,1-TRICHLOROETHANE	0.50	50.0	42.6	108	65-130	UJ
RE119D1-GW-081215	CHLOROETHANE	1.0	50.0	39.6	99.2	60-135	UJ
RE119D1-GW-081215	VINYL CHLORIDE	1.0	50.0	42.8	92.4	50-145	UJ
RE119D1-GW-081215	METHYLENE CHLORIDE	2.5	50.0	42	95.8	55-140	UJ
RE119D1-GW-081215	BROMOFORM	0.50	50.0	42.2	115	70-130	UJ
RE119D1-GW-081215	BROMODICHLOROMETHANE	0.50	50.0	41.6	108	75-120	UJ
RE119D1-GW-081215	1,1-DICHLOROETHANE	0.50	50.0	47.6	111	70-135	UJ
RE119D1-GW-081215	1,1-DICHLOROETHENE	0.50	50.0	44.4	105	70-130	UJ
RE119D1-GW-081215	TRICHLOROFLUOROMETHANE	1.0	50.0	42	100	60-145	UJ
RE119D1-GW-081215	1,2-DICHLOROPROPANE	0.50	50.0	39.6	103	75-125	UJ
RE119D1-GW-081215	1,1,2-TRICHLOROETHANE	0.50	50.0	40.4	103	75-125	UJ

Table A-2
Matrix Spike / Matrix Spike Duplicate Non-Conformance

Spiked Sample	Analyte	Sample Result (µg/L)	Spike Added (µg/L)	MS %R	MSD %R	%R Limits	Qualifier
RE119D1-GW-081215	TRICHLOROETHENE	0.50	50.0	41.6	106	70-125	UJ
RE119D1-GW-081215	METHYL ACETATE	0.75	50.0	64	91.4	70-132	UJ
RE119D1-GW-081215	1,1,2,2-TETRACHLOROETHANE	0.50	50.0	41.6	100	65-130	UJ
RE119D1-GW-081215	O-XYLENE	0.50	50.0	40.4	112	80-120	UJ
RE119D1-GW-081215	1,2-DICHLOROBENZENE	0.50	50.0	39.6	105	70-120	UJ
RE119D1-GW-081215	1,2-DIBROMO-3-CHLOROPROPANE	0.75	50.0	41.6	107	50-130	UJ
RE119D1-GW-081215	ISOPROPYLBENZENE	0.50	50.0	42.8	115	75-125	UJ

Notes:

µg/L = Micrograms per liter
MS = Matrix spike
MSD = Matrix spike duplicate
%R = Percent recovery
UJ = Non-detected and estimated

Attachment B
Qualifier Codes and Explanations

Qualifier	Explanation
J	The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
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 quantitation limit necessary to accurately and precisely measure the analyte in the sample.
U	The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Attachment C
Reason Codes and Explanations

Reason Code	Explanation
be	Equipment blank contamination
bf	Field blank contamination
bl	Laboratory blank contamination
bt	Trip blank contamination
c	Calibration issue
d	Reporting limit raised due to chromatographic interference
fd	Field duplicate relative percent difference
h	Holding times
i	Internal standard areas
k	Estimated Maximum Possible Concentration
l	Laboratory control sample
lc	Labeled compound recovery
ld	Laboratory duplicate relative percent difference
lp	Laboratory control sample/laboratory control sample duplicate relative percent difference
m	Matrix spike recovery
mc	Method compliance non-conformance
md	Matrix spike/matrix spike duplicate relative percent difference
nb	Negative laboratory blank contamination
p	Chemical preservation issue
r	Dual column relative percent difference
q	Quantitation issue
s	Surrogate recovery
su	Ion suppression
t	Temperature preservation issue
x	Percent solids
y	Serial dilution results
z	Interference check sample results (metals)

Attachment D
Final Results after Data Review

		Sample Delivery Group Lab ID Sample ID Sample Date Matrix		SI6083 SI6083-1 RE119D1-GW-081215 8/12/2015 Groundwater		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	UJ	m
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	UJ	m
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	UJ	m
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	UJ	m
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	UJ	m
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	UJ	m
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	UJ	m
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	UJ	m
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	UJ	m
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	UJ	m
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	UJ	m
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	UJ	m
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	UJ	m
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	UJ	m
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	UJ	m
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	UJ	m
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	UJ	m
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	UJ	m
8260C	BROMOFORM	75-25-2	UG_L	0.5	UJ	m
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	UJ	m
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	UJ	m
8260C	CHLOROETHANE	75-00-3	UG_L	1	UJ	m
8260C	CHLOROFORM	67-66-3	UG_L	0.5	UJ	m
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	UJ	m
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	UJ	m
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	UJ	m
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	UJ	m
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	UJ	m
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	UJ	m
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	UJ	m
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	UJ	m
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	UJ	m
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	UJ	m
8260C	O-XYLENE	95-47-6	UG_L	0.5	UJ	m
8260C	STYRENE	100-42-5	UG_L	0.5	UJ	m
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	UJ	m
8260C	TOLUENE	108-88-3	UG_L	0.5	UJ	m
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	UJ	m
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	UJ	m
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	UJ	m
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	UJ	m
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	UJ	m
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	UJ	m
8270C_SIM	1,4-DIOXANE	123-91-1	UG_L	0.17	U	

		Sample Delivery Group Lab ID Sample ID Sample Date Matrix		SI6083 SI6083-3 RE119D1-TB-081215 8/12/2015 Trip Blank		
Method	Analyte	CAS No	Units	Result	Qual	RC
8260C	1,1,1-TRICHLOROETHANE	71-55-6	UG_L	0.5	U	
8260C	1,1,2,2-TETRACHLOROETHANE	79-34-5	UG_L	0.5	U	
8260C	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	UG_L	0.5	U	
8260C	1,1,2-TRICHLOROETHANE	79-00-5	UG_L	0.5	U	
8260C	1,1-DICHLOROETHANE	75-34-3	UG_L	0.5	U	
8260C	1,1-DICHLOROETHENE	75-35-4	UG_L	0.5	U	
8260C	1,2,4-TRICHLOROBENZENE	120-82-1	UG_L	0.5	U	
8260C	1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	UG_L	0.75	U	
8260C	1,2-DIBROMOETHANE	106-93-4	UG_L	0.5	U	
8260C	1,2-DICHLOROBENZENE	95-50-1	UG_L	0.5	U	
8260C	1,2-DICHLOROETHANE	107-06-2	UG_L	0.5	U	
8260C	1,2-DICHLOROETHENE, TOTAL	540-59-0	UG_L	1	U	
8260C	1,2-DICHLOROPROPANE	78-87-5	UG_L	0.5	U	
8260C	1,3-DICHLOROBENZENE	541-73-1	UG_L	0.5	U	
8260C	1,4-DICHLOROBENZENE	106-46-7	UG_L	0.5	U	
8260C	2-BUTANONE	78-93-3	UG_L	2.5	U	
8260C	2-HEXANONE	591-78-6	UG_L	2.5	U	
8260C	4-METHYL-2-PENTANONE	108-10-1	UG_L	2.5	U	
8260C	ACETONE	67-64-1	UG_L	2.5	U	
8260C	BENZENE	71-43-2	UG_L	0.5	U	
8260C	BROMODICHLOROMETHANE	75-27-4	UG_L	0.5	U	
8260C	BROMOFORM	75-25-2	UG_L	0.5	U	
8260C	BROMOMETHANE	74-83-9	UG_L	1	U	
8260C	CARBON DISULFIDE	75-15-0	UG_L	0.5	UJ	c
8260C	CARBON TETRACHLORIDE	56-23-5	UG_L	0.5	U	
8260C	CHLOROBENZENE	108-90-7	UG_L	0.5	U	
8260C	CHLOROETHANE	75-00-3	UG_L	1	U	
8260C	CHLOROFORM	67-66-3	UG_L	0.5	U	
8260C	CHLOROMETHANE	74-87-3	UG_L	1	U	
8260C	CIS-1,2-DICHLOROETHENE	156-59-2	UG_L	0.5	U	
8260C	CIS-1,3-DICHLOROPROPENE	10061-01-5	UG_L	0.5	U	
8260C	CYCLOHEXANE	110-82-7	UG_L	0.5	U	
8260C	DIBROMOCHLOROMETHANE	124-48-1	UG_L	0.5	U	
8260C	DICHLORODIFLUOROMETHANE	75-71-8	UG_L	1	U	
8260C	ETHYLBENZENE	100-41-4	UG_L	0.5	U	
8260C	ISOPROPYLBENZENE	98-82-8	UG_L	0.5	U	
8260C	M- AND P-XYLENE	108-38-3/106-42	UG_L	1	U	
8260C	METHYL ACETATE	79-20-9	UG_L	0.75	U	
8260C	METHYL CYCLOHEXANE	108-87-2	UG_L	0.5	U	
8260C	METHYL TERT-BUTYL ETHER	1634-04-4	UG_L	0.5	U	
8260C	METHYLENE CHLORIDE	75-09-2	UG_L	2.5	U	
8260C	O-XYLENE	95-47-6	UG_L	0.5	U	
8260C	STYRENE	100-42-5	UG_L	0.5	U	
8260C	TETRACHLOROETHENE	127-18-4	UG_L	0.5	U	
8260C	TOLUENE	108-88-3	UG_L	0.5	U	
8260C	TRANS-1,2-DICHLOROETHENE	156-60-5	UG_L	0.5	U	
8260C	TRANS-1,3-DICHLOROPROPENE	10061-02-6	UG_L	0.5	U	
8260C	TRICHLOROETHENE	79-01-6	UG_L	0.5	U	
8260C	TRICHLOROFLUOROMETHANE	75-69-4	UG_L	1	U	
8260C	VINYL CHLORIDE	75-01-4	UG_L	1	U	
8260C	XYLENES, TOTAL	1330-20-7	UG_L	1.5	U	
8270C_SIM	1,4-DIOXANE	123-91-1	UG_L	NA		

Notes:

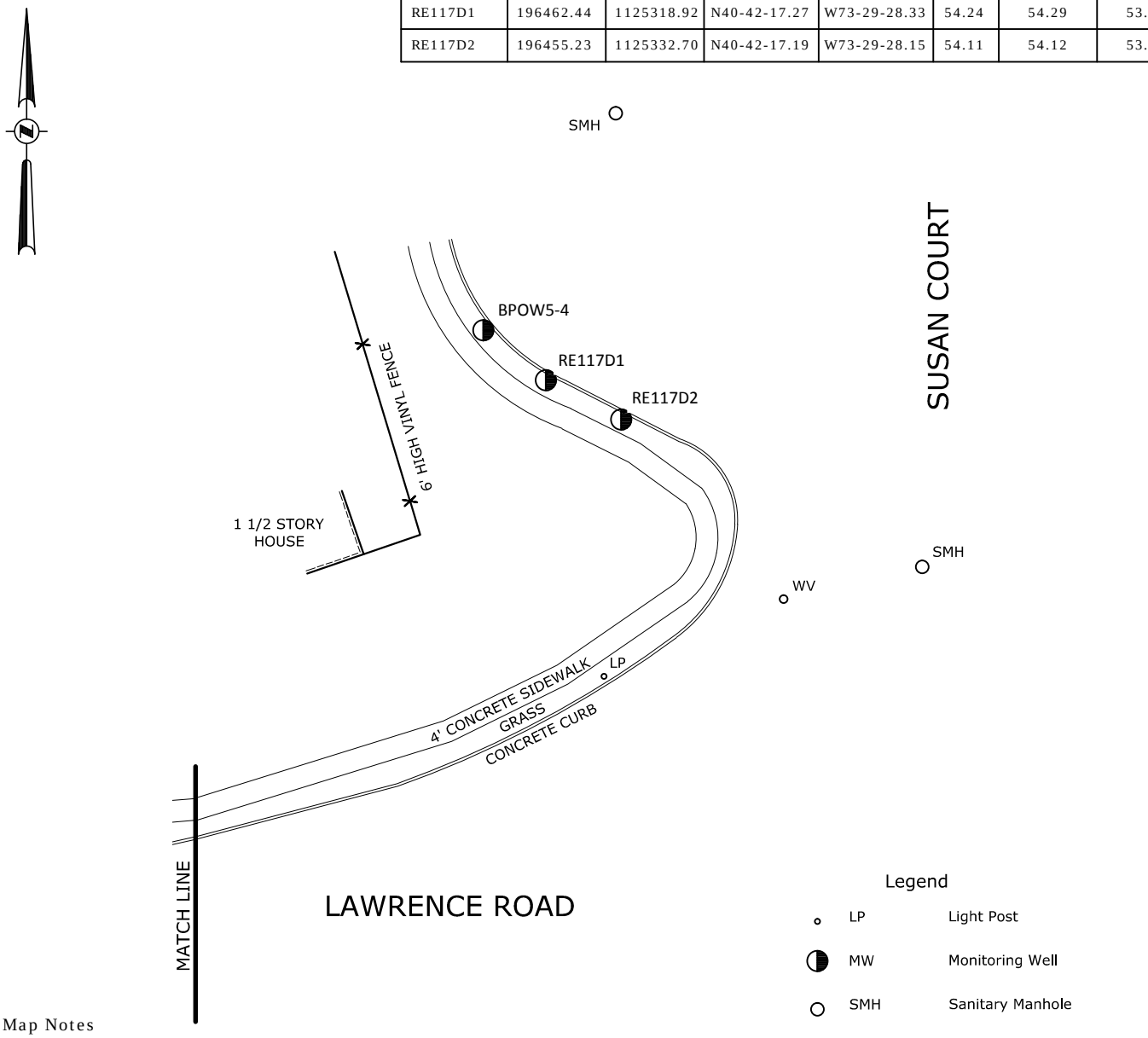
UG_L = Micrograms per liter
NA = Not analyzed
Qual = Final qualifier (Refer to Attachment B)
RC = Reason code (Refer to Attachment C)

Section 5

Survey

NONE :XREFS

Description	Northing	Easting	Latitude	Longitude	Ground	Rim	PVC
BPOW5-4	196471.55	1125307.44	N40-42-17.36	W73-29-28.48	54.49	54.47	53.88
RE117D1	196462.44	1125318.92	N40-42-17.27	W73-29-28.33	54.24	54.29	53.81
RE117D2	196455.23	1125332.70	N40-42-17.19	W73-29-28.15	54.11	54.12	53.59



Legend

○	LP	Light Post
◑	MW	Monitoring Well
○	SMH	Sanitary Manhole
○	WV	Water Valve

Map Notes

1. Information shown hereon was compiled from an actual field survey conducted from September 23-25, 2014.
2. North orientation is Grid North based on the New York State Plane Coordinate System, Long Island Zone, NAD 83 as obtained from GPS observations.
3. Vertical datum shown hereon is NAVD 88 as obtained from GPS observations.

BAR SCALE

30 0 15 30 60

1 inch = 30 ft.

SHEET 2 OF 2 | DWG NO. 14-503

Date	RECORD OF WORK	Appr.
7-7-15	ADDES SHEET 2	JFC

Drafter: LMK | Checker: JFC

Appr. by: JFC | Proj. No. 14.4121

VERTICAL PROFILE BORING 151 SURVEY LOCATION
3832 HARRIAD DRIVE WEST

TOWN OF SEAFORD | NASSAU COUNTY, NEW YORK

C.T. MALE ASSOCIATES
Engineering, Surveying, Architecture & Landscape Architecture, D.P.C.
50 CENTURY HILL DRIVE, LATHAM, NY 12110
518.786.7400 * FAX 518.786.7299

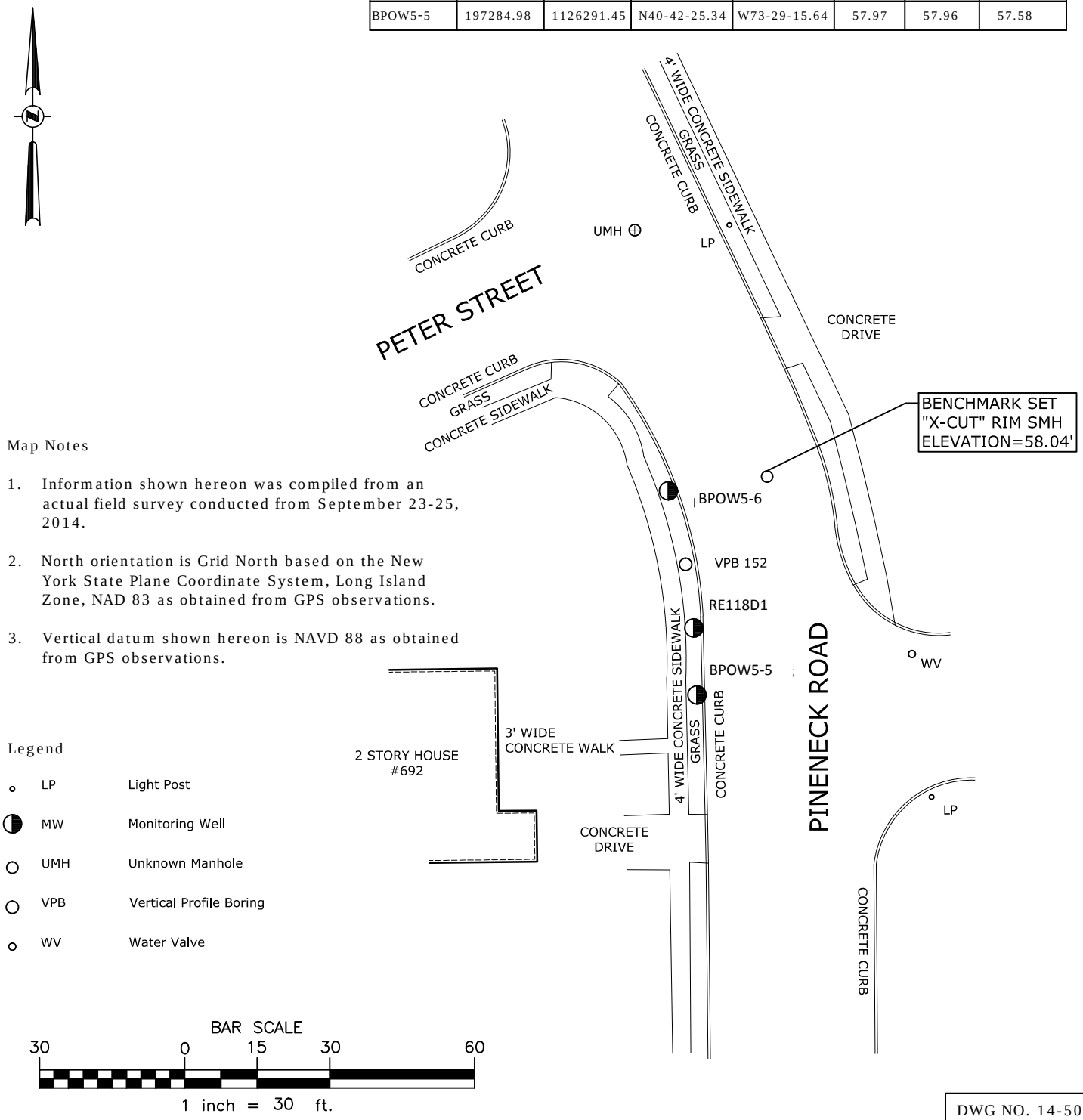
SCALE: 1"=30' | DATE: SEPT. 24, 2014

CAD DWG. FILE NAME: K:\Projects\14412\1\Survey\Drawings and Maps\VPB 151.dwg

NONE :XREFS

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

Description	Northing	Easting	Latitude	Longitude	Ground	Rim	PVC
VPB 152	197311.98	1126289.12	N40-42-25.60	W73-29-15.67	58.16	NA	NA
BPOW5-6	197327.15	1126285.56	N40-42-25.75	W73-29-15.71	58.21	58.27	57.72
RE118D1	197298.81	1126290.80	N40-42-25.47	W73-29-15.65	57.99	58.00	57.61
BPOW5-5	197284.98	1126291.45	N40-42-25.34	W73-29-15.64	57.97	57.96	57.58



Map Notes

1. Information shown hereon was compiled from an actual field survey conducted from September 23-25, 2014.
2. North orientation is Grid North based on the New York State Plane Coordinate System, Long Island Zone, NAD 83 as obtained from GPS observations.
3. Vertical datum shown hereon is NAVD 88 as obtained from GPS observations.

Legend

○	LP	Light Post
◐	MW	Monitoring Well
○	UMH	Unknown Manhole
○	VPB	Vertical Profile Boring
○	WV	Water Valve

BAR SCALE

30 0 15 30 60

1 inch = 30 ft.

DWG NO. 14-502

Date	RECORD OF WORK	Appr.
7-7-15	ADDITIONAL FIELD WORK	JFC

VERTICAL PROFILE BORING 152 SURVEY LOCATION
692 PINENECK ROAD

TOWN OF SEAFORD | NASSAU COUNTY, NEW YORK

C.T. MALE ASSOCIATES
Engineering, Surveying, Architecture & Landscape Architecture, D.P.C.
50 CENTURY HILL DRIVE, LATHAM, NY 12110
518.786.7400 * FAX 518.786.7299

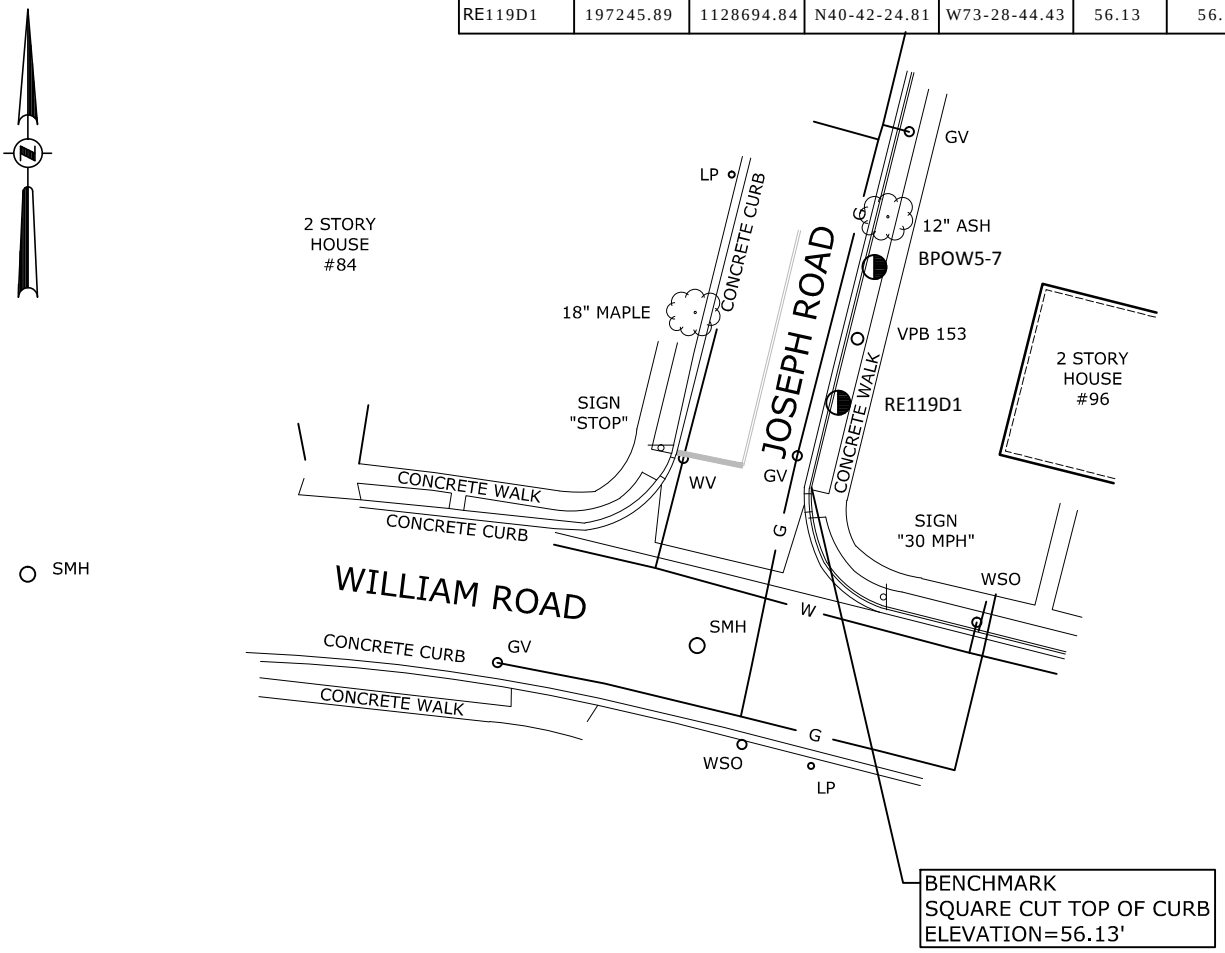
Drafter: LMK	Checker: JFC	SCALE: 1"=30'	DATE: SEPT. 24, 2014
Appr. by: JFC	Proj. No. 14.4121		

CAD DWG. FILE NAME: K:\Projects\14412\1\Survey\Drawings and Maps\VPB 152.dwg

NONE :XREFS

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF SECTION 7209 SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

Description	Northing	Easting	Latitude	Longitude	Ground	Rim	PVC
VPB 153	197259.21	1128698.82	N40-42-24.94	W73-28-44.38	56.28	NA	NA
BPOW5-7	197274.15	1128702.39	N40-42-25.09	W73-28-44.33	56.20	56.29	55.92
RE119D1	197245.89	1128694.84	N40-42-24.81	W73-28-44.43	56.13	56.21	55.61



Legend

GV	Gas Valve
LP	Light Pole
MW	Monitoring Well
SMH	Sanitary Manhole
VPB 153	Vertical Profile Boring
WSO	Water Shut Off
WV	Water Valve
G	Gas Line Markout
W	Water Line Markout

Map Notes

1. Information shown hereon was compiled from an actual field survey conducted on March 26, 2015.
2. North orientation is Grid North based on the New York State Plane Coordinate System, Long Island Zone, NAD 83 as obtained from GPS observations.
3. Vertical datum shown hereon is NAVD 88 as obtained from GPS observations.

BAR SCALE
40 0 20 40 80
1 inch = 40 ft.

DWG NO. 15-217

Date	RECORD OF WORK	Appr.
7-7-15	ADDITIONAL FIELD WORK	JFC

Drafter: LMK | Checker: JFC

Appr. by: JFC | Proj. No. 14.4121

VERTICAL PROFILE BORING 153 SURVEY LOCATION
96 WILLIAM ROAD

TOWN OF OYSTER BAY | NASSAU COUNTY, NEW YORK

C.T. MALE ASSOCIATES
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50 CENTURY HILL DRIVE, LATHAM, NY 12110
518.786.7400 * FAX 518.786.7299

SCALE: 1"=40' | DATE: MARCH 26, 2015

CAD DWG. FILE NAME: K:\Projects\14412\1\Survey\Drawings and Maps\VPB 153.dwg