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REPORT

CHARACTERIZATION OF CVOC CONTAMINATION AT THE FORMER PR-58 NIKE SITE AND ADJACENT NAVY NCBC DAVISVILLE SITE 03 NORTH KINGSTOWN, RI

CONTRACT NUMBER DACA31-94-D-0025 DELIVERY ORDER NO. 0181

Prepared for:

U.S. Army Corps of Engineers, New England District
696 Virginia Road
Concord, MA 01742-2751

Prepared by:

EA Engineering, Science, and Technology, Inc.
175 Middlesex Turnpike, Wyman Building
Bedford, Massachusetts 01730
(781) 275-8846

DRAFT
60957.56.0007
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LIST OF ACRONYMS

$\forall$	empirical constant
Δ_b	Soil dry bulk density
Φ	empirical constant for a given sorbate
atm	atmosphere
bgs	below ground surface
bls	below land surface
BNA	Semi-volatile organic compounds
BRAC	Base Closure and Realignment Act of 1988 and Defense Base Closure and Realignment Act of 1990, collectively
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
C_{atm}	Concentration of the chemical in air at the ground surface
CED	Construction Equipment Department
C_g	Concentration of chemical in gas
CGI	combustible gas indicator
$CHCl_3$	Chloroform
CLP	Contract Laboratory Procedure
cm	centimeter
C_s	Concentration of chemical in solid
CS	Confirmation Study
C_{tot}	Observed soil concentration
$C_{w,eff}$	Effective pore water concentration
DCA (or 1,1-DCA)	1,1-Dichloroethane
1,1-DCE	1,1-Dichloroethene
DCE (or 1,2-DCE [total])	1,2-Dichloroethene (total of cis 1,2-DCE and trans 1,2-DCE)
DANC	Decontaminating Agent Non-Corrosive
DERP	Defense Environmental Restoration Program
DNAPL	Dense Non-Aqueous Phase Liquid
D_o	Vapor phase diffusion coefficient in air
DO	Dissolved Oxygen
D_s	Effective vapor phase diffusion coefficient in soil
DUP	Duplicate
DV	Data Validation
ECD	Electron Capture Detector
E_H	Oxidation-Reduction Potential
EPA	Environmental Protection Agency
eV	electron Volt

LIST OF ACRONYMS (Continued)

famsl	feet above mean sea level
f^c	fraction of cosolvent in water
FID	Flame Ionization Detector
f_{oc}	Percent organic fraction
FS	Flush-Joint
FSP	Field Sampling Plan
ft	feet
GC	Gas Chromatograph
GC/MS	Gas Chromatograph/Mass Spectrometer
gm	gram
gpd/ft	gallons per day per foot
gpm	gallons per minute
H	Henry's Constant
HP	Hydroprobe
HSA	Hollow-Stem Augers
IAS	Initial Assessment Study
ID	Inner Diameter
IDW	Investigation-Derived Waste
in	inch
IR	Installation Restoration
IRP	Department of Defense Installation Restoration Program
J	Steady-state flux
°K	degrees Kelvin
K	Hydraulic conductivity
K_d	Sorption (distribution) coefficient in water
K^m	Sorption coefficient in mixed solvent systems
K_{oc}	Organic Carbon Partitioning Coefficients
K_{ow}	Octanol-Water Partitioning Coefficients
L	Distance
LNAPL	Light Non-Aqueous Phase Liquid
m	meter
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MGD	Million Gallons per Day

LIST OF ACRONYMS (Continued)

Mn	Manganese
Mn^{2+}	Manganese species
MnO_2	Manganese dioxide
mol	mole
mph	miles per hour
mS/cm	millisiemens per centimeter
MS/MSD	Matrix Spike/Matrix Spike Duplicate
mV	millivolts
MW	Monitoring Well
n	Porosity
NAPL	Non-Aqueous Phase Liquid
NAS	Naval Air Station
NBB	Narragansett Bay Basin
NCBC	Naval Construction Battalion Center
NO_2^-	Nitrate
NO_3^-	Nitrite
NTU	Nephelometric Turbidity Units
n_w	Water-filled porosity of soil
°C	Degree Centigrade
OD	Outer Diameter
°F	Degree Fahrenheit
P_a	Air filled porosity
PCA	Perchloroethane (1,1,2,2-Tetrachloroethane)
PCB	Polychlorinated Biphenyls
PCE	Perchloroethylene (Tetrachloroethene)
PID	Photo-Ionization Device
ppb	parts per billion
PPE	Personal Protective Equipment
P_t	Total porosity
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
R	Gas Constant
RB	Roller-Bit
R_f	Retardation factor
RI	Remedial Investigation
RIDEM	Rhode Island Department of Environmental Management
RIEDC	Rhode Island Economic Development Corporation

LIST OF ACRONYMS (Continued)

RIPA	Rhode Island Port Authority
RQD	Rock Quality Designation
SSHASP	Site Specific Health and Safety Plan
S_r	Residual saturation
SQL	Sample Quantitation Limit
SVOC	Semi-Volatile Organic Compounds
T	Temperature
TAL	Target Analyte List
1,1,1-TCA	1,1,1-Trichloroethane
1,1,2-TCA	1,1,2-Trichloroethane
TCE	Trichloroethylene (Trichloroethene)
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOC	Total Organic Carbon
UST	Underground Storage Tank
V	Advective velocity
VC	Vinyl Chloride
V_{NAPL}	Volume of NAPL
VOA	Volatile Organic Analyte
VOC	Volatile Organic Compounds
V_{voids}	Volume of voids
WLI	Water Level Indicator
ug/L	micrograms per liter
ug/kg	micrograms per kilogram
Mh/Mx	hydraulic gradient

1. INTRODUCTION

This Report entitled "Characterization of CVOC Contamination at the Former PR-58 Nike Site and Adjacent Navy Property" (report) has been prepared for the U. S. Army Corps of Engineers – New England District (USACE) to present the results of the joint USACE-Navy chlorinated volatile organic compound (CVOC) investigation under Contract No. DACA31-94-D-0025, Delivery Order No. 0181. As agreed upon by USACE and the Navy, for efficiency and because of the concurrent nature of the joint investigation activities, both the USACE and Navy portions of the joint investigation are included in this Report prepared for USACE with Navy input for the Navy portions. The USACE portion of this investigation (the former PR-58 Nike Site) was preformed under the Defense Environmental Restoration Program-Formally Used Defense Sites (DERP-FUDS) Program. The former PR-58 Nike Site property is currently owned by the Rhode Island Economic Development Corporation (RIEDC). The Navy portion of this joint investigation was performed under the Base Realignment and Closure Act (BRAC) Contract No. N62472-92-D-1296, Contract Task Order (CTO) 0096.

The U.S. Environmental Protection Agency – Region I (EPA) is the lead regulatory agency overseeing activities within the Navy property (BRAC funded). The Rhode Island Department of Environmental Management (RIDEM) is the lead regulatory agency overseeing the activities within the Nike area (DERP-FUDS funded). USACE acknowledges the cooperation and permission for investigative access from: (1) the Carriage Hill Association for adjacent property north of the former Nike Site property and the Navy property, and (2) the RIEDC.

1.1 INVESTIGATION AREA DESCRIPTION, BACKGROUND, AND SCOPE

The former PR-58 Nike Site is located west of and adjacent to Site 03 at NCBC Davisville, in the Town of North Kingstown, Rhode Island, approximately 18 miles south of Providence. A dissolved CVOC plume in deep ground water was detected in samples collected by the Navy in 1995 during their investigation of their Site 03 located on the property adjacent to the former PR-58 Nike Site property. The current investigation of CVOC plume included ground water beneath PR-58 Nike Site and a portion of the adjacent former NCBC Davisville facility.

The PR-58 Nike Site study area is bounded by Perimeter Road (and adjacent offsite Newcomb Road) to the west, Babcock Road to the south, Seabee Avenue to the east and Perimeter Road to the north, plus the offsite area north of Perimeter Road to assess an offsite extension of the CVOC plume (Figures 1-1, 1-2 and 1-2A). Most of the study area is currently forest covered, except for the former missile silo area which is a grass covered field. The highest ground surface elevation of approximately 40 ft above mean sea level (MSL) is located near the northwest and northeast portions of the area. The majority of the former PR-58 Nike onsite study area ranges from approximately 30 ft to 35 ft MSL. Just offsite (north of Perimeter Road), the ground surface ranges from approximately 30 ft to 45 ft MSL.

The NCBC Davisville portion of the CVOC plume includes the areas beneath Study Areas 01 (Construction Engineering Division [CED] Drum Storage Area) and 04 (CED Asphalt Disposal

Area), and Installation Restoration (IR) Program Sites 02 (CED Battery Acid Disposal Area) and 03 (CED Solvent Disposal Area) approximately located between Seabee Avenue to the west, Davisville Road to the south, Marine and Sanford Roads to the east, and Perimeter Road to the north. Most of the NCBC portion of the study area is open grass covered fields with a few shrubs and trees. The area around Building 224, which is located in the study area, is paved. The highest ground surface elevation in the NCBC portion of the study area is approximately 45 ft MSL along Perimeter Road between Seabee Avenue and Leave Street. The ground surface in the vicinity of Building 224 is approximately 40 ft MSL. The remainder of the ground surface in the NCBC portion of the study slopes gently down to approximately 30 ft MSL near the intersection of Seabee Avenue and Parade Street and to about 38 ft MSL along Davisville Road south of Building 224. Northeast of Building 224 and east of Sanford Road, the ground surface slopes more steeply downward toward Allen Harbor.

The main contamination of concern, which is the subject of this investigation, is a dissolved CVOC (Table 1-1) plume in the deep soil and bedrock ground-water zones. The specific CVOC are included in Table 1-1, of which the main compounds (based on the concentrations detected) are perchloroethane (PCA; a.k.a. 1,1,2,2-tetratrachloroethane), trichloroethene (TCE), and total 1,2-dichloroethene (DCE).

The former PR-58 Nike Site property (currently owned RIEDC) and the shallow (water table) overburden ground-water zone at the former PR-58 Nike Site have been the subject of environmental investigations by the USACE under the FUDS program. After those investigations, the Navy's investigations at the adjacent Naval Construction and Battalion Center (NCBC) Site 03 area identified dissolved CVOC in the deep ground-water. The goal of previous Navy investigations (1996-98) that included the former Nike Site was to obtain a sufficient understanding for the Navy of the subsurface conditions as it pertained to the CVOC plume detected in ground water that extends from the Nike site east under the adjacent Navy property. These Navy investigations were performed with the support and cooperation of the USACE. The findings of the Navy's Site 03/Nike Source Area Characterization and Offsite Investigation were incorporated into the Navy's February 1996 Draft Final Phase III RI Report to form the Comprehensive Phase III RI report (EA 1998). Based upon the findings of the Navy's study, the main source area for the CVOC plume detected in deep zone ground-water samples from the Navy property was in the vicinity of monitoring well MW03-14D located just east of the former PR-58 Nike missile silos and west, up-gradient of Navy property.

Based upon these findings and the comments from the U.S. Environmental Protection Agency - Region 1 (EPA) and the Rhode Island Department of Environmental Management (RIDEM), additional characterization of the plume was found to be necessary to further assess the nature and extent of CVOC in the bedrock. This Report details the results of the additional characterization that included consideration of EPA's and RIDEM's.

1.2 OBJECTIVES

The objectives of the USACE portion of the additional CVOC plume characterization within the former PR-58 Nike Site and the adjacent offsite area north of Perimeter Road are to:

- Further assess the nature and extent (lateral and vertical) of the potential primary CVOC source area in the competent bedrock in the vicinity of MW03-14.
- Assess the nature and extent (lateral and vertical) of an alleged (by RIDEM) second petroleum and/or CVOC source area located in the sand and gravel/weathered rock and competent bedrock zones at the end of a 20-25 ft dirt road just east of the former bermed area (where monitoring well EA-114 is located). This area was allegedly an area of historical disposal of solvents and acids.
- Assess the nature and extent of the CVOC plume with specific focus on the northeast edge that extends off the former Nike Site and Navy properties, north of Perimeter Road (impacting the GA aquifer).
- Further assess the natural attenuation of CVOC.
- Assess remedial alternatives in a focused (preliminary screening) manner.

The objectives of the Navy portion of the additional CVOC plume characterization within the Navy property are to:

- Document the direction of bedrock ground-water flow and assess the nature and extent of the CVOC plume in the competent bedrock. This plume has extended east beneath the Navy property from the former PR-58 Nike Site area.
- Further assess natural attenuation of CVOC within the Navy property.

To accomplish these objectives, the following work has been performed:

For the USACE:

- Installation, development, and testing of 13 monitoring wells. Two (2) of the wells were screened in the deep overburden ('D') ground-water zone, 8 of the wells were completed in the shallow competent bedrock ('R') ground-water zone, and 3 of the wells were completed in the deeper competent bedrock ('R2') ground-water zone.
- During drilling, two (2) soil samples were collected and analyzed from two (2) monitoring well locations (i.e., EA-114D and EA-116D).
- Ground water was collected and analyzed from the 13 new wells, plus 19 existing deep ('D'), shallow rock ('R'), and deeper rock ('R2') wells at the site.
- Data validation was performed on soil and ground-water analytical results.
- Preparation of this report documenting the USACE and Navy field investigation results, conclusions, and recommendations.
- Preliminary screening of potential remedial action alternatives.

For the Navy:

- Installation, development, and testing of 5 monitoring wells completed in shallow competent bedrock ground-water zone.
- Sampling and analyzing of ground water from the 5 new wells, plus 31 existing deep ('D') and rock ('R') wells in the NCBC Site 03 vicinity.
- Performance of data validation of the ground-water analytical results.
- Preparation and incorporation of the related Navy field investigation results, conclusions, and recommendations in this USACE report of the joint Navy / USACE investigations.

1.3 SUMMARY OF SITE HISTORY

1.3.1 Former PR-58 Nike Site

The former PR-58 Nike Site is currently owned by the Rhode Island Economic Development Corporation (RIEDC). The area bounded by Perimeter Road, Seabee Avenue, and Babcock Road, which was part of Camp Thomas, was not used after World War II until 1955-1956 when the U.S. Army constructed a Nike Missile battery at the far west end of the Navy property (Figure 1-2) (ESE 1984). The area between the Nike Site and Seabee Avenue has not been used since World War II as evidenced by the mature forest which this area now supports. Aerial photographs dated 1951, 1957, 1963, 1970 and 1976 show the area as vegetated and undeveloped.

The former Nike facility (Nike Battery Site PR-58) included three underground missile silos (Buildings 347, 348 and 349), a refueling area located to the south of Building 347, a missile assembly and test building (Building 344) with an underground storage tank (UST), a generator building with a 4,000 gal UST (Building 345), and personnel quarters (Metcalf and Eddy, 1994). The facility (a Nike "Ajax" only site) was constructed during the initial round of Nike Site construction in the mid-1950s and was equipped with short-range, conventionally armed Nike Ajax missiles. The PR-58 facility was deactivated in 1962.

Construction drawings of the Nike Site show a leaching field for sanitary wastes 250 ft east of Building 343, which was then used as the Ready (personnel) Building. The building was later used by the Navy as a training classroom. Each missile silo was equipped with a sump pit to collect liquids that accumulated in the bottom of each silo. The contents of the pit were pumped via pipe and discharged directly into a ditch that ran along the eastern edge of the silos. The concrete pad that surrounded the silos also drained into this ditch. An acid neutralization pit and drainage sump were reportedly located at the missile refueling area which was just south of the three former missile silos.

There is no site-specific documentation regarding the use, storage or disposal of hazardous material at this former PR-58 Nike Site. However, for Nike sites in general, a variety of chlorinated organic solvents such as carbon tetrachloride, tetrachloroethene (PCE), trichloroethane (TCA) and TCE were reportedly used for parts cleaning, cleaning of grease spills,

and overall cleaning in preparation of painting. Typical quantities used ranged from 30 to 120 liters per month of TCE and 190 to 380 liters per month of other solvents.

At the time of deactivation of a Nike Site, fuels and other chemicals in excess of recorded inventory were generally dumped onsite into a ground sump or on the ground (ESE 1984). For the former PR-58 Nike Site, the location of this sump / disposal area is not known. Discharges from sumps located in the bottom of each missile silo reportedly discharged into a drainage ditch located at the east edge of the concrete pad around the silos. That drainage ditch may have been the north-south oriented swale now located just east of the grass covered field where the missile silos, now demolished (refer to Section 1.3.1.3), had been located. This drainage ditch in turn emptied into a catch basin that was attached to the storm water drainage system shown in Figure 1-3. During dry weather periods, discharges from the sumps to the ditch probably infiltrated into the ground; however, during storm events, a portion of the discharge would have been carried into the storm water drainage system. Exfiltration of solvent-containing storm runoff from joints in the clay/cement pipes and catch basin bottoms may have occurred downgradient of the former PR-58 Nike Site. In that manner, the drainage system could transport VOC downgradient more quickly in an easterly direction than would be expected if it infiltrated at the point of the release into the subsurface and then flowed with the ground water from that point. As reported for Nike sites in general, some instances have been reported where excess material was transported offsite and dumped on open nearby areas (ESE 1984; Law 1986). Based upon available ground-water table elevation data calculated from two measurement events (May-June 1995 and July 2000) in monitoring wells, Figures 1-3A and 1-3B (respectively) illustrate that the ground-water table is below the storm water drainage system. These data indicate that the ground-water table and the main drainage line were the closest (approximately 1.3-1.4 ft) in the area between the former southern missile silo (Building 347) and Seabee Avenue in May-June 1995. Therefore, it does not appear that the shallow ground water would infiltrate the drainage lines, except possibly for short time frames during a seasonally higher water table.

1.3.1.1 Previous Navy Use of the Site

The Navy used the area west of the missile silos as the Disaster Recovery Training Area (Figures 1-2 and 1-2A) between 1964 and 1974 (SEC 1988). The training complex was comprised of 5 to 6 buildings constructed by the Navy, and was used to train Navy personnel for nuclear, chemical, and biological warfare. The training consisted of two weeks of classroom instruction on the fundamentals of nuclear weapons and chemical and biological agents, and two weeks of hands-on training. Available information about the uses of industrial chemicals for disaster training comes from a 1984 interview of Mr. Curt Fischer, Head of the Disaster Recovery Training Department at NCBC Davisville from 1964 to 1967. The interview was conducted as part of the preparation of the IAS (Hart 1984). According to Mr. Fischer, tear gas grenades, smoke pots, and biological agent simulants were used. Detonation cord, blasting caps and plastic explosives were also used in small quantities. All materials were considered to be consumed in use. Mr. Fischer also recalled that dozens of 5-gal containers of DANC[1] [Decontaminating Agent - Non-

[1] DANC is a mixture of 1,1,2,2-tetrachloroethane (PCA) and 1,3-dichloro-5,5-dimethylhydantoin

Corrosive] were stored at the Disaster Recovery Training Area. He did not recall any training with DANC. (A single empty 5-gal container label "decontaminating agent" was found in the vicinity of the former Disaster Training Area by the Navy in May 1995.) Monitoring wells EA-105D/R were installed in this area to investigate the possibility of historical release(s) of CVOC.

There are 30 pipes that rise about 4 ft above grade located east of the missile silos (referred to as the "pipe structure area" on Figures 1-2 and 1-2A). In 1988, the pipes were described as being filled with sand with the words "chemical agent" stenciled on them (SEC 1988). Decontamination and/or disposal of toxic materials exercises may have been conducted utilizing the "pipe structure" for disposal simulations. However, it is not known if actual chemicals were used in the simulations (SEC 1988). The Navy conducted interviews of former NCBC personnel to gather additional information about the pipe structure. No additional information was provided by these interviews. Monitoring well EA-103 was installed in this area to investigate the possibility of historical release(s) of CVOC.

1.3.1.2 Previous Peabody Clean Industries Use of the Site

In 1974, the land to the west of Seabee Avenue was transferred to the General Services Administration (GSA). In 1978, the GSA transferred ownership to RIPA (now RIEDC). RIPA leased 2.2 acres of land to Peabody Clean Industries between 1980 and 1982 for use as a hazardous waste tank farm (Figure 1-2). Estimates given indicate that at any one time, a maximum of 50,000 gallons of oil / water waste, 10,000 gallons of waste solvents, waste oil and sludge and 20 drums of various hazardous materials were on site (Halliburton NUS 1990). Three out of seven areas used by Peabody Clean Industries (A-3, A-4, and A-5) are located adjacent to the Nike Site. Four 20,000-gal, above ground storage tanks (AST) used to store water, oil and some solvent waste were located in Area A-3 as shown on Figure 1-2. A leaching field used for disposal of water phase of oily bilge waste was also located in this area. Two buildings used by Peabody Industries to store non-hazardous equipment and supplies were located in Area A-4, while Area A-5 was used to temporarily store drums of hazardous waste (SEC 1988; Metcalf and Eddy 1994). Peabody Clean Industries ceased operations in 1982 and conducted closure activities through 1983 (ERA 1984). In 1983, RIDEM directed Peabody Clean Industries in a cleanup of contaminated soil that had resulted from the Peabody Clean Industries activities at the site. RIPA (now RIEDC) removed the 4,000-gal UST at Building 345 and demolished many structures, including Building 345, as part of the cleanup/closure activities.

1.3.1.3 USACE Sampling and Demolition of Missile Silos

In September 1995, silo water, hydraulic fluid and surface sheen samples were collected from each of the three silos located at the Nike site (ESS 1995). Each surface sheen sample was laboratory analyzed for TPH (418.1), total metals, and VOC (8260). TPH was reported at concentrations ranging from 1,100,000 mg/kg (silo 2) to 1,600,000 (Silo 3). Metals detected in the surface samples included barium in concentrations of 189 mg/kg (Silo 1) and 487 mg/kg (Silo 3), and lead in concentrations of 18 mg/kg (Silo 3) and 19 mg/kg (Silo 1). Metals were not

detected in the surface sheen sample collected from Silo 2. One VOC (Methyl tert-Butyl Ether) was detected in surface sheen samples from one sample location (Silo 3) at a concentration of 208 ug/kg.

Water samples were collected from all three silos and laboratory analyzed for TPH (418.1), total metals (for Silo 3, the total metals sample was collected from the aqueous layer and from the oil layer), and VOC. TPH was detected at concentrations ranging from 33 mg/L (Silo 2) to 430 mg/L (Silos 1 and 3). Total metals detected in the Silo 1 water sample included barium (0.6 mg/L) and lead (0.2 mg/L). Barium was the only metal detected in the Silo 2 water sample (0.9 mg/L). For Silo 3, total metals detected in the aqueous layer sample included barium (2.8 mg/L) and lead (0.2 mg/L), and total metals detected in the oil layer sample included barium (161 mg/L), and lead (24 mg/L). VOC were not detected in the Silo 1 or Silo 2 water samples. VOC detected in the Silo 3 water sample included toluene (7 ug/L) total xylenes (9 ug/L) and 1,2,4-Trimethylbenzene (6 ug/L).

Hydraulic fluid samples were analyzed for flashpoint, polychlorinated biphyenyls (PCB) and water miscibility. Flashpoint results for all three samples were reported as "no flash". PCB were not detected in any silo hydraulic fluid samples. Water miscibility was reported as negative for Silo 1 and Silo 2 hydraulic fluid samples. Water miscibility for Silo 3 hydraulic fluid sample was reported as positive.

Additionally, one soil sample was composited from 9 locations along the berm located south of the silos and submitted for laboratory analysis for VOC (8260), TCLP VOC, TCLP SVOC, TCLP Organochlorine Pesticides, TCLP Organochlorine Herbicides and metals. No analytes were detected from the soil sample submitted for laboratory analysis. (Environmental Science Services, 1995)

In preparation for demolition of the silos, water from the silos was removed, filtered, and sampled. The three silos were dewatered from 24 October to 1 November 1995. During dewatering, water from the silos was filtered through a carbon filter system and a sample of the effluent was submitted for laboratory analysis of total petroleum hydrocarbons (TPH) (method 418.1), total metals, and VOC (method 8260). Filtered water was disposed of onsite. Periodic screening of effluent was performed using a PID and jar headspace methodology. No elevated PID readings were recorded. Six effluent samples were submitted for laboratory analysis. TPH was detected in one sample collected from effluent from Silo 1 at a concentration of 1 mg/L. Barium was detected at a concentration of 1.2 mg/L from the effluent sample collected from Silo 3. Lead was detected from the effluent sample from Silo 1 at a concentration of 0.2 mg/L. Three samples were submitted for VOC analysis. VOC were not detected. Thirty-one PID jar headspace samples were screened onsite during silo dewatering activities. All headspace samples were reported at 0 ppm. (Hydro Environmental Technologies, 27 November 1995)

1.3.1.4 USACE Closure of UST at Building 344

The 500-gal #2 fuel oil UST at Building 344 was removed by Green Environmental, Inc under contract to the USACE (RIDEM Closure Certificate, UST Facility ID 16920, dated 2 January 1995). On 9 November 1994, a 500-gallon No. 2 fuel oil UST was removed near Building 344 at the Nike Site PR-58. The tank was transported to a certified tank disposal facility. Approximately 377 gallons of oil/water were removed from the tank and disposed of by Jetline Services. Groundwater was not observed in the excavation during removal activities. Soil impacted with fuel oil was excavated and stockpiled. Confirmatory soil samples were collected from three sidewalls and the excavation bottom and laboratory analyzed for TPH (418.1) and VOC (8240). The excavation was lined with polyethylene sheeting and backfilled. Elevated concentrations of TPH were detected in samples submitted from sidewalls from the excavation. Personnel from Green Environmental returned to the site on 1 February 1995 to continue the excavation. Water with a sheen was observed in the excavation. A sample of the water was collected and submitted for laboratory analysis of TPH and VOC. Excavation was limited due to the presence of a 275-gallon AST adjacent to the building. Soil samples were collected from sidewalls and bottom of the excavation and submitted to a laboratory for analysis of TPH and VOC. The excavation was lined with polyethylene sheeting. On 26 October 1995, Green Environmental returned to the site again to continue excavation due to elevated concentrations detected in soil samples submitted in February 1995. The 275-gallon AST was removed prior to further excavation. Soil samples were collected from sidewalls and bottom of the excavation and submitted for laboratory analysis of TPH and VOC. The final VOC results were ND for all samples. TPH was detected in concentrations ranging from ND to 66 mg/kg (eastern sidewall). A total of 28.70 tons of petroleum impacted soil were recycled by in asphalt batching by Bardon Trimount, Stoughton, Massachusetts. Green Environmental recommended no further action at this site. (Green Environmental 1995)

In 1995, the Army drilled holes in the bottom of each of the PR-58 Nike missile silos, backfilled the missile silos with clean sand, and demolished the concrete pads surrounding the silos (refer to Section 1.5.4.1).

1.3.2 Former NCBC Davisville Facility and Related Sites

1.3.2.1 Former NCBC Davisville Facility

In 1942, Davisville was designated as the Advanced Base Depot as part of NAS Quonset Point activities, and a pier was constructed. Later that year, the Naval Construction Training Center (NCTC), known as Camp Endicott, was established at Davisville to train newly established construction battalions. By November 1942, the camp was at capacity; housing 15,000 enlisted personnel and 350 officers. More than 100,000 personnel were trained at Camp Endicott by the end of World War II.

The NCBC Davisville area experienced reduced activity between World War II and the Korean Conflict. In 1951, it became the Headquarters of the Construction Battalion Center. The

Construction Battalion Center loaded ships and trained personnel for both the Korean and Vietnam conflicts. In 1952, the Naval Construction Training Unit was established at Davisville.

In 1974, operations at NCBC were greatly reduced pursuant to the Shore Establishment Realignment Act of 1973. NCBC's mission was to provide mobilization support to the active Naval Construction Force; to act as a mobilization base for the rapid assembly, outfitting, and readying of Reserve Construction Battalions; to store, preserve, and ship advanced base and mobilization stocks; and to procure, receive, pack, and ship collateral equipment for Atlantic, European, and Caribbean military construction projects. In 1989, EPA added NCBC Davisville to the National Priorities List (54 Federal Register 48184, 1989) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) because of contamination reported at other NCBC Davisville sites. In 1991, the closure of NCBC was announced, and operations were phased down to minimum staffing levels for public works, maintenance, security, and personnel.

NCBC was decommissioned on 25 March 1994 and closed on 1 April 1994. The facility has been transferred to Northern Division, Naval Facilities Engineering Command, which has caretaker status pending disposal of the property. Most of the staff and materials have been moved offsite. Currently, a Navy Caretaker remains onsite associated with base closure.

1.3.2.2 NCBC IR Program Sites 02 and 03, Study Areas 01 and 04

Study Area 01 - CED Drum Storage Area

Study Area 01 is the CED Drum Storage Area (Figures 1-2 and 1-2A) and is located approximately 200 ft north of Building 224. It is currently a grassed, open field, a portion of which was converted into a leaching field in 1991. From the late 1960's to 1974, 55-gal drums of liquid waste, reportedly containing waste oil and solvent were stored in an open field north of Building 224. As many as 500 drums were stored there at one time. The drums were reported to be in deteriorating condition, and may have leaked liquids into the ground (Fred C. Hart 1984). The drums were removed in 1974. No testing of the soil beneath the drums was performed at that time. File information indicates that the leaching field was operative from December 1991 to April 1992 to dispose of surface water runoff and storm water from a truck washing area located south of the site at Building 224 (Halliburton NUS 1994a). The leaching field was closed in accordance with the Rhode Island Department of Environment (RIDEM) Regulations.

IR Program Site 02 - CED Battery Acid Disposal Area

Site 02 is a paved, flat area bounded to the west by Sayers Street, to the south by Warren Street and to the north and east by Building 224 (Figures 1-2 and 1-2A). Building 224 is not included in Site 02.

A dry well and leaching field were located at the southwest corner of the CED Building 224 (Figure 1-2). A floor drain inside the battery shop discharged into the dry well and leaching field

in the northern portion of Site 02 (Hart 1984). It was estimated that approximately 18,000 gal of dilute sulfuric acid were disposed, at a rate of approximately 60 gallons per month between 1955 and 1980. The acid reportedly contained lead (TRC 1991). The dry well and associated leach field were removed by Foster Wheeler in June 1996 (See Close-Out Report for the Time-Critical Removal Action at Site 02, NCBC Davisville, Rhode Island, Foster Wheeler Environmental Corp., 6 September 1996). Closeout for Site 02 included removal of water and sediment from the dry well chamber, removal and demolition of the dry well chamber and associated piping, removal of piping from the adjacent leach field, excavation of lead-impacted soil, decommissioning of three monitoring wells, and cleanup of the battery rooms in Building 224 and Building A10CT.

IR Program Site 03 - CED Solvent Disposal Area

Site 03 is an unmarked, previously paved lot to the west of Sayers Road, north of Parade Road and south of Battalion Boulevard (Figures 1-2 and 1-2A).

From 1955 to the late 1970s, paint thinners and unidentified solvents were disposed on the ground, west of Sayers Street and Building 224. Neither the exact manner of solvent disposal nor the precise limits of the disposal area are known; however, the solvent disposal activity is thought to have occurred in an area, which borders Sayers Street. An Initial Assessment Study (IAS) performed by Fred C. Hart Associates, Inc. (Hart 1984) estimated that approximately 3,000 gallons of solvents were disposed at a rate of about 10 gallons per month. Part of Site 03 was also used to store heavy equipment (TRC 1991).

The area to the immediate west of Site 03, and extending north and west to Perimeter Road was the former Camp Thomas. During World War II, military personnel were temporarily housed here. The camp included 800 huts scattered over 130 acres. At that time, Building 224 served as a recreation hall, drill hall, bowling alley and pool (Ecology and Environment 1994). Camp Thomas was demolished after World War II. Building 224 was converted into a truck/heavy equipment maintenance facility in the early 1950's, and was used in that capacity until base closure in 1994.

Study Area 04 - CED Asphalt Disposal Area

Study Area is located approximately 800 ft west of Building 224 (Figures 1-2 and 1-2A). Battalion Boulevard is located about 80-ft south of Study Area 04. Sometime in the late 1960's, a black, pliable, solid, asphaltic material was placed in a trench in this area. The source of this material is unknown (Halliburton NUS 1994b). This area was excavated by Foster Wheeler in November 1996 under contract with the Navy. Asphaltic material and affected soil were removed during the excavation. Four pits were excavated to remove asphalt material. Confirmatory sampling was performed on the sidewalls and bottom of the excavation pits. Samples were analyzed for TPH and PCB. Excavations were backfilled with clean soil in December 1996 after confirmatory sampling yielded results below the RIDEM criteria of 10 ppm for PCB and 300 ppm for TPH. Details of the excavation can be found in the Contractor's

Close-Out Report for the Removal Action at Study Area 4, NCBC Davisville, Rhode Island (Foster Wheeler 1997).

Former Gravel Pit and Training Area

This area is not a Study Area or IR Program Site, but a description has been included for a more complete understanding of the historical uses of the overall area included in the Navy's portion of this study. The former gravel pit area is bounded by the Sanford Road, Westcott Road, Davisville Road, and Allen Harbor (Figure 1-2). It was originally part of an old farm and homestead prior to the construction at NCBC Davisville. The farmhouse still exists (Building D272) and was used as a residential unit by the Navy.

Aerial photographs dated 1951 and 1963 indicate that a portion of this area was mined for construction/fill materials (gravel and/or sand) prior to 1951 with additional excavation and site work at some point between 1951 and 1963. Materials from this borrow pit (known as the "Snake Pit") were used to fill in low spots and wetlands in the area.

The area north and northeast of the Snake Pit was also converted into a heavy equipment operator-training site at some point between 1951 and 1963. The original topography consisting of fields/farmland and coastal wetlands were leveled and altered during the training which took place until at least 1970. Aerial photographs (1970) indicate that some heavy equipment was stored here. The area is currently vegetated with grass and shrubs.

1.4 SUMMARY OF PREVIOUS INVESTIGATIONS

USACE has performed two previous studies at the former PR-58 Nike Site, and RIDEM has performed a study at the Peabody Clean Industries used portion of the site. The results of these studies are summarized below. Boring logs and well diagrams of previously existing USACE and Navy wells included in the most recent ground-water sampling event (September-October 2000) are included in Appendix A1. Pertinent 1995, 1996, and 1998 Navy-collected data related to the CVOC plume in deep ground water is provided in Appendix A2.

1.4.1 Former PR-58 Nike Site

There have been three previous investigations conducted at the former Nike Site: The Peabody Clean Industries Closure/Post Closure Plan, a Confirmation Study (CS), and an Engineering Evaluation of Contamination Study. Additionally, the Nike Site is being investigated as part of the Phase III RI.

1.4.1.1 The Final Closure and Post Closure Plan for Peabody Clean Industries Hazardous Waste Tank Farm

The first investigation was conducted in 1982 and 1983 to support the closure of the Peabody Clean Industries hazardous waste storage facility (ERA 1984). Three of six areas used by

Peabody Clean Industries (A-3, A-4, and A-5) were located adjacent to or on the Nike Site (Figure 1-2).

Area A-3 consisted of four ASTs used to store oil, water, and some solvent wastes, two small buildings and a leaching field. The ASTs were drained, cleaned and reportedly scrapped, except for Tank G, which was reportedly given to the State of Rhode Island, and the hazardous materials from the tanks were solidified and shipped to CECOS International, Niagara Falls, NY for disposal. Approximately 10 cubic yards of contaminated surface soil from beneath the tanks were combined with other excavated soil (see below) and shipped to Central Landfill, Johnson, RI for disposal.

On 12 January 1983, the Area A-3 three-trench leach field with a wooden distribution box was investigated with "exploratory holes" (ERA 1984), and oily material was found in two of the trenches. A sample of the soil from the oiliest trench was analyzed for barium, cadmium, chromium, and lead and analyzed for EP Toxicity, VOC, and PCB. No PCB were reported. Barium (0.9 mg/L) was the only metal reported. VOC were reported by the laboratory in parts per million (ppm) and included 1,1- dichloroethane (DCA) at 3 ppm; 1,2-DCA at 2 ppm; 1,1,1-TCA at 19 ppm; PCE at 2 ppm; chlorobenzene at 1 ppm; toluene at 3 ppm; ethylbenzene at 4 ppm; and xylene at 8 ppm. Based on these data, the material was classified as non-hazardous. Therefore, between 24 January and 28 January 1983, approximately 710 cubic yards of soil were removed, replaced with clean fill, and shipped to Central Landfill, RI for disposal. No post-removal confirmatory sampling was conducted.

On 12 January 1983, a soil sample was collected from near the "tool shed" in Area A-3 and analyzed for the same parameters. No PCB or VOC were reported in the sample.

Ground water in the vicinity of the Area A-3 area leach field was sampled from test trenches. According to the ERA report, four samples were collected from the pits on 24 January 1983 and analyzed for dissolved metals and VOC. The analytical results reported no metals for the samples. Low concentrations of several CVOC were reported, including: 1,1-DCA at a maximum of 10 ppb; 1,1,1-TCA at 10 ppb; TCE at 1 ppb; PCE at 1 ppb; chloroform at 4 ppb; carbon tetrachloride at 1 ppb; and up to 97 ppb methylene chloride. According to the ERA report, four wells were subsequently installed on 14 April 1983 and sampled on 28 April 1983 for analysis of methylene chloride. Methylene chloride was reported at 1 ppb or less. No boring logs or well construction diagrams for the wells installed in Area A-3 were presented in the report or available in the RIDEM files. In correspondence from RIDEM dated 3 March 1983 regarding "*Groundwater Monitoring Requirements for the Davisville, Rhode Island Leachfield Area Off Perimeter Road*", Peabody International Corporation was directed to install four monitoring wells to evaluate the direction of ground-water flow and the degree of contamination. RIDEM outlined the following basic requirements for well construction:

1. "Fully penetrating" into the ground-water table with the pipe being slotted from about 5 feet above the ground-water level to at least ten ft below the ground-water surface.

2. Constructed of polyvinyl chloride (PVC) pipe or equivalent with riveted or pressure fit joints. No glued joints should be used, as this would add another possible source of contamination to the ground-water samples.

Therefore, it is highly likely that the wells were installed as water table wells with 15-ft screens, but there are no diagrams to confirm this. Only three of the wells, designated EW-A, EW-B, and EW-C were located at the time the Sirrine study (Sept. 1988) was conducted, and their locations are shown in Appendix A2, Figure 1-4.

Area A-4 consisted of two small buildings that were used for storage of non-hazardous equipment and supplies. The supplies in the buildings were removed and the buildings were demolished by RIPA. No samples were reported to have been collected in this area.

Area A-5 consisted of a fenced concrete pad used for temporary storage of drums containing hazardous waste. According to the ERA report, all hazardous materials from the drum storage area were disposed of at CECOS International in Niagara Falls, NY. RIPA demolished and removed the chain-link fence and concrete pad. Representatives from RIDEM reportedly sampled soil at A-5 in 1982, but results were not available in the file or the ERA report. On 12 January 1983, one soil sample was collected from the drum storage area and analyzed for barium, cadmium, chromium, and lead using the EP Toxicity Procedure, as well as for VOC and PCB. No VOC or PCB were reported. Among the metals, only barium was reported at 0.6 mg/L.

1.4.1.2 Confirmation Study (Sirrine Environmental Consultants, 1988)

The second study was a CS conducted by Sirrine Environmental Consultants (SEC) under contract with the USACE-Omaha District. The objective of the CS was to assess the presence or absence of chemical contamination that may have been caused by Department of Defense (DOD) related activities at the Nike Site (SEC 1988). The field investigations were conducted between October 1987 and December 1987, and the report was submitted in September 1988. The CS included the following field activities to evaluate site conditions:

- Installation of 4 monitoring wells (NMW-1 to NMW-4) screened at the water table at the locations shown in Appendix A2, Figure 1-4.

- Drilling of a test boring adjacent to the inactive tank north of Building 344 (NB-1), and the collection of 3 soil samples (NB-1-S1 to S3). Field headspace screening was used to select the interval with the highest volatile organic reading to be submitted for laboratory analysis for VOC, metals, PCB, TOC, total halides (TOX), phenols, and total recoverable petroleum hydrocarbons (TRPH).

- Collection of ground-water samples from the four wells and water samples from the bottom of each silo (NSW-1 to NSW-3), and analysis of each sample for VOC, metals, TDS, TOC, TOX, phenols, and TRPH.

- Collection of 9 near surface soil samples (NG-1 to NG-9, 6 to 24 inches (bls and analysis for VOC, metals, PCB, TOC, TOX, phenols and TRPH.

- Performance of a conductivity and magnetometer survey centered on the "pipe structure area" (Figures 1-2A and 1-2B).

The results of the CS are summarized below:

Surface Soil

Methylene chloride (8-21 ug/Kg), acetone (11-19 ug/Kg), chloroform (2 ug/Kg) and trichloromethane (1-5 ug/Kg) were reported in soil samples. The report concluded that these compounds were laboratory artifacts. No other VOC were reported.

PCB were not reported in any soil samples.

Phenols were reported to be present in 5 of the 10 samples (NG-1, NG-3, NG-4, NG-7 and NG-9) at concentrations that ranged from 0.1 to 3.5 mg/kg. The SEC report stated that phenols were reported in soils at levels determined to be of concern, and attributed its presence to past DOD activities. However, the reported concentrations are below EPA Region III RBCs. TRPH was reported in samples NG-1, NG-2, and NG-6 at concentrations that ranged from 26 to 2,122 mg/kg. The highest concentration was in sample NG-1which is located southeast of Building 344 (Appendix A2, Figure 1-4)

Metal concentrations were less than background levels except for cadmium (4.5 mg/kg), lead (195 mg/kg), and zinc (719 mg/kg) reported in sample NG-4 and selenium (2.2 mg/kg) reported in sample NG-7. Sample NG-4 is located in the bermed area south of Building 347, and NG-7 is located west of Building 349.

Subsurface Soil

The soil sample collected from 10 to 12 ft bls at NB-1 was analyzed for VOC, PCB, TRPH, phenols, TOX, and TOC. Benzene and toluene were reported to be present at 2 ug/Kg each. No PCB, TRPH, phenols or TOX were reported. TOC was reported at 7,760 mg/kg.

Silo Water

Water samples were collected from the bottom of each former missile silo (building). Acetone (9-65 ug/L) was reported in two samples (NSW-1 from Building # 347 and NSW-3 from Building # 349, Figure 1-2) and methylene chloride (8 ug/L) in one sample (NSW-3). No other VOC were reported. No TRPH was reported in surface water. Antimony (5.1-18 ug/L), chromium (14-26 ug/L), lead (8.2-177 ug/L), and zinc (88-367 ug/L) were reported in all three samples. Cadmium (0.45-0.67ug/L) was reported in NSW-2 (Building # 348) and NSW-3.

Phenol was reported in NSW-1 at 12 ug/L, TOC in the samples from NSW-1 and NSW-3 at 59 and 66 mg/l, respectively, and TOX at 91 and 29 mg/l, respectively.

Ground Water

Acetone was reported in samples from wells NMW-1 and NMW-2 at 52 and 7 ug/L, respectively. 1,1-DCA, 1,1,1-TCA and TCE were reported in the sample from NMW-3 at 1, 1, and 2 ug/L, respectively. NMW-3 is located downgradient (west) of the former missile silo (Building # 348, Figure 1-2). No VOC were reported in NMW-4. Reported metals concentrations were below MCLs in all four well samples. TOC ranged from 2.7-4.25 mg/l and TOX ranged from 66-80 mg/l. No phenols or TRPH were reported in any of the four ground-water samples.

Geophysical Survey

A surface geophysical study consisting of an electromagnetic (Geonics EM-31) as well as a Fisher FX-3 Ferro Probe survey was performed in the wooded area to the east of the Nike Site. Several anomalies were reported around the pipe structure area. The anomalies were interpreted as metal objects buried at 2 to 3 ft below ground surface.

Conclusions

SEC concluded that no degradation of ground-water quality had occurred; however, some degradation of soil and surface water had occurred. SEC also concluded that the elevated metal concentration were the results of past DOD activities, but did not provide any supporting documentation. No specific conclusions were provided for the CVOC reported in NMW-3 (SEC 1988).

1.4.1.3 Engineering Evaluation of Contamination Study (M&E, 1993)

Metcalf and Eddy conducted an engineering evaluation of contamination study under contract with the USACE-New England Division. The primary objective of the study was to confirm or deny the presence of selected COC resulting from past DOD activities. A soil gas survey was performed between 4 and 10 June 1993. The remaining field activities occurred between 4 and 10 October 1993, and the report was issued in November 1994. The scope of Metcalf and Eddy's evaluation included the following:

- Soil gas survey consisting of 133 sample points field-analyzed using a gas chromatograph (GC) for methane and VOC as described in the final Soil Gas Survey Report (M & E 1993d).

- Collection of 21 near surface soil samples (SB-1 through SB-21), and five subsurface samples from the monitoring well borings (ME-1 through ME-

4) at the locations shown in Appendix A1, Figure 1-4, and analysis of those samples for VOC, SVOC, pesticides/PCB, TAL, and TRPH.

- Installation of four monitoring wells (ME-1 through ME-4) screened at the water table (Appendix A1, Figure 1-4), and collection of ground-water samples from those wells, as well as the four wells installed by SEC in 1988 and analysis of the samples for VOC, SVOC, PCB/Pesticides, TAL, and TRPH.

Boring logs and well installation diagrams are included in the Comprehensive Phase III RI Report (EA 1998; Appendix A-2 and analytical results are presented in Appendix B-2). The results of the engineering evaluation are summarized below:

Subsurface Soil

Benzene was reported at 1 ug/Kg in the soil sample from ME-3. VOC were not reported in any other subsurface soil sample.

Di-n-octylphthalate was reported at 38 ug/Kg, and heptachlor at 0.29 ug/Kg in the ME-2 soil sample collected from 10 to 16 ft bls and di-n-octylphthalate at 49 ug/Kg in the ME-3 soil sample from 4 to 10 ft bls. TRPH was not reported in any of the soil samples analyzed.

Thirteen inorganic analytes were reported in the subsurface soil samples. All TAL analytes except cadmium and selenium were reported in all the samples. Cadmium was reported in the samples from ME-1 and ME-2 at 0.26 mg/kg and 0.17 mg/kg, respectively. Selenium was reported in the samples from ME-4 and ME-1 at 0.58 mg/kg and 0.43 mg/kg, respectively.

Near Surface Soil

Toluene was reported at eight sampling locations at concentrations between 1 and 5 ug/Kg. Benzene and toluene were reported at 1 ug/Kg at SB-4 and SB-19, respectively. 1,1,2,2-PCA was reported in SB-19 at 2 ug/Kg.

Two types of SVOC (PAH and phthalates) were reported in the near surface soil samples. PAH were reported at four sampling locations (SB-2, SB-14, SB-19 and SB-20).

Three pesticide compounds (heptachlor epoxide, 4,4'-DDE, and 4,4'-DDT) and PCB-Aroclor 1260 were reported in near surface soil samples. Pesticides were only reported in three samples (SB-7, SB-14 and SB-19). All three pesticides were reported above the quantification limit (QL) in SB-14. 4,4'-DDT at 8.3 ug/Kg and 4,4'-DDE at 2.8 ug/Kg were reported in SB-19, while only 4,4'-DDT was reported at 8.8 ug/Kg in SB-7. Aroclor 1260 was reported at 300 ug/Kg in SB-7 and at 64 ug/Kg in SB-15.

Fourteen of the 23 inorganic analytes were reported in the near surface samples. Ten of these analytes (aluminum, arsenic, beryllium, chromium, iron, lead, magnesium, manganese, nickel, and potassium) were reported in nearly all the samples. Antimony, cadmium, and selenium were reported less frequently. The inorganic data are summarized in Appendix B-2 of the Comprehensive Phase III RI Report (EA 1998).

TRPH was not reported in the near surface soil samples.

Ground Water

Four VOC (carbon disulfide, 1,2-DCE, TCE, and 1,1,2,2-PCA) were reported in the monitoring well samples. Carbon disulfide was reported in two of the samples collected (NMW-2 and the duplicate collected from NMW-1) at concentrations less than the QL. Three CVOC were reported in the ground-water sample from NMW-2. The compound with the highest concentration reported was 1,1,2,2-PCA at 28 ug/L. TCE and 1,2-DCE were reported at 17 and 6 ug/L, respectively. 1,1,2,2-PCA was also reported at NMW-4, but at a much lower concentration (2 ug/L).

The only SVOC reported in the samples from the monitoring wells was bis(2-ethylhexyl)phthalate which was reported in samples from six of the monitoring wells at concentrations between 2 and 5 ug/L.

Heptachlor was reported in the sample collected from ME-1 at a concentration of 0.011 ug/L. No other pesticides or PCB were reported in the other monitoring well samples.

Nineteen different inorganic analytes were reported in samples collected from the monitoring wells. The results are presented in Appendix B-2 of EA 1998.

The ground-water samples, with the exception of NMW-3, were reported to be turbid (contained silt). The presence of silt appeared to correlate with elevated metals results. The metals concentrations for all parameters were generally significantly less in the sample collected at NMW-3, which was not turbid and did not appear to contain any silt.

Petroleum hydrocarbons were not reported in the ground-water samples analyzed.

Conclusion

The Metcalf and Eddy report concluded that no significant human health or environmental risk existed at the former Nike Site and recommended no further site investigation to address onsite sources.

1.4.1.4 Related Portions of the Navy's Phase III Remedial Investigation

In 1995, the Navy began conducting a Phase III RI which included the adjacent PR-58 Nike Site. During March and April of 1995, a geophysical seismic refraction study was performed across portions of NCBC Davisville and included portions of the Nike Site. The results of the seismic refraction study were used to determine depth and configuration of bedrock beneath the site to aid in the evaluation of monitoring well locations.

After review of the seismic refraction survey results, a ground-water screening survey using hydroprobe began. The objective of this stage of the field work was to preliminarily assess the ground-water quality beneath a large area north and west of Site 03 to aid in the selection of locations for monitoring wells to be installed during the next phase of field work. This phase of the field work was comprised of a ground-water screening survey using a hydroprobe method to obtain ground-water samples from the saturated overburden. The ground-water samples were field-screened for the five main CVOC detected previously (DCE, PCE, TCE, 1,1,2,2-PCA, 1,1,2-TCA) and petroleum hydrocarbons [benzene, toluene, ethylbenzene, and xylene (BTEX)] using a gas chromatograph (GC) at a mobile laboratory located at NCBC. The seismic data were used to estimate the depth to the top of bedrock, which was the planned maximum depth for the hydroprobe sampling at each location.

- The initial hydroprobe survey (HP01 through HP17) undertaken in April and May 1995, was designed to encompass the vehicle storage/ maintenance area including the vicinity of Buildings T16CT, 378, and 423 and the area to the west of Seabee Avenue (Appendix A2, Figure 1-4). At all but three of the hydroprobe locations, ground-water samples were collected from three different depths to better characterize the water quality in three-dimensions. One sample was collected from the water table (approximately 10 ft below grade); a second, where possible, from the middle of the saturated, unconsolidated deposits; and a third at refusal (assumed to be just above the overburden-competent bedrock interface). However, at HP-10, HP-13, and HP-17 (all located at PR-58 Nike), the depth to bedrock was so shallow that only two samples could be collected at those locations. The procedures used to perform the hydroprobe survey and sample screening are included in Appendix E of EA 1998.

The Nike Site hydroprobe locations were as follows:

> Locations 10 and 11 were selected to investigate an apparent westward, upgradient VOC source(s).
>
> Locations 12, 14, and 16 were selected to evaluate the potential migration of CVOC in ground water along the bedrock surface at these locations and in conjunction with locations 5 and 6 to evaluate the northern extent of CVOC in ground water.

Location 15 was chosen near monitoring well ME-2 as a water-quality correlation point.

Locations 13 and 17 were selected to assess ground-water conditions to the east and downgradient of the former Nike Site leach field, and to evaluate the area upgradient from Location HP-9 where VOC were detected in the ground-water samples.

The results of the field GC headspace analyses of the April 1995 samples for BTEX and CVOC are summarized in the Comprehensive RI, Tables 2-1A and 2-1B, respectively.

In May 1995, ten monitoring wells were installed as part of the Phase III RI. Seven of the wells were installed in the Nike Site study area (MW03-11S, MW03-12D, MW03-12R, MW03-13D, MW03-13R, MW03-14D and MW03-14R). In May and June 1995, ground-water samples were collected from all new wells and eight previously existing wells located at the Nike Site (NMW-1, NMW-2, NMW-3, NMW-4, ME-1, ME-2, ME-3, and ME-4) for TCL VOC (VOA fraction by CLP SOW OLM03.1). Selected ground-water samples from new and previously existing wells at the Nike Site were also analyzed for manganese (NMW-4, ME-4, MW03-12D/R, and MW03-14D/R). Refer to Chapter 4 for a presentation of the results. The locations of the monitoring wells sampling in May-June 1995 are shown in Appendix A2, Figure 2-5. The CVOC detected in the samples are summarized in Appendix A2, Figures 4-3 through 4-6, 4-11, and 4-12.

As during the Phase II RI, the results from previous investigations continued to show that the highest concentrations of dissolved CVOC were detected in ground-water samples collected from the till and weathered bedrock zone that directly overlies the competent (coreable) bedrock. The upper surface of the competent bedrock continued to appear to be instrumental in the direction of migration of the CVOC plume. Therefore, in 1996, work began with a geophysical seismic refraction study of the former PR-58 Nike Site to: (1) add to the interpretive bedrock topography map begun during Stage 1, and (2) aid in the selection of nine boring locations to further characterize the CVOC source area in the 'deep' zone beneath the former Nike Site. Each of the locations was drilled and the soil sampled to assess the hydrogeology and the nature and extent of CVOC. Based upon field analyses, these borings were each completed as monitoring wells and developed. The following provides more detail of the 1996 field activities.

- A geophysical seismic refraction study was performed from 24 April to 3 May 1996 to further assess the depth to bedrock and configuration of the competent (coreable) bedrock surface beneath the Nike site (extending the geophysical interpretive data west from the extent of a related 1995 study). The work included a total of eight lines (designated as Lines 1 through 8 in Appendix A2, Figure 1-4), four trending approximately north/south and four trending approximately east/west. Lines 1, 2, and 3 were located along the northern, western and southern perimeters of the Nike Site area, respectively. Line 4 trended north-south to connect Line 3 with previous (1995) Line C-C'. Line 5 was an extension of Line B-B' from the previous (1995) seismic survey to the western edge of the site. Line 6 trended west to

east across north central portion of the site. Lines 7 and 8 trended south to north through the central portion of the sites along the west and east sides of the former Nike Missile Silos, respectively. The geophysical methods used and the results of the survey are detailed in Appendix D2 of the Comprehensive Phase III RI Report (EA, 1998).

- Based upon the results of the geophysical study, nine locations were selected and soil borings (EA-101 through EA-109) were drilled into the top of competent bedrock at each location during June 1996 as part of the Nike Site Source Area Characterization Study. The locations are shown in Appendix A2, Figure 1-4, and were selected as follows:

  EA-101 was installed northwest of MW03-14D between a drainage ditch east of the former missile silos and the 'pipe structure area' to assess the potential impact of spent solvents that may have been disposed in the trench and migrated east with ground-water flow.

  EA-102 was located west of MW03-14D and near the east edge of the former Peabody Clean Industries temporary drum storage area to aid in source area definition.

  EA-103 was located adjacent (east) to the Pipe Structure Area, northeast of MW03-14D, to evaluate suspected buried metallic objects identified in the Sirrine Report (1988) and to assess VOC potentially used in conjunction with this structure.

  EA-104 was located approximately 550 ft northeast of MW03-14D (toward MW-Z3-01 where low concentrations of CVOC had previously been detected) to evaluate potential CVOC migration from the site in a northeasterly direction along an apparent valley in the interpreted competent bedrock surface.

  EA-105 was located west of the former PR-58 Nike Missile Silo area to evaluate the former Disaster Preparedness Training Area and ground-water conditions west from the former missile silo area (where an apparent ground-water divide appeared to be).

  EA-106 was located near Perimeter Road to evaluate ground-water conditions north of the former PR-58 Nike Site at the property boundary.

  EA-107 was located southwest of EA-105, adjacent to Perimeter Road to evaluate ground-water conditions west of the former PR-58 Nike Site area at the property boundary.

  EA-108 was located south of the former missile silo area to evaluate ground-water conditions near the former PR-58 Nike Missile Fueling Area.

EA-109 is located near Battalion Boulevard on the eastern edge of the former PR-58 Nike missile silo area to evaluate ground-water conditions adjacent to the former silo area.

Soil samples were collected continuously from the ground surface to the water table, and every 5 ft thereafter. The soil samples were submitted to a field laboratory for onsite headspace analysis using a GC. From each boring, duplicate portions of the two samples with the highest VOC concentrations were submitted for offsite laboratory analyses of VOC. Additionally, a ground-water sample was collected from each boring from just above the top of competent bedrock for field GC analysis of VOC. The ground-water samples were collected using a hydroprobe, bailer, and/or submersible 'whale' pump. (The field and laboratory results are summarized in EA 1998, Tables 2-7A and 2-7B, respectively).

The preliminary boring logs and the field results of the ground-water samples were used as screening data that were coordinated daily with the BCT to determine whether or not a monitoring well would be installed. If VOC were detected, the boring was completed as a monitoring well, rather than being backfilled with grout. Because at least traces of VOC were detected in the ground-water samples collected from just above competent (coreable) bedrock from each of the nine borings, each boring was completed as a 2-in diameter PVC monitoring well (EA-101 through EA-109). The bottom of each well screen was set at the top of competent, coreable rock so that the overlying till and weathered bedrock (where present) interval was screened. The depth and elevation of each of the well screens is included in Table 1-2. The locations of these monitoring wells are shown in Appendix A2, Figure 1-4. The boring logs and monitoring well diagrams are provided in Appendix A1. A summary of the monitoring well data is included in Table 1-2. The nine monitoring wells were developed in July 1996. The related well development logs are provided in Appendix H2 and a summary of the field analytical data is provided in Table 2-8 of EA 1998. Slug tests were performed in each well to estimate the hydraulic conductivity (Appendix J2, Comprehensive Phase III RI Report, EA 1998).

- On 7 June 1996 (at the request of the Navy), two of the southern pipes in the 'pipe structure area' were removed from the ground to assess their extent. As stated in Section 1.3.1.1, the 'pipe structure area' is comprised of 30 pipes (Figures 1-2A and 1-2B). Based upon the field observations and the two removed steel pipes, the pipes are arranged in six rows of five pipes each. Each pipe was approximately 6-in diameter, 4.5 ft in length, extended into the ground approximately 12 in., and was partially filled with sand. No odor or staining of the soil was observed where the two pipes were pulled from the ground. An HNu measurement of 4 ppm was recorded in one of the shallow holes where a pipe had been pulled and 'ND' was measured in the other shallow hole. As stated above, monitoring well EA-103 was installed adjacent to the east perimeter (hydraulically downgradient) of the 'pipe structure area'.

- On 20 November 1996, the PVC well at MW03-14D was replaced with stainless steel because of the concern that the high concentrations of CVOC, detected at this location during the May 1995 sampling event, may degrade the PVC well. The replacement well screen was set in the same interval and to the same depth as the former PVC well, and was located within approximately 3 ft from the former PVC well. Prior to well replacement, a ground-water sample was collected from the PVC well using a disposable bailer and analyzed for VOC using the field GC. The results are included in the Comprehensive Phase III RI Report (EA 1998) and show the presence of relatively high concentrations of CVOC as had been detected previously in a sample collected in 1995.

During December 1996, groundwater samples were collected from 37 monitoring wells at NCBC, including the following wells located at the PR-58 Nike Site: EA-101 through EA-109, MW03-12D, MW03-13D, and MW03-14D. The selected wells located at the Nike Site for the first round of the Natural Attenuation assessment are shown in Appendix A2, Figure 2-5, and the related rationale were as follows:

> Wells EA-101 to EA-109 were installed in June 1996 and had not been previously sampled. Ground-water sample data were required from these wells to better characterize the Nike Site CVOC source area and to assess potential intrinsic biodegradation (natural attenuation) processes.
>
> MW03-12D, MW03-13D, and MW03-14D, are located on the eastern portion of the former Nike Site had detected total CVOC concentrations above 100 ug/L in the 1995 samples. These wells were sampled to assess specific chemical zonations attributed to intrinsic biodegradation processes.

The analytical program is summarized in Table 1-3. The ground-water samples were laboratory analyzed for VOC (EPA Method 8260), alkalinity, sulfate, total bromide, total chloride, nitrate, nitrite, orthophosphate, biochemical oxygen demand (BOD), total calcium, total magnesium, total iron, total manganese, total sodium, total potassium, total ammonia, total Kjeldahl nitrogen (TKN), TOC, total inorganic carbon (TIC), total phosphorus, chemical oxygen demand (COD), and hydrogen sulfide. One field-filtered sample for laboratory analyses of dissolved calcium, magnesium, iron, manganese, sodium and potassium was also collected from wells where the turbidity exceeded 10 NTU at the time of sample collection. The ground-water samples were field-analyzed for dissolved ferrous iron, dissolved hydrogen (except for MW03-14D and EA-102, which are constructed with stainless steel that interferes with the dissolved hydrogen ion concentration), methane, ethane, ethene, dissolved carbon dioxide, dissolved oxygen, pH, Eh, temperature, conductivity, and turbidity. Copies of the Field Sampling Forms are provided in Appendix K2 of the Comprehensive RI (EA 1998). The analytical results were validated in accordance with EPA Region I Laboratory Data Validation, Functional Guidelines for Evaluating Organic and Inorganic Analyses (1 February 1988 and 13 June 1988, respectively). Refer to Chapter 4 for a presentation of the results. A summary of the detected CVOC is illustrated in Appendix A2, Figures 4-7 and 4-8.

- Although public water is available to residences along Fletcher Road, Candlewood Road, and Quail Drive located north of the former Nike Site, some residences still use private well water for drinking. Based upon review of the above sample results, RIDEM coordinated with the Town of North Kingstown and the Rhode Island Department of Health (RIDOH) to identify residential properties in that area which use private well water for drinking. Eight such residences were identified along Fletcher Road. The addresses and approximate locations of these wells were received from RIDEM and are provided in Chapter 4. In May 1997, RIDOH received permission from the owners to sample seven of the wells and collected water from those wells for VOC analysis. A representative of the Town of North Kingstown Water Department visited each of these residences to try to obtain documentation of the construction details for these residential wells, e.g. total well depth and depth to the screened interval. However, no such data was found to be available by memory or in writing.

Because of the low detected concentrations of CVOC in samples from monitoring well MW-Z3-01 (near the north perimeter of NCBC) field work in 1997 and 1998 included assessment of the north edge (offsite) of the identified CVOC plume (refer to Appendix A2, Figure 1-4 for well locations). The fieldwork began with a geophysical seismic refraction study, followed by the installation of eight monitoring wells (four on the Nike Site area). In summary, ground water was then collected and analyzed from the four new Nike Site wells, plus six additional selected Nike Site wells to assess the nature and extent of the CVOC plume and to spot check and confirm the natural attenuation related results from the previous investigation. The Navy received permission for access to the northern offsite area from the Carriage Hill Association, dated 23 October 1997.

The following investigation was performed at the PR-58 Nike Site in 1997 and 1998:

- During October-November 1997, a seismic refraction geophysical survey was performed to further assess the depth to bedrock and configuration of the competent (coreable) bedrock surface along the northern edge of the CVOC plume in ground water. As shown in Appendix A2, Figure 1-4, a total of six lines were completed, including three lines on the Nike Site; two to the north (KK' and LL'), and one along the eastern boundary of the Nike Site (DD'). To relate these data to the previous geophysical study results, selected lines intersected or extended a previous (1995) survey line. Line LL' intersected the north end of previous (1995) Line DD'. The geophysical methods used and the results of the survey are detailed in Appendix D3 of EA 1998.

- Based upon the results of the geophysical survey and the interpreted direction of ground-water flow (December 1997 ground-water level data), eight new monitoring well locations were selected by the BCT, including four at the Nike Site. Monitoring wells EA-106R, EA-112D/R, and EA-113D were installed at PR-58 Nike during December 1997 - February 1998 (Appendix A2, Figure 1-4). The rationale for the Nike Site well locations are as follows beginning with the northern wells:

EA-113D was located northwest of MW-Z3-1, between MW-Z3-1 and the five residential water supply wells located north of the Nike Site.

EA-112D was located northeast of MW-Z3-1, along the trend of the apparent portion of the CVOC plume detected at EA-104 and MW-Z3-1, and along an apparent northeast trending low in the competent bedrock.

EA-112R is located within approximately 20 ft of EA-112D, to assess potential CVOC in the upper portion of the bedrock surface.

EA-106R is located within approximately 20 ft of EA-106, between the former Nike Site and the residential water supply wells, to evaluate the upper portion in the bedrock at this location.

The bottom of the deep well screens were set at the top of or slightly into the top of competent bedrock, screening the till and/or weathered rock zone. The rock wells typically screen the upper approximately 25 ft of the competent bedrock. The wells were constructed of 2-in diameter PVC pipe and screen, except for EA-112R which due to drilling challenges in the weathered bedrock zone, was constructed of 1.5-in diameter PVC pipe and screen. The boring logs and monitoring well diagrams are provided in Appendix A1. A summary of the monitoring well data is included on Table 1-2.

All new monitoring wells were developed from 3 - 12 February 1998. The related Well Development Logs are provided in Appendix H3 of EA 1998. Prior to installation of well at the rock well locations, packer tests were performed in the cored bedrock interval of each related borehole (Appendix I2, EA 1998). Slug tests were performed in each well to estimate the hydraulic conductivity (Appendix J3, EA 1998). Dedicated bladder pumps were then installed in these wells, except for EA-112R for which the well diameter was too small.

- Based upon the results of the first round of sampling (December 1996) to assess conditions for natural attenuation, 21 wells were low-flow sampled from 9 - 17 March 1998 for spot checking and confirmation of the December 1996 natural attenuation sample findings in the deep (D) zone. The locations of all of the monitoring wells sampled are shown in Appendix A2, Figure 2-6. The following is a summary of the Nike Site wells sampled in 1998:

  The newly installed monitoring wells EA-112D and EA-113D;

  Upgradient well EA-105;

  Along the approximate centerline of the plume to confirm CVOC concentrations and geochemistry included MW03-14D (source area),

In general, the sample depth interval for the monitoring wells was approximately the middle of the screened interval. For the newly installed monitoring wells constructed with more than 10 ft of screen, the sample intervals were based upon review of the field sample headspace measurement data, boring logs, packer test results, and the rock cores.

The ground-water samples were laboratory analyzed for VOC (EPA Method 8260), sulfate, total chloride, nitrate, nitrite, dissolved iron, dissolved manganese, total ammonia, TOC, total inorganic carbon, and hydrogen sulfide (Table 1-4). In-line filters (0.45 micron) were used during the collection of the aliquots that were analyzed for dissolved iron and manganese. Samples were analyzed for dissolved hydrogen (except MW03-14D) and methane/ethane/ethene using a GC with a regression gas detector (RGD) and flame ionization detector (FID) at a mobile laboratory located at NCBC. MW03-14D was not sampled for dissolved hydrogen analysis because it is a stainless steel well and, therefore, would yield erroneous results for hydrogen concentrations. The following parameters were field analyzed: dissolved ferrous iron, dissolved carbon dioxide, dissolved oxygen, pH, Eh, temperature, conductivity, and turbidity. The related Field Sampling Forms are provided in Appendix K4 of EA 1998. The analytical results were validated in accordance with EPA Region I Laboratory Data Validation, Functional Guidelines for Evaluating Organic and Inorganic Analyses (1 February 1988 and 13 June 1988, respectively). Refer to Chapter 4 for a presentation of the results. A summary of the detected CVOC is illustrated in Appendix A2, Figures 4-9, 4-10, 4-13, and 4-14.

To further aid in assessment of the nature and extent of CVOC, the two new monitoring wells located at the Nike Site (EA-106R and EA-112R; Appendix A2, Figure 1-4) screened in the upper portion of competent (coreable) bedrock, plus MW-Z4-01 and MW-Z4-02 (screened in the deep zone) were also sampled in March 1998. These wells were analyzed for VOC, dissolved oxygen, pH, Eh, temperature, conductivity, and turbidity only. The related Field Sampling Forms are provided in Appendix K4 of EA 1998. Refer to Chapter 4 for a presentation of the results.

1.4.2 NCBC IR Program Sites 02 and 03, Study Areas 01 and 04

Several investigations have been performed at NCBC Davisville Sites 02 and 03 (TRC 1987, 1991, and 1994), and Study Areas 01 (Halliburton 1994a) and 04 (Halliburton 1994b) in conjunction with the Navy, RIDEM and the Environmental Protection Agency (EPA). A summary of the previous investigations of the four NCBC Davisville Sites and Study Areas through the Phase III Remedial Investigation is provided in the Report for the Navy entitled Study Areas 01 and 04, and IR Program Sites 02 and 03, Phase III Comprehensive Remedial Investigation (EA 1998) and will not be repeated here. Pertinent summary figures are provided in Appendix A2.

1.5 REPORT ORGANIZATION

This report describes the field program conducted for the Characterization of CVOC at the former PR-58 Nike Site and Adjacent Navy Site. Chapter 1 presented the objectives and scope, descriptions and histories of the sites, previous investigations, and organization of this report. Chapter 2 presents a description of the field and analytical activities performed. Chapter 3 presents the description of the physical characteristics of the site. Chapter 4 presents the NCBC background concentrations and the nature and extent of contamination reported in the soil and ground water, Chapter 5 presents constituent fate and transport findings, including the findings of the natural biodegradation assessment. Chapter 6 presents the conclusions and recommendations. Supporting documentation is contained in the appendices.

2. FIELD INVESTIGATION

2.1 INTRODUCTION

This chapter provides a summary of the field program conducted by EA in 1999 and 2000 to further characterize subsurface and ground-water conditions in the former Nike PR-58 Site and Adjacent Navy Property. The fieldwork was performed in accordance with the Work Plan, Characterization of CVOC Contamination at the Former Nike Site and Adjacent Navy NCBC Davisville Site 03, North Kingstown, Rhode Island (EA 2000). The Work Plan included Field Procedures (Chapter 4 of the Work Plan) and the Quality Assurance Project Plan (QAPP) (Appendix A of the Work Plan), which established the procedures that were used to conduct the seismic refraction profiling, soil gas study, drilling and installation of monitoring wells, geophysical borehole logging, and ground-water sampling and analysis that are presented in this report. Figure 2-1 shows the site field investigation area and subsurface sampling locations.

2.2 FIELD PROGRAM

The field program consisted of the following five tasks:

1. **Seismic Refraction Profiling.** Previous site investigations had shown that the configuration of the surface of competent bedrock appears to influence the migration of the CVOC plume. Seismic refraction interpretive data was available for the areas of additional characterization except for the area of the northeast extension of the CVOC plume beyond EA-112D/R. Therefore, during October 1999, this task included the addition of 4,240 linear ft of seismic refraction traverses by Geophysical Applications, Inc, to aid in locating the northeast trending valley in the competent bedrock surface beyond EA-112D/R, and to aid in locating new monitoring well cluster EA-116D/R/R2, and optional well cluster EA-117D/R/R2 (if determined to be needed). Additionally, four very low frequency (VLF) geophysical traverses were completed perpendicular to the northeast extension of the CVOC plume to assess the potential presence of northeast trending water-bearing fractures or fracture zones in the bedrock oriented parallel to the valley in the competent bedrock surface. The location of this seismic refraction and VLF traverses are shown of Figure 2-1. The results are included in Figure 2-2 (Interpretive Contour Map of the Upper Surface of Competent Bedrock). Details of the fieldwork and findings was provided Geophysical Applications' report 'Geophysical Survey Report, Vicinity of Nike PR-58 Site, NCBC Davisville – North Kingstown, RI' (Geophysical Applications 1999), previously submitted under separate cover.

2. **Soil Gas Study.** This task included the performance of a soil gas survey (up to 10 points) in the area east of the former PR-58 Nike Site "bermed area" (Nike missile refueling area) and west of Seabee Avenue (Figure 2-1). The purpose of this study was to obtain screening level data at an RIDEM-alleged petroleum and/or solvent dumping (source) area pointed out by RIDEM personnel during a 2 June 1999 site visit and to help select the location for the new monitoring well cluster EA-114D/R.

EA performed the soil gas study as planned on 7 October 1999. A copy of the field procedures was provided as Attachment 2 of the Work Plan (EA 2000). Nine (9) soil gas samples were collected from six (6) locations (SG-01 through SG-06) at intervals ranging between four (4) to eight (8) ft bg (refusal or the water table, which ever was encountered first). The soil gas sampling locations are shown on Figure 2-3. SG-01 and SG-02 were located at the two small piles of gravelly soil (alleged spill/source areas) that an RIDEM representative had pointed out on 2 June 1999 as covering the two areas of stained soil that he had previously observed. The remainder of the samples were located east, downgradient (in the direction of ground-water flow) from the alleged spill/source area.

The soil gas samples were field analyzed by means of a Varian gas chromatograph (GC) interfaced with a Varian DS 654 data station for the following petroleum hydrocarbon VOC:
benzene, toluene, ethylbenzene, m&p-xylene, and o-xylene (BTEX); and the following CVOC:
1,1,2,2-PCA; perchloroethene (PCE); carbon tetrachloride; TCE; 1,1,1-trichloroethane (1,1,1-TCA); cis 1,2-DCE; trans 1,2-DCE; and methylene chloride. The analytical results indicated that none of the analytes were detected above the method detection limit (Table 2-1) and they do not support the presence of a VOC source area at this location. Additionally, these results did not provide support for any specific location for well cluster EA-114D/R. Therefore, EA-114D/R were located east, downgradient (with respect to ground water flow) from the alleged spill/source area.

3. **Drilling and Installation of Monitoring Wells.** This task included the installation of 13 new monitoring wells for the USACE and 5 for the Navy during June-July 2000.

The rationale for monitoring well locations was provided in the Work Plan on Tables 1a, 1b, and 1c. All monitoring wells were installed in accordance with the field procedures presented in Chapter 4 of the Work Plan (EA 2000), including revised pages provided on 6 and 15 June 2000. Two additional wells for USACE (EA-104R2 and EA-114R2) were included in the Work Plan. However, because there were no obvious field indications of CVOC during the drilling of EA-104R and EA-114R, the need for the 'R2' wells of these clusters was placed on hold by USACE pending review of the analytical results of samples from the 'R' wells.

The locations of the 18 new monitoring wells are included on Figure 2-1. A summary of the construction data for the new monitoring wells is included in Table 1-2. Boring logs for new monitoring wells are provided in Appendices A3 and A4. Development of the new monitoring wells was completed during 6-25 July 2000 as described in Section 4.6 of the work plan (Well Development Forms are provided in Appendices B1 and B2 and the well development field analysis data is summarized on Table 2-2). During June 2000, the rock cored portions of MW03-14R2, EA-114D/R, and EA-116D were packer tested. The packer

test logs are provided in Appendix C. On 18 July, EA-114D and EA-116D were slug tested. The slug testing data are provided in Appendix D.

Rock wells that were advanced using a roller bit or air hammer and completed as open boreholes (MW01-10R, MW01-13R, MW01-15R, MW02-03R, MW03-03R, EA-104R, EA-105R, EA-107R, EA-108R, EA-112R2, EA-113R, EA-116R, EA-116R2, and MW03-11R) were geophysically logged as outlined below. Because EA-114R2 and MW03-14R2 are located near an alleged or known CVOC source area, the bedrock was cored rather than the air rotary method. The resulting rock cores were then visually logged by a geologist, but not geophysically logged.

4. **Geophysical Borehole Logging and Monitoring Well Sampling Pump Installation.** During 28 July-11 August 2000, geophysical logging of the open borehole portions of 14 wells completed in bedrock (MW01-10R, MW01-13R, MW01-15R, MW02-03R, MW03-03R, EA-104R, EA-105R, EA-107R, EA-108R, EA-112R2, EA-113R, EA-116R, EA-116R2, and MW03-11R) was performed by Geophysical Applications. The logging methods included caliper, single-point resistance, fluid temperature, heat-pulse flow meter, and acoustic televiewer (ATV) logging, as planned, plus fluid resistivity and natural gamma. Logging was performed to aid in the assessment of the bedrock fractures and areas of ground-water flow, and to aid in the selection of the intake depth of the dedicated bladder-type ground-water sampling pumps to be installed in each well.

   On 11 August, the available draft geological logs, geophysical logs, and well construction diagrams were submitted along with recommended intake depths for the bladder-type ground-water sampling pumps for each new monitoring well to the BCT for review, comment, and concurrence. Comments were received, issues resolved, and concurrence received on 6 September 2000. The pumps were then ordered, and on 13-14 September 2000, they were installed in each of the new monitoring wells.

5. **Sampling and Analysis.** At two (2) monitoring well locations (EA-114R and EA-116D), two soil samples were collected and analyzed for the Target Compound List (TCL) VOC. The soil samples were selected based upon the criteria described in Section 4.4.1.1 of the Work Plan. The soil samples collected from EA-114R were also analyzed for TCL semi-volatile organic compounds (SVOC) and the Target Analyte List (TAL) inorganics, Tables 2-3 and 2-4, to aid in assessment of that alleged petroleum and/or solvent dumping (source) area.

   During 25 September-4 October 2000, ground-water samples were collected from monitoring wells located in both the USACE and Navy portions of the study area. The location of these wells is shown on Figure 2-4. For USACE, ground-water samples were collected from the 13 new and 19 existing deep ('D') and rock ('R') wells in the former PR-58 Nike Site vicinity to aid in assessment of the alleged source area in the vicinity of EA-114; the concentration of dissolved TAL metals in the vicinity of the northern site perimeter; natural biodegradation, and for further assessment of the nature and extent of the

CVOC plume in the deep soil and bedrock zones. Copies of the Field Sampling Forms are provided in Appendix E1, and the Analytical Program for the USACE ground-water samples is provided in Table 2-5. For the Navy, ground-water samples were collected from the 5 new and 30 existing deep ('D') and rock ('R') wells in the NCBC Site 03 vicinity to aid in further assessment of CVOC natural biodegradation and the nature and extent of the CVOC plume in the deep soil and bedrock zones. Copies of the Field Sampling Forms are provided in Appendix E2, and the analytical program for the Navy ground-water samples is summarized on Table 2-6.

Ground-water samples were collected using bladder pumps and low-flow sampling technique as has been used during previous Navy investigations at this site and in accordance with Section 4.7 of the Work Plan. The following monitoring wells were sampled using peristaltic pumps due to the absence of a bladder pump within the well: EA-112R, MW-Z4-01 and MW-Z4-02, MW03-12R, MW03-13R, and MW03-14R. Prior to sampling, depth to water was measured in monitoring wells and piezometers for use in interpreting ground-water flow direction(s) beneath the Nike Site and the adjacent Navy property. To provide data that is consistent with the large existing Navy database, the samples were analyzed in accordance with Test Methods for Evaluating Solid Waste, SW-846 (Tables 2-5 and 2-6). Table 2-7 provides a summary of the field measured ground-water quality parameters recorded at the end of purging prior to sample collection.

The ground-water samples were submitted to Ceimic Corporation for analysis of TCL VOC, methane, and selected general chemistry parameters (i.e., alkalinity, chloride, nitrate, sulfate, and sulfide). Ground-water samples collected from the EA-114 well cluster were also analyzed for TCL SVOC and TAL inorganics, in addition to TCL VOC, methane, and selected general chemistry parameters. Ground-water samples collected from EA-104D/R, EA-106D/R, EA112D/R/R2, and EA-113D/R were analyzed for TAL inorganics, in addition to TCL VOC, methane, and selected general chemistry parameters.

Additionally, a TAL inorganics aliquot of ground water was collected from EA-116D/R/R2 and submitted to Ceimic Corp, but was being held. Analysis of those samples was determined to not be required because the related RIDEM ground-water standards were not exceeded in the samples collected from EA-112D/R/R2 and EA-113D/R.

EPA collected split ground-water samples from monitoring wells EA-116/R/R2 for VOC analysis. A copy of the analytical results has not yet been received by USACE.

Additional sample volume was also collected from monitoring wells EA-112R2, EA-114R, EA-116R2, and MW03-14R2 and submitted to Severn Trent Laboratories in Colchester, VT, (USACE's quality assurance lab) for the same analytical program as for the related samples submitted to Ceimic Corp.

3. PHYSICAL CHARACTERISTICS

3.1 INTRODUCTION

This section describes the local and regional physical characteristics of the former PR-58 Nike Site and adjacent Navy NCBC Davisville property study area. Descriptions of subsurface physical features are based upon the current field investigation, which included drilling and installing 18 monitoring wells. Supporting data used in the preparation of this chapter includes data from the Navy's Study Areas 01 and 04 and Sites 02 and 03 Phase III Remedial Investigation report (EA 1998). A description of the regional geologic and hydrogeologic setting is presented below, along with specific characteristics pertaining to the former PR-58 Nike Site and adjacent Navy NCBC Davisville property study area.

3.2 PHYSIOGRAPHY

The former PR-58 Nike Site and adjacent Navy NCBC Davisville property study area is located on the Seaboard Lowland coastal belt of the New England physiographic province (Fenneman 1938), and within the Narragansett Basin which contains metamorphosed sedimentary rocks of Pennsylvanian age. Most of the study area is currently forest covered, except for the former missile silo area which is a grass covered field (Figure 1-2A). The highest ground surface elevation of approximately 40-ft above mean sea level (MSL) is located near the northwest and northeast portions of the Nike Site area. The majority of the former PR-58 Nike onsite study area ranges from approximately 30 ft to 35 ft MSL. In the offsite portion of the study area (north of Perimeter Road), the ground surface ranges from approximately 30 ft to 45 ft MSL.

Most of the NCBC portion of the study area is open grass covered fields with a few shrubs and trees (Figure 1-2A). The area around Building 224 is paved. The highest ground surface elevation in the NCBC portion of the study area is approximately 45 ft MSL along Perimeter Road between Seabee Avenue and Leave Street. The ground surface in the vicinity of Building 224 is approximately 40 ft MSL. The remainder of the ground surface in the NCBC portion of the study slopes gently down to approximately 30 ft MSL near the intersection of Seabee Avenue and Parade Street and to about 38 ft MSL along Davisville Road south of Building 224. Northeast of Building 224 and east of Sanford Road, the ground surface slopes more steeply downward toward Allen Harbor.

Nearly all the surficial deposits are of glacial origin deposited during the Wisconsin Glacial Stage. The glacial deposits record a single invasion of the ice sheet and are only slightly modified by post-glacial weathering and erosion (Schafer 1961). Portions of the land surface have undergone significant modification, e.g., hills were leveled and depressions filled in, as part of the original construction of the Nike Site and NCBC facility as well as during equipment training operations on portions of the Navy property.

3.3 METEOROLOGY

Meteorological data were obtained from the National Weather Service Station, located at T.F. Green Airport, Warwick, Rhode Island, and the National Climatic Center, Asheville, North Carolina. The airport is located approximately 6.5 miles north of NCBC Davisville.

In Rhode Island, both winters and summers are influenced by the moderating effect of the Atlantic Ocean. The ocean effect is apparent by the higher winter temperatures and the lower summer temperatures, as compared to inland areas. In the winter, the average temperature is 30 F and the average daily minimum temperature is 20 F. In the summer, the average temperature is 70 F and the average daily maximum is 80 F.

The average annual precipitation for the area is 45.32 in., as measured for the period of 1951 through 1980. In 1989, total precipitation was 56.06 in. June has been the driest month historically with an average of 2.79 in. of precipitation, whereas December, averaging 4.47 in., has been the wettest. In 1989, the driest month on record was January with 1.17 in. of total precipitation; the wettest month was October with 8.37 in.

Given the coastal proximity of the former Nike Site and NCBC Davisville, weather patterns are continuously modified by the dynamic effects of Narragansett Bay and the Atlantic Ocean. The average annual wind speed over the area is 10.6 miles per hour (mph) with a prevailing southwesterly direction.

3.4 SURFACE WATER HYDROLOGY

The investigation area lies within the Hunt River and Coastal drainage basins. All stream and river flow in the vicinity of the study area eventually discharges into Narragansett Bay. During most of the year, a part of the stream flow consists of water discharged from retention storage in natural and man-made impoundments. The remaining flow is from direct runoff of precipitation and from base flow runoff consisting largely of ground-water discharge. During 1962 and 1963, the ground water contributed approximately 50 percent of the average annual stream flow (Rosenshein et al. 1968).

3.5 SOIL

Soil development generally refers to the first 5 ft of material underlying the ground surface. The soil surface in the central and eastern portions of the former PR-58 Nike Site, plus the study area north of Perimeter Road and most of the adjacent NCBC Davisville property, is classified as Merrimac sandy loam. Merrimac soils are developed on outwash plains and terraces with zero to eight percent slope. The surface layer (0-8 in) of the Merrimac soil is a dark brown sandy loam grading to a yellowish brown sandy loam at depth (8 - 25 in). The substratum is a light-dark yellowish brown gravelly sand (25 - 60 in). Permeability is moderately rapid in the surface layer, moderately rapid to rapid in the subsoil, and rapid in the substratum. The soil is moderately

well drained, the available water capacity is moderate, and runoff is slow. Acidity of the soil ranges from extremely acid to medium acid. The Merrimac soil is suitable for community development, however careful design is necessary to prevent pollution of ground water. Slopes in excavated areas are commonly unstable and may require shoring. Quick establishing plant cover helps control erosion during construction (USDA 1981).

The surface soil in the western portion of the former PR-58 Nike Site (west of the former missile silo area) is classified as Newport silt loam. Newport soils are developed on glacial drumlins and till plains with zero to eight percent slope. The surface layer (0-8 in) of the Newport soil is a dark brown silt loam grading to an olive brown and olive silt loam at depth (8 - 24 in). The substratum is an olive gray channery silt loam (25 - 60 in). Permeability is moderate to moderately rapid in the surface layer and subsoil, and slow to very slow in the substratum. The soil well drained, the available water capacity is moderate, and runoff is medium. Acidity of the soil ranges from very strongly acid through medium acid. The Newport soil is suitable for community development, however careful design is necessary. Quick establishing plant cover helps control erosion during construction (USDA 1981)

3.6 GEOLOGY

3.6.1. Regional Geology

The investigation area is located within the Narragansett Basin, a complex structural syncline approximately 12 miles wide and up to 12,000 ft deep. The Narragansett Basin's western limit is approximately 3 miles west of the former PR-58 Nike Site and adjacent NCBC Davisville property, and its eastern edge is close to Fall River, Massachusetts. Based upon the bedrock geological maps for the Wickford Quadrangle (Williams 1964) and the East Greenwich Quadrangle (Quinn 1952), there are no mapped faults within at least 2 miles of the investigation area. The potential presence of bedrock faults was evaluated during the investigation as the brecciated rock zones associated with faults could provide a preferential pathway for ground-water migration. What appeared to be brecciated rock zones (possible fault) was observed in the rock core obtained from monitoring well EA-112R during the Navy's Phase III RI study.

According to Williams (1964) and USDA (1981), the principal bedrock unit in the vicinity of the investigation area is the Pennsylvanian age undifferentiated Rhode Island Formation. The original sedimentary rocks were fine- to coarse-grained sandstone and shale. Throughout the Rhode Island Formation, these sedimentary rocks have been metamorphosed into various types of meta-sandstone (quartzite), phyllite, gneiss, and schist. The amount of metamorphism increases from north to south across the formation. The color of the rock varies from light to dark gray, and greenish. The Rhode Island Formation is further characterized by cross-bedding and irregular, discontinuous beds. In the investigation area, the depth to competent bedrock ranges from approximately 15 ft to 100 ft below ground surface (bgs) (Table 3-1).

The unconsolidated Quaternary sediments overlying bedrock were deposited by glacial activity during the Pleistocene epoch. The final deposition of glacial material occurred during the

Wisconsin glacial stage 10,000 to 12,000 years ago. As the glacier front melted and receded, unconsolidated glacial till, glacio-fluvial and glacio-lacustrine sediments were deposited. Till, a dense, non-stratified, heterogeneous mixture of sand, silt, clay, and gravel, was emplaced on top of bedrock as the advancing glaciers scraped, ground, crushed, and then deposited the material passively on bedrock as ablation till.

As streams of melt water flowed from the retreating glaciers, sediment from the melting ice was entrained, transported downstream, and deposited as well-sorted sand or gravel (glacio- fluvial deposits). Fine-grained silt and clay were transported by the streams into glacial lakes, where they were settled on the lake bottom (glacio-lacustrine deposits). The thickness of the glacial deposits is quite variable, although generally thin. They range from less than 10 ft in thickness at the higher elevations (nonexistent where bedrock is exposed) to more than 100 ft thickness in portions of the bedrock valleys (Rosenshein et al. 1968).

3.6.2. Site Geology

The results of the current field investigation and previous investigations show that the subsurface geology from the former Nike Site east to the NCBC Sites 02 and 03 area is characterized by Quaternary glacial deposits mantling the quartzitic and phyllitic bedrock (weathered and competent zones) of the Rhode Island Formation. In general, based upon logs of borings, the unconsolidated sedimentary (glacial) deposits consist of the following units presented in order from the ground surface downward: (1) glacio-fluvial deposits of sand with varying amounts of silt and/or gravel, (2) glacio-lacustrine deposits of silt to very fine sand and silt (present only beneath a portion of the Navy property east from the MW03-07D and MW03-10D area), and (3) sandy silty gravel to sandy gravelly silt (possibly till).

Figure 3-1 shows the location of four geologic cross-sections. The interpreted geology shown on these cross sections is based on data from the 18 new monitoring wells incorporated with the previous reassessment for the Navy of the geological information on logs of previously installed wells in an attempt to achieve consistency in the interpretation of data collected during several different investigation stages. Specifically, this was done to better interpret the extent of the three deeper geologic units may play an important role in contaminant fate and transport. These units are (1) the silty sand and gravel, possibly till, unit was correlated to soil sample descriptions which included subrounded gravel; (2) weathered bedrock was correlated to sample descriptions which included subangular to blocky gravel and fissile gravel, and bedrock fragments; and (3) competent bedrock was correlated to intervals of coreable bedrock. Figures 3-2 through 3-5 are Geologic Cross Sections AA' through DD', respectively, which present the interpreted generalized distribution and thickness of the geological units from selected borings. These cross sections had been prepared to illustrate the geology beneath the former PR-58 Nike Site and the geology along the northeast and east-southeast portions of the CVOC plume detected in deep ground water. A summary of the geological data used to prepare these cross sections is provided in Table 3-1. All four cross sections cross through the MW03-14 well cluster where the highest total CVOC has been detected in ground-water samples. Cross Section AA' extends approximately north from MW03-11S/R to EA-106R and EA-113D located

between the former Nike Site and the residential area. Cross Section BB' extends northeast from EA-108D/R (south of the former missile silo area) to wells EA-116D/R/R2 along the trend of an apparent valley in the bedrock surface (Figures 2-2 and 3-3) and the northeast extension of the dissolved CVOC plume in ground water. Cross Section CC' extends southeast from EA-107D/R (west edge of the former Nike Site) through well pairs EA-111D/R and EA-110D/R to MW-Z4-01. Cross Section DD' extends east along the approximate alignment of the CVOC plume in deep ground water ending at MW01-14D (east of the Navy's Building 224).

The glacio-fluvial deposits were encountered in all monitoring well borings at thicknesses ranging from approximately 4 ft at MW03-12D to 74 ft at EA-110D across the entire study area. At the former Nike Site, these deposits range in thickness from approximately 4 ft at MW03-12D and 8 ft at EA-114D/R to 62 ft to 79 ft within the northeast trending valley in the bedrock surface (EA-116D and EA-112D, respectively). Due to the nature of these deposits, individual beds or "layers" often pinch out and/or crossbed within a short distance. A general description of the deposits includes gray, brown, and olive poorly to well graded sand, sand and gravel and uniform fine sand with varying amounts of silt.

Glacio-lacustrine deposits underlie the glacio-fluvial deposits only beneath a portion of the adjacent Navy property at and to the east of monitoring wells MW03-07D and MW03-10D. The deposits consist of dark gray to olive gray silt. Locally, these deposits contain varying amounts of sand (very fine to fine) interbedded in the silt (MW03-03D) (Figure 3-5). This silt deposit grades into a very fine sand and silt east of MW03-05D, and the silt is overlain by these deposits at MW03-05D (Figure 3-5). Where present, the silt thickness ranges from approximately 13.5 ft at MW03-05D to 22 and 55 ft at MW01-14D and MW-Z4-01, respectively.

The sandy silty gravel to sandy gravelly silt (possibly glacial till) is a discontinuous unit. This unit was encountered mostly north of MW03-14 from EA-103 to EA-113D/R (Figure 3-2), southwest of MW03-14 from EA-102 to EA-114D/R (Figure 3-3), east of MW03-14 between MW03-13 and MW03-07, plus at MW01-14D (mostly beneath Navy property; Figure 3-5), and southeast of MW03-14 from MW03-13 to MW-Z4-01 (mostly beneath Navy property; Figure 3-4). The unit underlies the glacio-fluvial and glacio-lacustrine deposits and overlies the bedrock. Where present, this unit ranges in thickness from approximately 5 ft (EA-103, EA-114, and MW-Z3-03) to 15 ft (EA-106).

Bedrock was encountered in the monitoring well borings at depths ranging from approximately 14.5 ft bg (EA-114, competent rock) to 20.5 ft bg (MW03-14D, weathered rock) to 89 ft bg (MW01-14, weathered rock). Based on the results of the seismic refraction survey and the monitoring well borings, the competent (coreable) bedrock surface has an irregular shape (Figure 2-2). Beneath the central portion of the former Nike Site, the bedrock surface ranges from approximately +5 to -5 ft MSL. There are interpreted high areas of the competent bedrock surface of at least +10 ft above mean sea level (msl) in the southeast, southwest, and northwest portions of the Nike Site. These three areas are separated by two areas that are lower in elevation and that trend approximately northeast (Figure 2-2). One of those two areas can be extended northeast through MW03-14 and into an interpreted northeast trending deeper valley in the

competent bedrock surface that slopes down to below -40 ft MSL at MW-Z3-01 through EA-116D/R/R2. Four VLF geophysical traverses were located across (perpendicular to) this northeast trending feature, as shown on Figure 2-2, to assess the potential presence of northeast trending water-bearing fractures or fracture zones in the bedrock oriented parallel to the valley in the competent bedrock surface. As shown on Figure 2-2, the presence of four such fracture zones was interpreted from the results that are located within and parallel to the northeast trending valley in the bedrock surface.

The results of the borehole geophysical logging (specifically the acoustic televiewer [ATV] and heat pulse flow meter logs) of 14 of the new monitoring wells completed in bedrock further support the presence of a northeast trending structural feature (fracture zone(s)) that may act as a preferential pathway for ground-water flow. The related geophysical logging data is summarized in Table 3-2 for nine of the new wells in bedrock at the former Nike Site, and then, the five new wells in bedrock at the adjacent Navy property. The ATV logs provide the interpreted strike and dip of fractures that cross a borehole and fractures that are interpreted to be 'open' through which ground water may flow. The heat pulse flow meter logs provide interpreted depths below ground surface of the main zones of ground-water flow penetrated by a well boring in rock. The number of fractures interpreted from the ATV logs are grouped in five trend (strike) categories for each well (northeast-southwest, and then cross cutting trends northwest-southeast, east-west, north-south, and horizontal). Additionally on Table 3-2, the depth (ft bgs) of those fractures interpreted to be 'open' is provided for each well. These data indicate that for the wells at the former Nike Site (minus MW03-11R which is located southeast of the northeast trending structure), 74% of the interpreted fractures are within the northeast-southwest category and 77% of the fractures interpreted to be 'open' are also within the northeast-southwest category. However, for the wells at the adjacent Navy property all of which are located east of the northeast trending structure at the Nike Site, the number of interpreted fractures (particularly those interpreted to be 'open') are more evenly distributed through the five trend categories. Specifically, only 34% of the interpreted fractures are within the northeast-southwest category and only 29% of the fractures interpreted to be 'open' are also within the northeast-southwest category.

Although the size of this data population is small, the well locations provide selected data from large areas, and the apparent overall picture shown should not be ignored. These geophysical log data suggest that ground-water flow in bedrock beneath much of the former Nike Site may be along northeast trending fractures with only relatively few cross cutting fractures, resulting in a localized northeasterly flow compared to the apparent regional flow toward the east and southeast. Conversely, the same data suggest that ground-water flow beneath much of the adjacent Navy property may be distributed more evenly through fractures trending in nearly any direction, resulting in a ground-water flow direction closer to the regional flow toward the east and southeast.

Beneath the adjacent Navy property, about 200 feet west of Sayers Street in the vicinity of MW03-06D and MW03-03D, there is a divide (high) in the bedrock surface (Figure 2-2). The surface slopes down to the north and south to below -30 ft msl, but continues to rise to the east

beneath the Building 224 area to approximately -3 ft msl at MW02-03R. Further east the bedrock surface drops off steeply to -50 ft msl at MW01-13D and -59 ft msl at MW01-14D.

Weathered bedrock separates the underlying competent (coreable) bedrock from the overlying unconsolidated glacial deposits mostly in the area beneath the former Nike Site centered around MW03-14, south to MW03-11R (Figure 3-2) and at EA-109 and EA-108D/R (Figure 3-3), west at EA-105 (Figure 3-5), north to EA-113D/R (Figure 3-2), northeast to EA-112D/R/R2 (Figure 3-3), and east to MW03-08D/R and MW03-10D (Figures 3-4 and 3-5). Where present, weathered bedrock thickness ranges from 43 ft at MWZ3-01 to 1.3 ft at EA-109. Where present beneath the former Nike Site, the weathered bedrock is thicker than 10 ft at five wells (MW03-12D, 21 ft; EA-112D, 18 ft; MW03-14D, 16.5 ft; EA-113D, 13.5 ft; and EA-101, 12.5 ft) and less than five feet at four wells (MW03-13D, 3.5 ft; EA-103, 2.5 ft; EA-104D, 2.5 ft; and EA-109, 1.3 ft). The weathered bedrock is generally dark gray, platey, blocky and highly fractured. Interbedded clay, silt and sand layers are often present within this zone and between fractured sections. Rock fragments obtained from samples in the weathered zone range from approximately 1 to 3-in. and break in planar blocky sections (typically phyllite) or angular fragments (typically quartzite).

The depth to the top of competent bedrock can vary considerably over short distances. The largest such variation was encountered at well cluster EA-112D/R/R2 which are located within approximately 15 ft of one another. The top of competent rock was approximately 82.0 ft bg at EA-112R, 97.0 ft bg at EA-112D, and 102 ft bg at EA-112R2.

The bedrock underlying the former PR-58 Nike Site and the adjacent Navy property is typically alternating layers of quartzite and phyllite which can vary considerably over short horizontal distances. This situation is best documented by findings at EA-112D and -112R. These two well borings have approximately 12 ft of core from a common depth interval below grade. However, the common interval was not comprised of the same sequence and thickness of rock types (quartzite and phyllite lenses were at different depths and thicknesses). The boring logs appear to show either horizontal facies changes between quartzite and phyllite over relatively short distances, localized faulting, and/or the layers of this rock are sloping (tilted, not horizontal) and/or folded. This results in encountering the layers at different depths in wells located 10-20 ft apart. No apparently continuous layer of lower permeability material (e.g. a clay layer) was encountered through this material (zone just above coreable bedrock) that could subdivide this zone.

Competent bedrock core recoveries were generally greater than 90 percent (Table 3-3). Rock Quality Designation (RQD) as a percentage of the length of core, that is longer than 4 in. each, ranged from 13 to 100 percent, with most RQD values falling between 50 and 100 percent (Table 3-3). Although originated for geotechnical use to aid in assessment of rock quality for construction, RQD provides an indication of how solid or massive versus broken, bedded, or fractured the rock core interval is. Ground-water flow through the rock types beneath the site is along interconnected natural openings in the rock, such as along bedding, fracture, or jointing planes. RQD provides a general idea of whether the rock core interval (typically 5 ft in length) is

solid (high RQD) with little potential for ground-water flow through versus fractured/bedded (low RQD) with more potential for ground-water flow through. However, a low RQD only indicates the relatively higher potential for ground-water flow through, but not whether the openings are interconnected or are filled with silt or clay which could mitigate the actual ground water flow.

The quartzite bedrock displays significant amounts of quartz veins, with vertical to horizontal orientations, and contains near vertical and horizontal fractures. Where encountered, the quartzite is generally massive and the color ranges from light to dark gray with occasional banding and mottling. Fractures were often observed to be filled with quartz, chlorite and pyrite.

The phyllite is typically dark gray to black metamorphosed shale with fractures. Based upon the boring logs, the phyllite was observed to have a maximum thickness of at least 29-ft at EA-106D/R. Fractures in the phyllite are often open (not healed with mineralization), but filled with silt.

3.7 HYDROGEOLOGY

3.7.1 Regional Hydrogeology

The State of Rhode Island is divided into five drainage basins: the Narragansett Bay Basin, the Pawtucket River Basin, the Rhode Island Coastal Basin, the Thames River Basin, and the Massachusetts Coastal Basin. The former PR-58 Nike Site and adjacent Navy property lie within the Narragansett Bay Basin (NBB), the largest and most hydrogeologically significant basin in the state. The NBB covers approximately two-thirds of the state and includes a system of waterways that discharge into the Atlantic Ocean between Point Judith and Sakonnet Point. The NBB includes Narragansett Bay and its entire shoreline, the drainage system of three major rivers (Taunton, Blackstone, and Pawtuxet), and a number of small rivers and streams that drain into Narragansett Bay (USDA 1981). Within each drainage basin, smaller sub-basins may be defined based on significant streams, tributaries, and reservoirs.

Rhode Island's abundant precipitation, numerous perennial streams, lakes, and reservoirs provide a significant surface supply of fresh water for the states' industry and domestic consumption. Additionally, three primary aquifers provide fresh ground water for the state. In 1985, the total freshwater withdrawals in Rhode Island were 147 million gallons per day (MGD). Of this, approximately 69 percent was for domestic and commercial use, twenty-seven percent was for industrial and mining use, and 4 percent was for agricultural use. Eighty-one and a half percent of the fresh water was obtained from surface water sources and the remaining eighteen and a half percent was from ground water. The Scituate Reservoir in Providence County accounts for more than eighty percent of the reservoir storage capacity in Rhode Island. Approximately 76 percent of the State's population receives its drinking water from the Rhode Island reservoir system. Approximately 24 percent obtain potable water from public supply wells (USGS 1989). There are also an unknown number of private residential water supply wells.

3.7.2 Regional Surface Water Quality

Annual precipitation in the State of Rhode Island ranges from approximately 42- to 48- in. Approximately one-half of the annual precipitation runs off to streams and lakes of the State. As stated in section 3.7.1, 81.5 percent of the fresh water used in Rhode Island is drawn from surface water sources. The quality of Rhode Island's surface water is affected primarily by land use and commercial factors such as urban runoff, point-source discharge, and municipal/ industrial wastewater discharge (USGS 1993).

In sparsely populated areas, stream water quality is affected mainly by impurities in precipitation and by constituents released from the soil and rock. Because the bedrock, glacial deposits, and soil in Rhode Island are composed largely of insoluble silica minerals, concentrations of dissolved inorganic constituents are low. Surface water in Rhode Island is soft (hardness less than 60 milligrams per liter (mg/L) of calcium carbonate) and slightly acidic (pH values less than 7).

No fresh surface water bodies are included in the former Nike Site property. The nearest surface water bodies are Davol Pond, located approximately 1,400 ft southwest and Allen Harbor located approximately 3,500 ft northwest of former Nike Site study area at the intersection of Seabee Avenue and Perimeter Road. Two wetland areas are located adjacent to and north of the site, north of Perimeter road.

3.7.3. Regional Ground-Water Quality

Ground water in Rhode Island is present in two types of aquifers: unconsolidated Pleistocene glacial deposits and consolidated Paleozoic bedrock. The ground water within the glacial deposits is divided into two hydrologic units: the stratified drift unit (glacio-fluvial deposits at the former Nike Site and adjacent Navy property) and the till unit. The stratified drift unit consists of interbedded lenses of gravel, sand and silt. The till unit consists of boulders, gravel, sand, silt and clay. Both aquifers constitute important water resources for the state. Most domestic wells in Rhode Island obtain water from the bedrock aquifer (USGS 1988).

The quality of ground water in most of Rhode Island is suitable for human consumption with little or no treatment. Typically, the ground water has total dissolved solids (TDS) concentrations less than 200 mg/L, is soft (hardness less than 60 mg/L of calcium carbonate), is slightly acidic (pH 5.5 to 7.0), and is relatively cold (10 to 12 Celsius). The percentage of the State's land with non-potable ground water is relatively small. Although many areas have measurable degradation of water quality, the amount of degradation has not impaired the water quality for human consumption and other major uses. Because the ground water occurs mostly under unconfined conditions with a depth to water less than 20 ft bgs, the ground water in Rhode Island is often vulnerable to contamination and quality degradation (USGS 1988).

In localized situations, specific effects from waste disposal, agricultural, and urbanization have caused significant water quality degradation. The principal sources for ground-water

contamination are waste disposal sites, underground fuel storage tanks, surface impoundments of liquid waste, solid waste landfills, septic systems and cesspools, storage areas for highway deicing salts, and oil and chemical spills. The principal ground-water contaminants derived from these sources are volatile organic compounds (VOC), pesticides, metals, nitrate, sodium and chloride (USGS 1988).

3.7.4 Regional Aquifer Characteristics

USGS Water Supply Paper 1779 (Rosenshein 1968) describes the aquifer characteristics of the Potowomut-Wickford area of south-central Rhode Island. That study area comprises approximately 60 square miles from East Greenwich to the southern tip of North Kingstown and west into parts of West Greenwich, Rhode Island. The former PR-58 Nike Site and adjacent Navy property are located in the east-central part of the study area. The Potowomut-Wickford area comprises parts of five river basins; however, only three basins display major hydrogeological significance. The three primary basins include; the Potowomut River Basin, the Annaquatucket River Basin, and the Pettaquamscutt River Basin. All three basins are situated west and/or southwest of the former Nike Site study area.

The primary aquifer of the Potowomut-Wickford area is the Potowomut-Wickford Aquifer, producing water primarily from stratified drift unit. That area of ground-water supply production is located generally within a northeast trending valley in the bedrock surface located about 2 miles northwest of the former Nike Site study area.

The transmissivity of the Potowomut-Wickford aquifer ranges from 0- >40,107 ft^2/day. The areas of highest transmissivity are concentrated around the three primary river basins. The transmissivity decreases outward from each river basin toward till and bedrock boundaries.

Recharge to the Potowomut-Wickford Aquifer occurs primarily from October through April. Under natural conditions, recharge is effectively equal to the discharge plus the change in subsurface storage. Natural discharge from the aquifer occurs as flow to surface water and movement away from source areas. Most of the discharge occurs as a component of stream flow; however, some discharge occurs as subsurface underflow and discharges into Greenwich Bay and the west passage of Narragansett Bay.

3.7.5 Site Hydrogeology

The previously described geological units underlying the site have been divided into the following three hydrogeological zones (beginning with the uppermost zone):

> Shallow ground-water zone ('S' wells) -- consists of the glacio-fluvial sand unit overlying the glacio-lacustrine silt and very fine sand unit (where present beneath the adjacent Navy property) or directly overlying the silty gravelly sand to sandy gravelly silt (possibly till) where the glacio-lacustrine deposits are not present. This zone occurs under unconfined conditions.

Deep overburden ground-water zone ('D' wells) -- consists of the silty gravelly sand to sandy gravelly silt (possibly till) unit and the weathered bedrock zone. These two units are considered as a single ground-water zone for the following reasons. No apparently continuous layer of lower permeability material (e.g. a clay layer) was encountered at either the former PR-58 Nike Site or the adjacent Navy property through this zone that could subdivide this zone. The weathered bedrock where quartzite (hard) and phyllite (soft) are interbedded, form a zone that is hydrogeologically similar because of the apparent horizontal and vertical variation observed which would allow for horizontal and vertical flow (hydraulic communication) through it. In other words, ground water could flow more readily through the softer, fractured phyllite and fractured quartzite, but less could flow through the more massive zones of quartzite and very weathered phyllite with fractures filled by silt and clay. The estimated hydraulic conductivity for the screened till and weathered rock zone ranged from approximately 1 to 50 ft/day. The weathered bedrock is in direct hydraulic communication with the overlying silty gravelly sand to sandy gravelly silt (possibly till) unit. Additionally, this zone is in direct hydraulic connection with the shallow ground-water zone, except in areas beneath the adjacent Navy property (generally east of MW03-08) where the glacio-lacustrine silt and very fine sand unit is present. The deep ground-water zone occurs primarily under unconfined conditions. Partially confined to confined conditions appear to be present adjacent to and east of the Navy's Building 224.

Competent shallow bedrock ground-water zone ('R' and 'R2' wells) -- includes the upper approximately 25-30 ft of competent bedrock ('R' wells) and the next 25-30-ft depth interval (approximately 30-60 ft below the top of competent bedrock) which was investigated, but may extend deeper. This zone is in direct hydraulic connection with the overlying deep ground-water zone. Data available indicates this unit occurs under unconfined conditions. The estimated hydraulic conductivity for screened intervals of competent (coreable) bedrock ranged from approximately 0.3 to 175 ft/day depending on the amount and interconnectedness of fracture/bedding planes and the presence of 'fines' filling the fracture/bedding planes. The highest hydraulic conductivity was estimated for the screened intervals of wells EA-106R and EA-112R. Both of these wells are located at the former Nike Site, and EA-112R is located within the northeast trending valley in the bedrock surface. In comparison and as stated above, the estimated hydraulic conductivity for the overlying screened till and weathered rock zone ranged from approximately 1 to 50 ft/day.

Depth to ground water was measured in study area wells in July 2000 and are summarized in Table 3-4. Because some of the 'R' wells had not yet fully recovered from lowered water levels due to well development activities earlier in July, their July 2000 data was replaced with measurements obtained January 2001. The related interpretive ground-water contour maps for

the shallow (S), deep (D), and rock (R) ground-water zones are presented in Figures 3-6, 3-7, and 3-8, respectively. Although there were fewer monitoring wells in previous years from which to measure the depth to ground water, the overall directions of ground-water flow interpreted from that data obtained by the Navy (EA 1998) is similar for the shallow and deep ground-water zones as currently interpreted from the July 2000 data (Figures 3-6 and 3-7). The January 2001 data measured from the rock (R) ground-water zone is the first to have a sufficient number of wells to meaningfully contour the data. Based upon Figure 3-7, the interpreted ground-water flow direction in the deep zone is southeast and east from the vicinity of well cluster MW03-14 (CVOC plume source at the former Nike Site) to the vicinity of the Navy's Building 224. Because of the slight ground-water mound east of the Navy's Building 224 in the vicinity of an old gravel/borrow pit, the ground-water flow east appears to diverge in the vicinity of Building 224 to the northeast and southeast. A slight ground-water mound beneath the area of the former missile silos results in a west ground-water flow beneath a relatively small portion of the study area located west of the former missile silos.

Based upon the January 2001 water level data, ground-water flow in the shallow bedrock (R) zone is interpreted to be approximately toward the southeast (Figure 3-8). The highest elevation in these data is for well EA-106R which is located along the northern boundary of the former Nike Site property. A slight ground-water mound beneath the area of the former missile silos results in a west ground-water flow beneath a relatively small portion of the study area located west of the former missile silos. North of EA-104, the ground-water flow is interpreted to be toward the northeast and offsite.

Vertical hydraulic heads and gradients are summarized in Table 3-5 for various well clusters in the study area. The following summarizes the vertical gradients observed between the deep (D) and competent shallow bedrock (R) zones.

Former PR-58 Nike Site

Generally, unconfined conditions (downward gradient) have been recorded at well clusters EA-108D/R, MW03-12D/R, and MW03-13D/R.

Slightly confined conditions (upward gradient) have been recorded at well clusters EA-113D/R, EA-114D/R, EA-116D/R, and MW03-14D/R.

An equal number of downward and upward vertical gradient conditions have been recorded at well clusters EA-106D/R and EA-112D/R.

Adjacent Navy Property

Generally, unconfined conditions (downward gradient) have been recorded at well clusters EA-111D/R and MW03-03D/R.

Slightly confined conditions (upward gradient) have been recorded at well clusters MW02-03D/R and MW03-08D/R.

An equal number of downward and upward vertical gradient conditions have been recorded at well clusters EA-110D/R.

For the vertical gradients observed between the competent shallow bedrock (R) and competent deep bedrock (R2) zones, unconfined conditions (downward gradient) have been recorded at well

clusters EA-116R/R2 and MW03-14R/R2, and slightly confined conditions (upward gradient) have been recorded at well cluster EA-112R/R2.

Slug tests have been performed in the screened monitoring wells. The data were used to calculate estimated hydraulic conductivities for the material screened around each well. Table 3-6 summarizes the estimated hydraulic conductivities along with the geologic unit(s) screened at each well. The estimated hydraulic conductivity for the screened till and weathered rock zone ranged from approximately 1 to 50 ft/day. In comparison, the estimated effective hydraulic conductivity for screened intervals of competent bedrock ranged from approximately 0.3 to 175 ft/day depending on the amount and interconnectedness of fracture/bedding planes and the presence of 'fines' filling the fracture/bedding planes. The slug test data for the two new screened wells EA-114D and EA-116D are provided in Appendix D.

The ground water beneath the former PR-58 Nike Site and adjacent Navy property is classified by RIDEM as GB (presumed to require treatment prior to drinking). The southern extent of class GA ground water is Perimeter Road (the northern boundary of the site). Class GA ground water is presumed not to require treatment prior to drinking.

4. NATURE AND EXTENT

4.1 INTRODUCTION

This chapter presents the analytical results of soil and ground-water samples collected during the June-October 2000 field activities, plus a summary of the nature and extent of CVOC detected beneath the former PR-58 Nike Site and adjacent Navy property study area. Section 4.2 provides information on the private ground-water supply wells north of the former PR-58 Nike Site. Section 4.3 provides the results of a previous ground-water background study by the Navy. The analytical results of the June 2000 soil samples are presented in Section 4.4. The analytical results of the September-October 2000 ground-water samples are presented in Section 4.5. Information on the water source used during the field activities is provided in Section 4.6. A presentation of potential CVOC source(s) is presented in Section 4.7.

4.2 RESIDENTIAL WATER SUPPLY WELLS

No municipal water supply wells were sampled during investigative activities. The nearest municipal supply well is located near the intersection of Frenchtown Road and U.S. Route 1 over 2 miles northwest of the former Nike Site (GZA, 1992).

Although public water is available to residences along Fletcher Road, Candlewood Road, and Quail Drive located north of the former Nike Site, some residences still use private well water for drinking. Based upon review of the results of previous samples collected by the Navy, RIDEM coordinated with the Town of North Kingstown and the Rhode Island Department of Health (RIDOH) to identify residential properties in that area which use private well water for drinking. The Town of North Kingstown, RI reviewed their water department records for the area north of Perimeter Road and identified eight possible locations of private wells. They confirmed the existence and use of these wells and received permission to sample seven of the wells. The addresses and approximate locations of these wells were received from RIDEM and are provided in Table 4-1 and Figure 2-1.

On 6 May 1997, the RIDOH sampled seven of the eight residential water supply wells for analysis of VOC (EPA Method 524). None of the VOC analytes detected in the study area ground water were detected in samples from four of these wells located just north of Perimeter Road, or in samples from the northeasternmost 2 wells along Fletcher Road. Trace concentrations of PCE (0.7 ug/L) and 1,1,1-trichloroethane (1 ug/L) were detected in the sample collected from "Matoes" well, both of which are below the RIDEM standards (5 ug/L and 200 ug/L, respectively). This well is located along Fletcher Road more than 2000 ft from the former Nike Site. Because documentation of the construction details for these eight residential wells (eg. total well depth and depth of the screened interval) is important to assessing their position in comparison to the CVOC plume detected in deep ground water from the former Nike Site, Town of North Kingstown Water Department staff visited/contacted each of these residences to try to obtain the information. However, no such information was found to be available by memory or in writing.

4.3 GROUND-WATER BACKGROUND RESULTS

Background concentrations for inorganic analytes in ground water at the adjacent NCBC Davisville property have been established by the Navy as a result of their Basewide Ground Water Inorganics Study (Stone and Webster 1996). The established inorganics background concentration values are summarized on Table 4-2.

4.4 SOIL

During the monitoring well drilling activity, four soil samples were collected from well borings in two new locations (EA-114 and EA-116) and submitted to CEIMIC Corporation for TCL VOC and TAL metals analysis. The validated results are summarized in Tables 4-3A and 4-3B. Additionally, the soil samples from monitoring well boring location EA-114 were analyzed for TCL SVOC because it was believed by RIDEM that this location had also been a potential spill site (based on stained soil previously observed by RIDEM staff). The validated SVOC results are summarized in Table 4-3C. The sampled intervals analyzed were as follows: 0-2 ft bgs and 9-11 ft bgs from EA-114R (competent bedrock was encountered at 14.5 ft bgs), and 23-25 ft bgs and 83-85 ft bgs from EA-116D (competent bedrock was encountered at 86 ft bgs). The results are summarized on Table 4-3. The only VOC detected above analytical detection limits was 2-Butanone at a concentration of 660 ug/L (EA-114R, 0-2 ft bgs). The only SVOC detected above the detection limits was benzoic acid at a concentration of 490 ug/Kg and pentaclorophenol at a concentration of 40 ug/Kg (both from EA-114R, 0-2 ft bgs), and di-n-butyl phthalate at 36 ug/Kg (EA-114R, 9-11 ft bgs).

Based upon the sample results from location EA-114R, this area does not appear to have been a petroleum or chlorinated solvent spill site. Based upon the EA-116D sample results, there is not residual CVOC DNAPL present and a high concentration dissolved CVOC plume does not appear to be present there offsite (north of Perimeter Road, Figures 2-1 and 2-2.

4.5 GROUND WATER

4.5.1 Volatile Organic Compounds

This section presents the results of ground-water samples collected for TCL VOC analysis in 2000. In September and October 2000, ground-water samples from18 new wells and 49 existing monitoring wells (deep [D], rock [R], and deep rock [R2] zones) were collected and submitted for laboratory analysis.

Previously, the Navy has collected ground-water samples in the study area for analysis during three events (1995, 1996, and 1998). The VOC results of the Navy's three ground-water sampling events are detailed in EA 1998, but for convenience are also summarized in Appendix A2 (Figures 2-4 through 2-6 and 4-3 through 4-14, and Tables 4-2A/B, 4-3, and 4-4) of the current report. In May and November 1995, ground-water samples were collected by the Navy and laboratory analyzed from 64 shallow and deep monitoring wells. In December 1996,

ground-water samples were collected by the Navy from 38 deep monitoring and submitted for laboratory analysis. In March 1998, ground-water samples were collected by the Navy from 17 deep (D) and four rock (R) monitoring wells and submitted for laboratory analysis.

No LNAPL or DNAPL was measured in the monitoring wells sampled during fieldwork, nor were they observed in previous investigations (EA 1998; TRC 1991, 1994; Metcalf & Eddy, 1994; SEC, 1988).

4.5.1.1 Deep (D) Ground-Water Zone

The locations of the monitoring wells sampled in September-October 2000 are shown on Figure 2-4. A summary of the validated results of the VOC detected in the ground-water samples collected from 43 deep monitoring wells are included in Table 4-4. Figures 4-1 and 4-2 illustrate the distribution of total and individual (respectively) CVOC detected in the samples collected from deep ground-water zone. VOC were detected in 30 of the 43 deep ground water samples. Overall, the results of these samples confirm the general CVOC plume location and the relative detected concentrations reported by the Navy for the three previous sampling events. The results for those three previous sampling events are summarized in Appendix A2 (Figures 2-4 through 2-6 and 4-3 through 4-14, and Tables 4-2A/B, 4-3, and 4-4)

In general, Figures 4-1 and 4-2 show that the highest total and individual (respectively) CVOC concentrations were detected in the sample from MW03-14D (383,700 ug/L) which was comprised of the following six compounds: PCA (240,000 ug/L), TCE (120,000 ug/L), and cis-1,2-DCE (11,000 ug/L), trans-1,2-DCE (6,500 ug/L), 1,1,2-TCA (2,800 ug/L), and PCE (3,900 ug/L). The next highest total and individual (respectively) CVOC concentrations were detected in the sample from nearby well EA-102 (115,148 ug/L) located approximately 80 ft west of MW03-14D. West, southwest, and north (EA-103, EA-105, EA-107, EA-108, and EA-114D) across the former Nike Site from MW03-14D, the detected concentrations decrease to 'not detected'. As shown on Figure 4-1, the data indicate that the main detected total CVOC plume (greater than 1,000 ug/L) extends from the former Nike Site area (MW03-14D/EA-102) to east beneath the adjacent and down gradient Navy property (MW03-12D, MW03-08D, and MW03-06D), plus an extension of the plume with lower concentration (less than 50 ug/L total CVOC) toward the northeast and offsite (EA-112D, EA-113D, and EA-116D).

CVOC were not detected in the samples from the three southeastern perimeter monitoring wells located on the adjacent Navy property (EA-110D, MW-Z4-01, and MW-Z4-02). Not detected and 4 ug/L of total CVOC were reported for the samples from the easternmost wells sampled (MW01-13D and MW01-14D, respectively). Therefore, these data indicate that the southwestern and western (EA-105, -107, -108 and -114), northern (EA-106), eastern (MW-Z4-01; MW01-13D, and MW01-14D), and southeastern (EA-110D and -111D) extent of the monitoring well network continues to appear to be beyond or at the fringe of the CVOC plume in the deep ground water, and further, appears to be at good locations to monitor current and future conditions in those deep zone areas. Monitoring wells EA-106D (located at the north edge of the site property) and EA-116D and EA-113D (located north, offsite on private property) were installed

to assess the CVOC plume extent north between the former Nike Site (and northwest from the MW-Z3-01 vicinity) and the five nearest offsite residential water supply wells. VOC were not detected from EA-106D. However, the total CVOC results for samples from deep wells north in the offsite area (35 ug/L at EA-112D and 45 ug/L at EA-116D) indicate that the edge of the plume extends beyond these wells.

As shown in Table 4-5 where the total CVOC data have been summarized for comparison, the following observations are apparent:

(1) Based upon review of up to 4 years of data collected from 49 study area monitoring wells with, detected total CVOC concentrations are decreasing or remaining approximately the same for samples from beneath the Navy's Study Area 01 and Sites 02/03 (all wells except MW02-11D, MW02-03D, MW03-02D, MW03-09D, MW-Z3-01 and MW-Z3-02), and the Nike source area (MW03-14D, and MW03-13D where substantial CVOC decreases were indicated);

(2) In one study area well (MW03-08D [5 yrs of data] located between the Nike source area and Site 03), detected CVOC concentrations decreased from 1995 to 1996, but increased from 1996 to 1998 (although not up to the 1995 values) and decreased again in 2000; and

(3) Detected concentrations of CVOC increased in samples from eight deep wells each with 2 to 5 years of data (EA-102, EA-109, MW02-11D, MW02-03D, MW03-02D, MW03-09D, MW-Z3-01, and MW-Z3-02) and located between the Navy's Sites 02/03 and the Nike source area.

The data indicate that most of the CVOC appears to be migrating in the till and/or weathered bedrock zone just above the surface of competent bedrock.

4.5.1.2 Shallow Competent Bedrock (R) Ground-Water Zone

This section presents the CVOC detected in the samples collected from 21 wells completed within the top 25 ft of competent bedrock and sampled during the September-October 2000 event. A summary of the validated sample results is included in Table 4-4. Figures 4-3 and 4-4 illustrate the distribution of total and individual (respectively) CVOC detected in the ground-water samples collected from these wells. Bedrock monitoring wells were installed near existing deep wells in July 2000 at the following locations: EA-104, EA-105, EA-107, EA-108, EA-112D, EA-113, MW01-10D, MW01-15D, MW02-03D, MW03-03D, MW03-11S and MW01-13D. Additionally, rock wells were installed at two new locations (EA-114 and EA-116). VOC were detected in 13 of the 21 shallow competent bedrock ground-water zone samples.

In general, Figures 4-3 and 4-4 show that the highest total and individual (respectively) CVOC concentrations were detected in the sample from MW03-14R (20,811 ug/L total CVOC) which

was comprised of the following eight compounds: PCA (7,500 ug/L), PCE (8 ug/L), 1,1,2-TCA (75J ug/L), TCE (10,000 ug/L), 1,2-DCE total (3,200 ug/L), 1,1-DCE (13J ug/L), 1,1-DCA (4J ug/L), and VC (11 ug/L). The next highest total and individual (respectively) CVOC concentrations were detected in the sample from nearby well EA-104R (5,201 ug/L total CVOC) located approximately 400-500 ft northeast of MW03-14R. Southwest and north (EA-108R, EA-114R, and EA-106R) across the former Nike Site from MW03-14D, the detected CVOC concentrations decrease to 'not detected'. As shown on Figure 4-3, the data indicate that the main detected total CVOC plume (greater than 1,000 ug/L) extends from the former Nike Site area (MW03-14R) to the northeast (EA-104R) and east beneath the adjacent and down gradient Navy property (MW03-12R and MW03-08R), plus an extension of the plume with lower concentration (less than 500 ug/L total CVOC) toward the northeast and offsite (EA-112R, EA-113R, and EA-116R).

CVOC were not detected in the samples from the four eastern and southeastern perimeter monitoring wells located on the adjacent Navy property (MW01-13R, MW02-03R, EA-110R, and EA-111R). Therefore, these data indicate that the southwestern (EA-108R and EA-114R), northern (EA-106), and eastern to southeastern (MW01-13R, MW02-03R, EA-110R, and EA-111R) extent of the monitoring well network appears to be beyond or at the fringe of the CVOC plume in the shallow competent bedrock ground-water zone. Further, they appear to be at good locations to monitor current and future conditions in those rock zone areas. However, the total CVOC results for samples from rock wells near the west edge of the former Nike Site property (19 ug/L at EA-105R and 12 ug/L at EA-107R) indicate that the edge of the plume extends beyond these wells. Additionally, the TCE concentration detected in the sample from EA-105R (12 ug/L) exceeds both the MCL and RIDEM GA standards. Monitoring wells EA-106R (located at the north edge of the site property) and EA-112R, EA-113R, and EA-116R (located north, offsite on private property) were installed to assess the CVOC plume extent north between the former Nike Site (and northwest from the MW-Z3-01 vicinity) and the five nearest offsite residential water supply wells. VOC were not detected from EA-106R. However, the total CVOC results for samples from rock wells north in the offsite area (146 ug/L at EA-112R, 467 ug/L at EA-113R, and 97 ug/L at EA-116D) indicate that the edge of the plume extends beyond these wells.

VOC concentrations exceeding the Federal MCLs and/or Rhode Island water quality standards in samples from the bedrock monitoring wells include (some of the VOC detected in the ground water have no federal MCLs and/or Rhode Island water quality standards and hence are not given below):

Well #	VOC	Detected (ug/L)	MCL limit (ug/L)
EA-104R	TCE	3,000	5
	1,1,2-TCA	75J	5
	1,2-DCE (total)	1,300	170
	VC	16	2
EA-105R	TCE	12	5
EA-112R	TCE	81	5
EA-113R	TCE	260	5
	1,2-DCE (total)	200	170
	VC	7J	2
EA-112R	TCE	42	5
MW03-11R	TCE	6	5
MW03-12R	VC	6	2
	1,2-DCE (total)	720	170
	TCE	2,000	5
	1,1,2-TCA	50	5
MW 03-13R	1,2-DCE (total)	370	170
	TCE	87J	5
	1,1,2-TCA	23	5
	VC	3	2
MW03-14R	1,2-DCE (total)	3,200	170
	1,1,2-TCA	75	5
	TCE	10,000	5
	VC	11	2
MW03-03R	TCE	160 (170 Dup)	5
MW03-08R	1,2-DCE (total)	380	170
	TCE	1,000	5
	1,1,2-TCA	25	5
	VC	3.5	2

The majority of the CVOC plume detected in the bedrock ground-water samples appears to indicate that the plume is migrating northeast and east from the vicinity of MW03-14R. This finding is similar to the finding from the CVOC data for the deep ground-water well samples, except that low CVOC concentrations have also been detected in rock wells near the western edge of the former Nike Site and the concentrations detected in samples from EA-104R and EA-113R are approximately 1-2 orders of magnitude higher than the concentrations detected in the related deep (D) well of each well pair. Similar to the deep ground-water zone results, these data indicate that a main CVOC source appears to be located in the vicinity of wells MW03-14D/R.

4.5.1.3 Deep Competent Bedrock (R2) Ground-Water Zone

In July 2000, three deep bedrock wells completed within the zone approximately 30 to 60 ft below the top of competent bedrock (EA-116R2, EA-112R2, and MW03-14R2). Ground-water samples were collected from these three wells during the September-October 2000 sampling event. A summary of the validated VOC results is included in Table 4-4. Figures 4-5 and 4-6 illustrate the distribution of total and individual (respectively) CVOC detected in the samples collected from deep bedrock ground-water zone. In the CVOC source area (MW03-14R2), the detected concentration of total CVOC was 15,088 ug/L (12,699 ug/L duplicate). Offsite, north of Perimeter Road, CVOC were not detected in the sample from EA-112R2, and only TCE (0.9 ug/L) was detected in the sample from EA-116R2.

4.5.2 Semi-Volatile Organic Compounds

Because it was believed by RIDEM that the EA-114D/R location had been a potential spill site based on stained soil previously observed by RIDEM staff, the ground-water samples collected from these two wells were analyzed for TCL SVOC (Table 2-3) to aid in assessment of that allegation. The validated results are summarized on Table 4-6. None of the TCL SVOC were detected. Therefore, based upon the EA-114D/R ground-water sample results, this area does not appear to have been a petroleum or chlorinated solvent spill site.

4.5.3 Metals

Ground-water samples collected in September-October 2000 from nine of the monitoring wells were also analyzed for TAL metals (Table 2-4). Samples from these wells were analyzed for TAL metals to assess potential metals in ground water from the former Nike Site to be migrating offsite, north of Perimeter Road, which is also the boundary between the areas classified by RIDEM as class GA ground water (north of Perimeter Road) and GB ground water (south of Perimeter Road). Monitoring wells EA-112D/R/R2 and EA-113D/R are located just north of the former Nike Site boundary (Perimeter Road) and near the south edge of the class GA ground water. Monitoring wells EA-104D/R and EA-106D/R are located just south of the former Nike Site boundary (Perimeter Road) and near the north edge of the class GB ground water area. As a new location, samples from EA-114D/R also received metals analysis. The validated results are summarized in Table 4-7.

Metals detected include aluminum in concentrations ranging from 135 ug/L (EA-104R) to 1,240 ug/L (EA-106D), calcium ranging from 2,790 ug/L (EA-114D) to 22,700 ug/L (EA-106R), iron ranging from 573 ug/L (EA-104D) to 14,600 ug/L (EA-114R dup), magnesium ranging from 1,400 ug/L (EA-114D) to 5,520 ug/L (EA-113D), nickel ranging from ND to 60.3 ug/L (EA-104R), potassium ranging from 988 ug/L (EA-104D) to 15,200 ug/L (EA-112R2 dup), sodium ranging from 5,790 ug/L (EA-104D) to 17,700 ug/L (EA-112R2), zinc ranging from ND to 92 ug/L (EA-112R2). Lead was also detected at a concentration of 1.9 ug/L at one location (EA-106D). RIDEM GA ground water objectives have been established for ten of the metals parameters. None of these analytes detected in this sampling round exceeded the RIDEM GA groundwater objectives.

4.6 WATER SOURCE

RIEDC provides water to NCBC from wells located off base. During the June-July 2000 drilling activities, the water source was obtained from a hydrant located in the parking lot at the end of Davisville Road, within approximately 300 ft of the intersection of Davisville Road and Allens Harbor Road, for drilling fluid and part of the decontamination process for drilling and reusable sampling equipment. A sample of this water was collected on 28 June 2000 and analyzed for TCL VOC. Only trace concentrations of VOC were detected, including chloroform (3 ug/L), dibromochloromethane (2 ug/L), and bromodichloromethane (3 ug/L). These detected trace concentrations of VOC are not expected to have had adverse impact on soil and ground-water samples collected for chemical analyses.

4.7 POTENTIAL VOC SOURCE AREAS

Nine deep (D) monitoring wells (EA-101 through EA-109) were previously drilled for the Navy at the former Nike Site in June 1996 (Appendix A2, Figure 1-4). In general, soil samples were collected continuously from ground surface to ten ft bg, and then, at approximately 5-ft intervals from ten feet bg to the top of bedrock (bottom of the screened interval of the monitoring wells). Based upon the results of previous studies, the samples were field screened using a field GC with purge and trap system for selected CVOC and BTEX. BTEX was not detected in the soil samples. Neither CVOC nor BTEX were detected in the soil samples from EA-105. A key use of these screening data was to aid in the locating of potential CVOC surface release/spill areas, ie. areas where CVOC were detected in soil samples collected from above the water table. This only occurred at well borings EA-101 and EA-102, where trace concentrations (1.2 ug/Kg to 5.4 ug/Kg) of 1,1-DCE, trans-1,2-DCE, trichloroethene, and/or PCA were detected. For the remaining borings/wells, CVOC were detected only in soil samples collected from below the water table. Additionally, CVOC were not detected in the two soil samples collected during the June 2000 drilling of EA-114R. All of these findings continue to support the belief that the dissolved CVOC detected in ground-water samples from monitoring wells are migrating with the ground water and are not from a surficial source in soil above the ground-water table.

Based on the September-October 2000 ground-water results (supported by data from the previous three sampling events by the Navy), the distribution of detected CVOC indicates the presence of

a main CVOC source area in the vicinity of MW03-14D and EA-102 (located immediately east of the former Nike missile silo area). The highest concentrations of total CVOC continue to be detected in the ground-water samples collected from MW03-14D (526,480 ug/L in May 1995, 423,000 ug/L in December 1996, 373,500 ug/L in March 1998, and 383,700 ug/L in October 2000). CVOC detected in ground-water samples from MW03-14D and EA-102 have included PCA, PCE, TCE, TCA, DCE, DCA, chloroform, and carbon tetrachloride. However, the main constituents are PCA and TCE. Based upon the 1995, 1996, 1998 and 2000 sample data for MW03-14D as shown in Table 4-5, the detected total CVOC has steadily decreased through 1998 and then increased very slightly. Detected concentrations of total CVOC have increased by approximately double or more (Table 4-5) in samples from EA-102, EA-109, MW03-09D, and MW-Z3-01, which are located just upgradient of MW03-14D and between Site 03 and the MW03-14D source area. Additionally, the detected concentration of total CVOC in samples increased from not detected to 54 ug/L. However, only a total of two samples have been collected from this well. The detected concentration of total CVOC in samples from nearly all of the remaining wells sampled show an apparent decreasing trend or are remaining approximately the same. While some of these wells have up to four sampling events of data for comparison, the 18 newly installed wells of course have only one set of sampling results at this time.

The types of compounds reportedly stored, used and/or disposed at the sites could produce the pattern and distribution of CVOC detected in the ground-water samples. Solvents, including TCA and TCE, were reportedly used at the Nike Site and were disposed on the ground (ESE, 1984; Law, 1986). DANC, which contains PCA, was reportedly stored at the Disaster Recovery Training Area (Hart, 1984). However, CVOC were not detected in the December 1996 and October 2000 ground-water sample from EA-103 (located just east of the 'pipe structure', reportedly part of a former Navy training area) and does not support the 'pipe structure' as being a CVOC source area. CVOC were present in the soil and ground water beneath the Peabody Clean Industries Site (Metcalf & Eddy, 1994). Additionally, the former Peabody Clean drum storage area (Site A-5 on Figure 1-2) was located just west and upgradient of wells EA-102 and MW03-14D. The former vehicle wash rack located on the adjacent Navy property west of Building T16CT was previously eliminated as a potential VOC source based on GC headspace screening by the Navy of soil samples collected from beneath the drainage pit and along the drain line leading south from the wash rack to a catch basin. The area west of Site 03 and east of Seabee Avenue (Figure 1-2) was used for storage of supplies and equipment, and no historical documentation is available to indicate the presence of a specific potential source location(s) in that area.

5. FATE AND TRANSPORT

The fate and transport of VOC detected in the ground water beneath the former PR-58 Nike Site and adjacent Navy NCBC Davisville property are evaluated in this chapter to provide an understanding of the processes controlling the migration of the VOC in the ground water.

The major factors that affect VOC fate and transport are (1) physicochemical characteristics and (2) site environmental characteristics.

Section 5.1 presents an assessment of the presence, fate, and transport of non-aqueous phase liquids (NAPL). Solute (dissolved phase) transport is presented in Section 5.2. The site environmental characteristics that affect the constituent's fate and transport are presented in Section 5.3. Section 5.4 presents the results of the VOC natural attenuation assessment.

5.1 PRESENCE, FATE, AND TRANSPORT OF NON-AQUEOUS PHASE LIQUIDS

5.1.1 Evidence for the Presence or Absence of NAPL

In general, compounds present in excess of their solubility limit are present in a discreet, immiscible phase known as NAPL. Most NAPL present in the subsurface is not composed of a single component (e.g. pure TCE), but multiple components. The presence of various chlorinated aliphatics and other compounds at the former PR-58 Nike Site and downgradient areas, which are not breakdown products of a single compound, suggests that, if NAPL is present, it exists in a multi-component form.

Direct evidence of NAPL presence can be obtained by visual inspection during field investigations of soil and/or fluid samples. At chlorinated solvent spill sites, this is complicated by the fact that most chlorinated NAPLs are colorless and may be heterogeneously distributed within the soil phase. At the former PR-58 Nike Site, no direct, visual confirmation of a separate phase product has been documented.

In the absence of direct, visual NAPL evidence, the presence of NAPL at a site can be inferred if one or more of the following four conditions are present (Cohen et.al. 1993):

1. The groundwater concentration exceeds 1% of the pure phase or effective aqueous solubility of the compound;

2. NAPL compounds concentrations in the soil exceed 10,000 mg/Kg;

3. NAPL compounds concentrations in ground water calculated from soil-water partitioning relationships and soil sample analyses exceed their effective solubility; or

4. Organic vapors detected in soil vapor (or sample head space) exceed 100 to 1,000 ppm.

Neither soil nor organic vapor samples were collected from the immediate vicinity of the subsurface source area (monitoring wells MW03-14 and EA-102) during the current field effort, so the second through fourth criteria cannot be used to evaluate the presence or absence of NAPL in these areas. Additionally, no sample of NAPL has been collected or analyzed from the Nike Site, so mole fractions and, thus, effective solubilities of various detected compounds cannot be calculated. Thus, NAPL presence can only be inferred, using the criteria set forth by Cohen et al., by comparing detected concentrations to 1% of their solubility in water. The original source of the dissolved-phase CVOC plume now present in ground water beneath the former PR-58 Nike Site may have resulted historically from a solvent spill(s) of unknown specific composition that migrated into the subsurface as a NAPL at that time. Because NAPL potentially present at the Nike Site is likely to be a multicomponent mixture, the effective solubility of the compounds will be less than the compound solubility and interpretation of the presence of NAPL at the site based on 1% of solubility should be conservative.

The maximum concentration for each detected compound was compared to 1% of the aqueous solubility of the given compound. This comparison is shown in Table 5-1. Of the deep wells, concentrations of 1,1,2,2 tetrachloroethane (PCA), cis-1,2-dichloroethene (DCE), tetrachloroethene (PCE) and trichloroethene (TCE) detected in samples from well MW03-14D each exceeded the 1% rule of thumb suggesting that NAPL is present in the vicinity of this well. Previous Navy sample results from 1995, 1996, and 1998 indicated that concentrations of TCE, DCE, and PCA detected in the sample from well MW03-14D also exceeded the 1% rule of thumb. Additionally, the detected concentration of PCA exceeded 1% of the solubility in both the 2000 sample and in the previous Navy sample collected in 1996 from well EA-102. Well EA-102 is located directly west (upgradient) of MW03-14D.

No compounds were detected in excess of 1% of their solubility in rock (R) wells. However, the concentration of TCE reported in both the 1995 and 2000 samples from MW03-14R approaches the criterion (10,000 ug/L detected vs 11,000 ug/L the 1% solubility value). In the deep rock (R2) zone, TCE concentrations detected in the 2000 sample from well MW03-14R2 exceeded the 1% of solubility rule of thumb.

Thus, the presence of NAPL is strongly suspected (perhaps as residual NAPL as a coating on soil particles or as ganglia between soil particles or in bedrock fractures) in the vicinity of the well cluster MW03-14 and EA-102.

5.1.2 NAPL Transport

NAPL transport within the saturated zone of the Nike Site will be affected by the density, viscosity, interfacial tension, volume and saturation of the NAPL; and the pore size of the

formation. Each of these parameters is presented relative to NAPL transport at the Nike Site below.

Density

Density is the ratio of mass to volume and affects the mobility of the compound in the subsurface. NAPL with density less than water (known as lighter than water NAPL - LNAPL) float on the ground water. NAPL with density greater than water (known as denser than water NAPL - DNAPL) sinks through the ground water. The mobility of LNAPL is different from DNAPL. Generally, DNAPL has higher molecular weight compounds and greater degree of halogenation. Small differences (~ 1%) in density affect the NAPL mobility in the subsurface. Density depends on temperature; generally the density is higher at low temperature. Mole fraction of individual components contributes to the overall density of a multicomponent NAPL.

The NAPL that is inferred to be present at the former PR-58 Nike Site is likely a multicomponent DNAPL composed primarily of chlorinated aliphatics (PCA, PCE, TCE and DCE). The specific gravity (density relative to water) of each of these compounds is greater than water (1 g/cc) and range from 1.26 to 1.62 g/cc, as shown in Table 5-2. DNAPLs migrate vertically downward, through the unsaturated and saturated zones, until a layer finer grained material or competent bedrock surface is encountered. The finer grained material acts as a barrier to continued vertical transport. This is presented in greater detail in the section on formation pore size below.

At the former Nike Site and, more specifically, in the vicinity of well MW03-14D, DNAPL is expected to have migrate downward until the competent bedrock surface was encountered. In many locations, the bedrock likely acts as a impediment to the rate of DNAPL migration limiting migration in bedrock to areas of interconnected open fractures and lateral migration in the overlying silty, gravelly sand and/or weathered bedrock interval to down the slope of the competent bedrock surface. This may not be in the same direction as ground-water flow. As shown in Figures 3-2 through 3-5, bedrock in the vicinity of well MW03-14D slopes generally to the north and northwest. Thus, while ground water beneath the former Nike Site is generally interpreted to flow east to southeast except the western portion that appears to flow west (Figures 3-6 to 3-8), DNAPL could have flowed in a north to northwest direction via gravity flow.

Viscosity

Viscosity is a measure of a fluid's resistance to flow, i.e. resistance is proportional to viscosity. The absolute viscosity of the pure-phase liquids for the likely major components of the suspected DNAPL at the Nike Site are presented in Table 5-2. The viscosities range from 0.4 (DCE) to 1.75 (PCA) centipoise (cp), where the absolute viscosity of water is 1.0 cp and PCA is the only component of the CVOC plume with a pure phase viscosity greater than 1.0 cp. Because PCA and TCE are the main components of the suspected DNAPL, based on

aqueous concentrations in the vicinity of well EA-102 and well cluster MW03-14, the viscosity of the suspected DNAPL is likely slightly in excess of 1.0 centipoise or slightly more viscous than water. Thus, the suspected DNAPL is likely to have flowed relatively easily.

Interfacial Tension

Interfacial tension is the surface energy at the interface between immiscible phases and is given by the ratio of force acting on the interface to the interface area. The interfacial tension between two liquids determines which liquid will wet solid surfaces (wettability) and, therefore, the ease of transport of each liquid through a porous medium. Interfacial tension or wettability for NAPLs in saturated porous media is typically measured by the contact angle of the NAPL on a solid surface. Contact angles less than 70 degrees are considered water-wet systems. Contact angles greater than 110 degrees are considered NAPL-wet.

No contact angle measurements were performed using DNAPL that is suspected to be present at the Nike Site. Generally, interfacial tension increases with halogenation and decreases with temperature. Chlorinated ethene DNAPLs generally lead to water-wet systems, although many researchers have found that this can change over time, i.e. the NAPL can transition to the wetting phase with time.

If the DNAPL suspected present at the Nike Site is not the wetting phase, then the mobility of the leading edge of the DNAPL pool, if present, would be hindered. Water will coat the surfaces of the grains in a water-wet system, lowering the DNAPL saturation. Permeability of the formation to DNAPL is proportional to saturation leading to reduced mobility. Additionally, the capillary pressure associated with the wetting water phase will tend to act against the movement of the DNAPL. At the receding edge of the pool, the water-wet system tends to push the DNAPL into the next pore due to the capillary pressure exerted by the water phase.

The water-wet system can also lead to the development of ganglia trapped in the pore space (residual DNAPL). Because separate phase DNAPL has not been visibly observed in soil or ground-water samples collected during field activities at the site, this type of inferred residual DNAPL may be present in the subsurface beneath the former PR-58 Nike Site. Because water coats the grains in this system, "snap-off" of DNAPL is possible when water completely surrounds the DNAPL within a pore. This DNAPL can approach residual saturation and become very difficult to remove without the aid of either significantly increased hydraulic pressure or the introduction of solvents, surfactants or heat/steam.

Volume

The volume of a DNAPL pool, if present, would affect the mobility of the DNAPL within the subsurface. The weight of the DNAPL within a pool is proportional to the volume of DNAPL present. This weight counteracts the resistance to DNAPL flow created by capillary pressure. One-dimensionally, it is possible to calculate the pool length required for DNAPL transport.

In the vicinity of well MW03-14D, the bedrock slopes to the north and northwest as shown in Figure 2-2. Assuming this is the line of greatest slope, then the critical DNAPL pool length can be calculated from the following:

$$L_n = \frac{(2\sigma \cos\phi)}{rg(\rho_n - \rho_w)\sin\theta}$$

where

L_n = stable DNAPL pool length;
= interfacial tension (44 dyn/cm – interfacial tension for PCE);
= contact angle between NAPL and water (35° - typical contact angle for PCE);
r = pore radius of the porous medium (0.007mm - typical for silty sand);
g = gravity acceleration (9.8 m/s^2);
$_n$ = NAPL density (1.6 g/cc – density of pure PCE);
$_w$ = water density (1.0 g/cc);
= slope of the bedrock layer (2.9° - based on slope from Figure 2-2).

Using the parameters above, a DNAPL pool length of 30 to 35 meters would theoretically be required to overcome capillary pressure and allow DNAPL to migrate laterally along the bedrock slope in the vicinity of well cluster MW03-14 and well EA-102. Such a DNAPL pool has not been observed

Saturation

Saturation also affects the mobility of DNAPL in a three-phase system (water, NAPL, solid phase). The presence of another fluid within the porous matrix diminishes the ability of both liquids to migrate through the porous matrix. This reduction in mobility is most often expressed as relative permeability, which is a measure of the permeability of the porous matrix at a reduced saturation to the permeability of the matrix at 100% saturation by a given fluid. For example, a porous medium that is 80% saturated with NAPL may lead to a relative permeability for that NAPL of 0.5, or the formation is half as permeable as it would be if the NAPL saturation was 100%. Because NAPLs are not typically the wetting phase, saturation will almost always be less than 100%. The relative permeability of NAPL approaches zero as NAPL saturation approaches residual saturation.

No information was collected during this or any previous investigations at the Nike Site to give an indication of the NAPL saturation.

Formation Pore Size

Because NAPL is not the wetting phase, NAPL transport is inversely proportional to pore size. The material just above the competent bedrock at the former Nike Site is mainly composed of silty gravelly sand and/or weathered bedrock, which consists of 1 to 3 in. rock

fragments interbedded with clay, silt and sand layers (see section 3.6.2). Such a heterogeneous medium will likely lead to fingered and irregluar NAPL transport.

Also, if separate phase DNAPL is present at the former Nike Site, downward DNAPL migration could occur readily under two conditions: (1) where DNAPL is moving from a finer grained material into a coarser grained material or (2) where sufficient DNAPL pool exists to overcome the capillary pressure exerted by the wetting phase (water). The first condition could occur where fractures exist in the competent bedrock and are not filled with silt. The second condition could exist where a DNAPL pool, if present, exceeds a critical height calculated from the following (Cohen et al. 1993):

$$z_n = \frac{2\sigma \cos\phi}{r_{finer} g(\rho_n - \rho_w)}$$

where

= interfacial tension (44 dyn/cm - interfacial tension for PCE);
= contact angle between NAPL and water (35° - typical contact angle for PCE);
r = pore radius of the finer-grained porous medium (0.007mm - typical for silty sand);
g = acceleration due to gravity (9.8 m/s^2);
$_n$ = NAPL density (1.6 g/cc - density of pure PCE);
$_w$ = water density (1.0 g/cc).

5.2 SOLUTE TRANSPORT

Residual NAPL inferred to be present at the former Nike Site would act as a continuous source of CVOC to the aqueous phase until all constituents of the DNAPL have been depleted. Time frames for complete NAPL dissolution will depend on the volume of DNAPL present in the sub-surface, but could likely range from hundreds to thousands of years or longer. Once dissolved, solutes will be carried ground-water flow through advection. However, during transport, the solute will interact with the porous media. Each of these processes, effective solubility, advection, and retardation/sorption are discussed in greater detail in this section.

The following subsections are presented relative to transport of dissolved CVOC through the deep ground-water (porous media) and bedrock ground-water zones, the zones in which the CVOC plume has been detected. No discussion of vadose zone transport or interactions are included because the CVOC plume is present in the deep ground water and not near the ground-water table.

5.2.1 Effective Solubility

No sample of NAPL has been collected or analyzed from the former PR-58 Nike Site, so mole fractions and, thus, effective solubilities of various detected VOC cannot be calculated.

5.2.2 Advection

Advection is the process of transportation of non-reactive compounds by the bulk motion of the ground water and is given by the average velocity of ground water. Without any retardation factors in the subsurface, the extent of dissolved compound transport can be predicted by the advective flow of ground water. However, many factors such as partitioning, compound transformation reactions, dissolution, and dispersion affect the compound's mobility. Hydraulic conductivity, porosity, and hydraulic gradient control the advective flow of ground water.

5.2.3 Retardation/Sorption

Partitioning can control the transport of chemicals in the environment. It is defined as the equilibrium concentrations of a chemical among phases in a system containing multiple phases. The three most common partitioning behaviors observed in the environment include aqueous-solid phase partitioning, aqueous-gaseous phase partitioning, and solid-gaseous phase partitioning.

5.2.3.1 Aqueous/Solid Phase Partitioning

Partitioning between aqueous and solid phase is given by a number of parameters such as sorption, octanol-water (K_{ow}) and organic carbon (K_{oc}) partitioning coefficients, and solubility. Sorption of hydrocarbons on a solid phase is given by sorption equations such as Langmuir and BET equations or by the more complex Freundlich equation. The partitioning parameters are controlled by various factors such as the concentration difference between the aqueous phase and sorbed phase, the type of surface (which typically affects the surface charge), the surface area available for sorption, and the organic fraction present in the solid phase. Presence of a mixture of pure phases of compound may also affect the partitioning of the compound into the aqueous phase and would depend on cosolvency and fraction of the compound in each pure phase. K_{ow} and K_{oc} are convenient partitioning parameters that are useful in explaining the fate and transport of some compounds in the subsurface.

5.2.3.2 Aqueous/Gas Phase Partitioning

Aqueous-gas phase partitioning can occur when VOC dissolved in surface water or ground water come into contact with air. An equilibrium is established between the VOC concentration in the aqueous phase and in the air. Henry's Law Constant (units atm-m^3/moles), given by the ratio of the VOC's vapor pressure and water solubility, is commonly used to quantify the aqueous/gas phase partitioning. Because the VOC detected beneath the former Nike Site area are more than 10 ft below the ground-water table, the aqueous-gas phase partitioning is not a significant factor in determining the fate of VOC in the subsurface at this site.

5.2.3.3 Solid/Gas Phase Partitioning

Solid-vapor phase partitioning occurs in vadose zone soils containing VOC. In general, this partitioning is one of the sources of soil vapor present at sites (the other source is ground water).

Volatilization from the soil is a mechanism for VOC to migrate from soil to the air. Compounds with low vapor pressure (e.g., PAH and some pesticides) will not migrate in the vapor phase but will be associated with suspended and entrained dust. When the VOC associated with soil are exposed to air, there is a potential for the exposed VOC to volatilize into air.

Because the VOC were detected below the ground-water table, the solid/gas or aqueous/gas partitioning and the VOC flux into atmosphere would be negligible at the former PR-58 Nike Site area.

5.2.3.4 Dispersion

Dispersion of compounds in ground water is a function of two factors: (a) a mechanical dispersion coefficient which is proportional to ground water velocity and is influenced by the pore scale velocity profile and pore geometry, and (b) an effective molecular diffusion coefficient which is given by the molecular properties of the compound and is also influenced by tortuosity of the medium. Dispersion affects the longitudinal migration of the compound (along the ground water flow) and transverse migration of the compound (perpendicular to the ground water flow). Large transverse dispersivity could spread the compound plume over the entire thickness of the aquifer. Longitudinal dispersivity of the compound is affected by the aquifer heterogeneity. Compound plumes move more rapidly in layers with higher permeability than in layers with lower permeability.

5.2.3.5 Colloidal Transport

Colloids are ultra-fine particulates that pass through a 0.45 micron filter (McCarthy and Zachara, 1989). Both organic and inorganic materials can exist as colloids in the ground water, including microorganisms, microemulsions of NAPL, mineral precipitates, and mineral fragments (McCarthy and Zachara, 1989). The high surface area-to-volume ratios of colloids suspended in the ground water can act as adsorptive surfaces and facilitate the transport of the chemical in the subsurface. The retardation which results from the organic carbon content of the aquifer solids is partially superseded when significant amounts of colloids are present. The chemical's transport is tied to the transport of the colloids through the aquifer solids.

As the colloidal content of ground water was not investigated during the study, the affect of colloids on the migration of the VOC in the ground water cannot be identified. However, the low dissolved organic content concentrations and soil type suggest that colloidal transport would not be significant at this site.

5.3 SITE ENVIRONMENTAL CHARACTERISTICS AFFECTING CHEMICAL FATE AND TRANSPORT

The environmental characteristics of the site that can influence the fate and transport of the VOC present, include geology, hydrology, and climate. This information is presented in Chapter 3.

5.3.1 Soil

The six principal soil characteristics affecting chemical transport are porosity, permeability, organic carbon content, density, pH and Eh.

5.3.1.1 Porosity

Porosity is defined as the percentage of the volume of bulk soil that contains pore spaces, and is an index of how much water can be stored in the saturated soil (Driscoll, 1986). Typical porosities sand and gravel mixtures range from 10-35%, till from 10-25%, and clay from 45-55%. Porosity measurements were not made for subsurface soil samples collected from the site.

5.3.1.2 Permeability

Permeability, also called hydraulic conductivity, is a measurement of the ability of ground water to move through a geologic formation (Ferrara et al., 1984). Hydraulic conductivity for the hydrogeological layers was determined using slug test data which was previously described in Section 3.7.5.

5.3.1.3 Organic Carbon Content

The organic carbon content of the soil (typically quantified as total organic carbon, TOC) can significantly affect the retardation of organic chemicals in ground water. As stated in Section 5.2.3.1, the organic carbon content is used with the K_{oc} values to calculate partitioning of organic chemicals to solids. TOC has a less significant affect on the partitioning of inorganics to the solid phase.

TOC was not measured during this investigation. However, TOC was measured during the Navy's Phase II RI at nearby Site 03 and Site 02 (TRC, 1994), found to be very low, and is presented as fraction of organic carbon (f_{oc}) in Table 5-3. Given the similarities of the materials encountered, it is believed that TOC is not a significant environmental factor in the former PR-58 Nike Site either.

5.3.1.4 Density

Soil density is the mass of soil per unit volume of soil, and is most commonly reported as a soil bulk density. It is inversely related to particle size. As the particle size decreases (e.g., as one moves from sand to clay) the soil density increases. Accordingly, retardation is directly related to soil density. Soil bulk density was not determined at this site.

5.3.1.5 pH and Eh

The relationship between pH and Eh influences the valence state of metal constituents, which in turn affects their behavior in the environment. Therefore, the pH and Eh of the soil (and ground water) can influence the apparent K_d of metal constituents. This was not measured during this investigation and is not considered to be significant to the organic (non-metal) compounds (CVOC) of this study.

5.3.2 Ground Water

The pertinent characteristics of ground water which can influence chemical fate and transport include salinity, pH and Eh, temperature, dissolved oxygen, biochemical oxygen demand (BOD), and chemical oxygen demand (COD).

5.3.2.1 Salinity

Salinity is defined as the weight (in grams) of dissolved inorganic chemicals per kilogram of water, after the bromide and iodide ions are converted to equivalent chloride ion, and all bicarbonate and carbonate ions are converted to the oxide (Stumm and Morgan, 1981). The salinity of the water affects the water solubility of the chemicals. As salinity increases, the potential regions between the water molecules decreases (since they are occupied by the cations and anions from the salt), which can reduce the solubility of the test chemical.

Based upon field measurements during previous ground-water sampling events (1995 and 1996) by the Navy, the ground water beneath the former PR-58 Nike Site is not saline (Tables 2-5 and 2-10 of EA 1998). Hence, there would be no affect of salinity on the solubility of compounds detected in the ground water beneath the site.

5.3.2.2 pH and Eh

The pH of the ground water is directly related to the solubility of organic acids (e.g., benzoic acid) and inversely related to the solubility of the organic bases, although it is not anticipated to significantly affect the solubility of neutral organic compounds.

Ground-water pH and Eh can affect the mobility of inorganic chemicals by two mechanisms. First, as the pH of the ground water lowers, there is greater potential for the "extraction" of

metals from the solid phase. Second, the relationship between pH and Eh influences the valence state of the metal, which in turn affects its behavior in the environment.]

The field measured pH of the ground water during the three sampling events at the sites averaged about 5.7, with the measured Eh falling within the slightly reduced to slightly oxidized range (i.e. Eh ranging in the order of -10^2 to $+10^2$ mV).

5.3.2.3 Temperature

The chemical's solubility in water is a function of temperature, but the magnitude and direction of the solubility change is not consistent over all chemical classes (Lyman et al., 1990). Generally, it is anticipated that the solubility of the chemical can increase with increasing temperature. The field measured temperature of the deep and bedrock zone ground water during four sampling events (1995-2000) at the site ranged across the study area from approximately 6.0^0C to 17.0 ^{0}C. The lower and higher values are probably a result of the winter and summer (respectively) weather temperatures during the four sampling events.

5.3.2.4 Dissolved Oxygen

The dissolved oxygen content of the ground water determines whether there is the potential for aerobic or anaerobic biodegradation of dissolved chemicals. It is also an indicator of the potential exchange between the ground water and atmosphere. The field measured DO of the ground water during four sampling events at the sites ranged from approximately 0.4 mg/L to 9.4 mg/L.

5.3.2.5 BOD/COD

BOD measures the oxygen uptake in the microbiologically-mediated degradation of organic matter, while COD measures the amount of oxidizing agent required to oxidize the organic matter under sterile conditions (Stumm and Morgan, 1981). Lyman et al (1982) used the ratio of BOD and COD as an index for potential biodegradability, as follows:

BOD/COD ratio $<$ 0.01: relatively undegradable
BOD/COD ratio of 0.01 to 0.1: moderately degradable
BOD/COD ratio $>$ 0.1: relatively degradable

The ground-water samples collected during the 1996-sampling event of the Phase III RI were analyzed for BOD and COD (EA 1998). BOD was not detected ($<$2 mg/L) in 30 of the 37 wells sampled. Detected BOD ranged from 2.1 mg/L to 32.5 mg/L in the remaining seven wells sampled. COD was not detected ($<$5 mg/L) in 15 of the 37 wells sampled (EA 1998). Detected COD ranged from 5.2 mg/L to 871 mg/L in the remaining 22 wells sampled.

5.3.3 Atmosphere

The pertinent site environmental characteristics affecting the air quality at the site include local meteorology, and the affect of site topography and demography on atmospheric mixing and chemical sources, and potential exposure receptors.

5.3.3.1 Meteorological Data

Meteorological data for the site vicinity was summarized in Section 3.3, and was based upon information collected at the National Weather Service Station located at the T.F. Green Airport in Warwick, Rhode Island. This airport is located approximately 6.5 miles north of the site. Local weather patterns are continuously modified by the dynamic effects of Narragansett Bay and the Atlantic Ocean.

5.4 NATURAL ATTENUATION ASSESSMENT

5.4.1 Introduction and Background

At one time, chlorinated solvents were believed to be persistent in the subsurface environment because they were found to be resistant to degradation. However, studies in the early 1980's indicated that chlorinated VOC biologically degraded in anaerobic environments by reductive dechlorination (Bouwer and McCarty, 1983, and Vogel and McCarty, 1985). Additional studies in the late 1980's indicated that some CVOC were aerobically biodegradable, in the presence of certain substrates (due to cometabolism) (Wilson and Wilson, 1985, Little et al., 1987). The anaerobic degradation of PCE and TCE identified by Vogel and McCarthy (1985) is as follows:

PCE→TCE→1,2-DCE (cis and trans)→Vinyl Chloride→Ethylene

The rates of aerobic cometabolic chlorinated aliphatics degradation is generally faster than anaerobic dechlorination. However, the conditions necessary for aerobic degradation are rarely found in the subsurface. In the absence of conditions favorable to cometabolism, chlorinated aliphatics are unlikely to be oxidized because of the relatively high oxidative state of the carbon atoms. However, where appropriate subsurface anaerobic conditions exist (presence of electron acceptors such as NO_3-, Fe^{3+}, and SO_4^{2-}, and/or methanogenic conditions) chlorinated aliphatics may naturally biodegrade.

In addition, as compounds are reductively dechlorinated, they become more reduced and, therefore, more amenable to aerobic biodegradation. DCE, vinyl chloride and ethylene may be microbially oxidized under aerobic or other conditions (e.g. nitrate-, iron-reducing) to carbon dioxide and water.

In addition, 1,1,1-TCA has been shown to abiotically transform via a dehydrohalogenation process in ground water under likely conditions within timeframes of interest (1 to 2 decades).

The transformation occurs via two different pathways, yielding acetic acid and 1,1-DCE in the ratio of 80% and 20%, respectively (McCarty, 1996). Acetic acid is a fairly innocuous daughter product of this transformation, but 1,1-DCE is more toxic than the 1,1,1-TCA parent compound. Reported half-lives for abiotic transformation of 1,1,1-TCA range from 1.1 to 2.5 years (Pankow and Cherry, 1996).

Similarly 1,1,2-TCA will abiotically transform to 1,2-DCE via the same dehydrohalogenation process. However, reported half-lives for this reaction (140 to 170 years) are much greater than those for 1,1,1-TCA and, therefore, this may not be as significant of a transformation pathway.

The following is a summary evaluation of the results of the natural attenuation sampling that has been conducted. The purpose of this evaluation is to provide an indication of the potential for biodegradation of chlorinated compounds detected at the site. The evaluation focuses on the deep (till and weathered bedrock) ground-water zone material where the majority of the CVOC have been detected. Previous natural attenuation data was gathered by the Navy in 1995, 1996 and 1998 (EA 1998). Data from each of these sampling efforts are also presented, discussed and compared to results from the current September-October 2000 ground-water sampling event.

An initial round of sampling for VOC was conducted in 1995 (refer to Appendix A2, Figure 2-4 for the well locations). After the installation of nine new wells in the vicinity of the former Nike Site, the 38 wells shown on Figure 2-5 in Appendix A2 were sampled in 1996 for VOC and natural attenuation parameter analyses. In March 1998, a subset of thirteen of these wells, plus eight new monitoring wells that were installed in January-February 1998 (Appendix A2, Figure 2-6), were sampled. These samples were again analyzed for VOC and natural attenuation parameters.

This natural attenuation (intrinsic bioremediation) assessment includes the chlorinated aliphatic portion of the CVOC, not the chlorinated aromatic portion (eg, chlorinated benzene compounds). Therefore, where 'CVOC' is stated in this section, it refers to the chlorinated aliphatic portion (alkanes and alkenes). The chlorinated aliphatics (CVOC) detected in ground-water samples from the till and weathered bedrock ground-water zone include: PCE; PCA, TCE, 1,1,1-TCA, cis- and trans- 1,2-DCE), and DCA; vinyl chloride (VC), chloroform, chloromethane and carbon tetrachloride. The more oxidized of these compounds (PCE, PCA, TCE) are the most favorable electron acceptors. They can be reductively dechlorinated to ethylene (Freedman and Gossett 1989). However, the microorganisms mediating the reduction require reducing conditions, an electron donor and a carbon source for cell growth. Evidence of intermediate daughter products, like TCE, DCE, and VC, can provide indirect evidence of biodegradation.

5.4.2 REDOX Zonation

Microorganisms utilizing chlorinated aliphatics as electron acceptors must compete with microorganisms using other electron acceptors. Microorganisms utilizing more energy-producing electron acceptors, such as oxygen and nitrate, can typically out-compete chlorinated aliphatic-reducing organisms for the available electron donor source and other nutrients. Reductive dechlorination is most often reported under highly reducing conditions such as sulfate-reducing and methanogenic environments, however reductive dechlorination has also been observed under nitrate- and iron-reducing conditions (Bouwer 1994).

Figure 5-1 and Appendix A2 Figure 5-1 present conceptual models of the various redox zones that appear to be present beneath the site based on the sampling conducted in 2000 and 1996, respectively. The conceptual models were developed from electron acceptors (like dissolved oxygen (DO), nitrate, sulfate, and carbon dioxide), biogenic products [iron (II), hydrogen sulfide, ammonia, etc.], redox potential, and hydrogen concentrations from each of the sampled deep wells. Some field measured DO values did not correlate with values collected for other measured parameters. When evaluating in-situ conditions, the values for all parameters collected were considered and, in some instances, greater weight was given to Eh, other electron acceptor concentrations, and hydrogen concentrations in evaluating the dominant electron acceptor being utilized in the vicinity of a given well. In some cases, data for a given well indicated that perhaps more than one electron acceptor was being utilized. It is plausible, even likely, that microenvironments exist within the subsurface vicinity and that different electron acceptors are dominant within these microenvironments.

5.4.2.1 1996 Redox Zonation

Results of the 1996 sampling (Appendix A2, Figure 5-1) suggested only one area appeared to possibly be indicative of methanogenesis. This area corresponded to a region of higher total organic carbon (TOC) values southwest of Study Area 01 on the adjacent Navy property. It is speculated that the higher TOC values in this area may be the result of a former leaching field that collected storm water runoff from a truck washing area near Building 224. No organics other than CVOC were detected in lab analyses of ground-water samples collected from monitoring wells in this area. The higher organic carbon concentrations are likely responsible for the more reducing conditions in this area and provide an electron donor for reductive dechlorination. Thus, this area is likely the most promising for microbial degradation of the CVOC.

A sulfate-reducing zone appears to be present outside of the methanogenic zone near the Navy's Study Area 01. Another sulfate-reducing zone appears to exist in the source area south of Perimeter Road, near Seabee Avenue, near the Navy/RIEDC (former PR-58 Nike Site) property boundary. The majority of the remainder of the assessed area appears to be an iron-reducing zone, with nitrate-reducing zones potentially appearing at the fringes of plume.

Data collected in March 1998 generally support the conceptual redox zonation developed from the 1996 data. Using well EA-105 as a background well, it appears that most of the assessed area remained iron reducing, especially the eastern portion. Specifically, concentrations of various analytes reported in samples collected from wells EA-111D, EA-110D, MWZ3-03, MW02-10D, EA-113D and EA-112D indicated iron is the dominant electron acceptor. Several wells appear to indicate the presence of both iron-reducing and aerobic microorganisms likely resulting from micro environments where one or the other dominates. Wells MW03-14D, MW03-07D, MW03-03D, and MW02-03D fit within this group. A small methanogenic zone appears to persist in the vicinity of MW01-12D that may extend to MW01-14D. In addition, sulfate appears to continue to be the dominant electron acceptor in the vicinity of well MWZ3-01.

5.4.2.2 2000 Redox Zonation

The redox zonation for 2000 differs significantly from 1996. Much of the area remains apparently predominantly iron-reducing, but aerobic regions are now present within the aquifer. The aerobic regions appear upgradient of the Nike Site, toward the middle of the Navy's Site 03, and in both the Navy's Study Area 01 and Site 02. The previously methanogenic area around MW01-12D from 1996 now appears dominated by iron and/or manganese. The most reduced area of the aquifer appears to be in the southeast corner where sulfate-reducing and methanogenic conditions appear to exist in the vicinity of wells EA-110D, MWZ4-01 and MWZ4-02. No volatile organic compounds were detected in these wells during the sampling effort and it is unclear what is driving the very reduced conditions in this section of the aquifer. Table 5-4 lists the redox indicator parameters values from the 2000 sampling effort as well as the interpreted dominant electron acceptor.

5.4.2.3 Electron Acceptor Assessment

The electron acceptor conditions beneath the site in 1996 appeared to be amenable, although not optimal, for reductive dechlorination. The majority of the site appeared to be dominated by a combination of iron- and sulfate-reducing conditions with a small area of methanogenesis. While much of the ground water geochemistry, such as low dissolved oxygen and higher than normal dissolved hydrogen, indicated a reducing environment, the limiting factor controlling the rate of reductive dechlorination was, and likely remains, mass of electron donor (carbon source). No significant concentrations of non-CVOC (potential electron donors) were detected in the Navy's previously collected (December 1996 or March 1998) ground-water samples nor in the current September-October 2000 samples, and reported TOC concentrations ranged from 1.2 mg/L in background wells to 29.1 mg/L beneath the area near the Navy's Building 224. Therefore, the site conditions are conducive to reductive dechlorination, but the rate at which it will occur is likely limited by the supply of electron donors in ground water.

Electron acceptor conditions are likely even less amenable to reductive dechlorination based on the September-October 2000 sampling event results. However, aerobic biotic transformation

of more reduced chlorinated aliphatics like DCE and vinyl chloride (VC) may occur in the aerobic portions of the plume.

5.4.3 Evaluation of Chlorinated Aliphatic Degradation

5.4.3.1 Natural Attenuation Screen

A natural attenuation potential screen was conducted following a screening method described in the draft *Technical Protocol for Evaluating the Natural Attenuation of Chlorinated Solvents in Ground Water* (AFCEE 1996). In this screening process, points are awarded for compound concentrations above certain screening criteria [e.g., three points are awarded if the iron (II) concentration exceeds 1 mg/L in the most contaminated zone]. Table 5-5 provides a summary of the scoring criteria for the various analytical parameters. A score greater than 20 points indicates that there is strong evidence for biodegradation of chlorinated organics; a score between 15 and 20 indicates that there is adequate evidence for biodegradation; and a score between 6 and 14 indicates that there is limited evidence for biodegradation.

1996/1998 Natural Attenuation Screen

In 1996, a screen was conducted using the source well MW03-14D that led to a score of 14. Using the 1998 data, a more comprehensive screen was conducted for six representative monitoring wells along the center line of the dissolved phase plume. Wells include: EA-105 (background), MW03-14D (source area), MW03-07D (downgradient), MW02-10D (downgradient), MW01-14D (downgradient), and EA-112D (cross gradient). Results of this natural attenuation screen are shown in Table 5-6. A rating of four was scored for the background well. Monitoring wells within the dissolved phase plume scored values ranging from 9 to 19. Three wells scored above 15 and two scored below 15. Based on screens using both data sets, the site exhibits adequate to limited evidence for biodegradation of chlorinated organics.

2000 Natural Attenuation Screen

Using the 2000 data, the natural attenuation screen was conducted using the same six wells that were used for the 1998 natural attenuation screen. Results of this evaluation are shown in Table 5-7. The background well, EA-105 again scored 4. The monitoring wells within the dissolved phase plume scored values ranging from 9 to 12, significantly below the scores using the 1998 data. Scores in this range are indicative of limited evidence for biodegradation (AFCEE 1996). Based on this screening, it appears that the aquifer is less conducive to intrinsic bioremediation than it was in 1998.

5.4.3.2 Daughter Products Evaluation

1996 and 1998 Evaluation

Based on the ground-water data from the Navy's three previous ground-water sampling events (May 1995, December 1996, and March 1998), there appears to be evidence that daughter products are present at the site. For example, TCE, DCE, and TCA were detected in numerous wells onsite during each sampling event. In addition, the detected cis-1,2-DCE concentrations, the dominant microbially produced isomer, were significantly greater than detected trans-1,2-DCE concentrations (only reported for the 1996 and 1998 samples, because the 1995 analysis did not distinguish cis-1,2 DCE from trans-1,2-DCE and yielded a sum of the two isomers). Low concentrations of VC were detected in four of the 1995 ground-water samples (MW03-12D, MW03-09D, MW03-06D, and MW03-03D); however, VC was not detected in the aforementioned ground-water samples or any other of the December 1996 samples. During March 1998, low levels of VC were reported in samples from wells MW02-10D (1 μg/L), MWZ3-03 (0.8 μg/L), and MW02-03D (0.7 μg/L).

The distribution of PCE, TCE, 1,2-DCE (total), and VC is illustrated in Appendix A2, Figure 5-2, for the 1995 and 1996 sample analyses. Similarly, Figure 5-3 in Appendix A2 presents the distribution of PCA, TCA, 1,1-DCE, and VC for the 1995 and 1996 sample analyses. These distribution maps show that the ratio of detected TCE concentrations to detected 1,2-DCE (total) concentrations and the ratio of detected PCA concentrations to detected TCA concentrations are similar for the 2 years. This trend suggests that conditions have remained relatively stable over the 1-year period, which is evidence against significant transformation of the parent compounds into daughter products over the relatively short study duration.

Figures 4-9 and 4-10 in Appendix A2 show the concentrations of detected CVOC in the deep ground-water zone from the March 1998 sampling event (refer to Section 4.5.1.2). In general, concentrations are similar to those reported for 1995 and 1996 (Appendix A2, Figures 4-5 through 4-8). The TCE:DCE ratio increased for 3 wells (MW-02-10D, MW03-14D and MWZ3-03), decreased for 5 wells (MW01-12D, MW03-03D, MW03-07D, MW03-08D and MWZ3-01) and remained relatively constant for 3 wells (EA-105, MW01-14D, and MW02-03D); again suggesting no marked changes in the ratio of these compounds. This indicates little attenuation due to intrinsic bioremediation, although the data in Table 4-5 suggest that the decrease in detected total CVOC concentration maybe due to dilution and dispersion.

2000 Evaluation

The presence of daughter products of reductive dechlorination continues at the site based on the 2000 sampling event results. TCE, DCE (including cis-1,2-DCE), TCA, and DCA are each still present at various locations throughout each of the study areas. Cis-1,2-DCE concentrations continue to exceed trans-1,2-DCE concentrations at each of the wells where DCE is present, providing further evidence of intrinsic bioremediation.

In addition, vinyl chloride was detected in samples from 10 monitoring wells (MWZ3-01, EA-104, MW03-12D, MW03-13D, MW03-07D, MW03-06D, MW03-09D, MW03-03D, MW02-11D, and MW02-10D). This is an increase in the aerial extent of detected vinyl chloride from that shown in the 1996 and 1998 results, as well as an increase in the absolute concentrations of vinyl chloride. The highest concentrations of vinyl chloride were detected in samples from monitoring wells MW03-12D and MW03-13D, which are located directly downgradient of the source well, MW03-14D at the former PR-58 Nike Site.

The ratios of TCE to DCE concentrations for each well, as well as, the concentrations of TCE, DCE and VC are shown in Figure 5-2. The 2000 TCE:DCE ratios are compared to 1996 TCE:DCE ratios for individual wells in Table 5-8 As shown on the table, ratios for eight (8) wells increased from 1996 to 2000 by greater than 25%, suggesting reductive dechlorination may be occurring. Ratios for three (3) wells decreased by greater than 25% and ratios for 12 of the wells changed by less than 25%. Thus, there is some indication at approximately one third of the wells that some reductive dechlorination has occurred. Six of the eight wells with increased ratios are located on the eastern portion of the assessed area, while the other two are the Nike Site source area wells, MW03-14D and the nearby well EA-102.

5.3.2.4 Natural Attenuation Summary

Compared to the available data developed by the Navy for previous sampling events, the data collected during the 2000 sampling event provide somewhat contradictory evidence for the presence or absence of reductive dechlorination. The redox zonation developed using this data indicate that redox conditions are generally more oxidized than they appeared during sampling in 1996 and 1998. This would tend to limit reductive dechlorination. Similarly, the natural attenuation screen also shows generally lower scores for the six wells used to screen for natural attenuation in 1996 and 2000.

However, the increase in concentration and aerial extent of vinyl chloride provides strong evidence that reductive dechlorination is occurring. Similarly, the TCE:DCE ratios also increased at approximately one third of the wells (installed through 1996) from 1996 to 2000.

6. CONCLUSIONS AND RECOMMENDATIONS

The objectives of the additional investigation of the CVOC plume within the former PR-58 Nike Site, the adjacent Navy property, and the adjacent offsite area north of Perimeter Road are to:

- Further assess the nature and extent (lateral and vertical) of the potential primary CVOC source area in the competent bedrock in the vicinity of MW03-14.
- Investigate a potential second petroleum hydrocarbon and/or CVOC source area identified by RIDEM located just east of the former bermed area (where monitoring well EA-114 is located). This area was allegedly an area of historical disposal of solvents and acids.
- Further assess the hydrogeology and the nature and extent of the CVOC plume with specific focus on the northeast edge that extends off the former Nike Site and Navy properties, north of Perimeter Road (impacting the GA aquifer).
- Document the direction of ground-water flow in the deep overburden and bedrock zones.
- Further assess the conditions for and progress of natural attenuation of the CVOC.

Based on the data obtained from the field investigation program described in Chapter 2 of this report, the following conclusions can be made relative to the above stated objectives:

6.1 GEOLOGY

The former PR-58 Nike Site and adjacent Navy property to the east is characterized by Quaternary glacial deposits mantling fractured quartzite and phyllite bedrock (weathered and competent zones) of the Rhode Island Formation. In general, based upon logs of borings, the unconsolidated sedimentary (glacial) deposits consist of the following units presented in order from the ground surface downward: (1) glacio-fluvial deposits of sand with varying amounts of silt and/or gravel, (2) glacio-lacustrine deposits of silt to very fine sand and silt (present only beneath the eastern portion of the adjacent Navy property), and (3) silty gravelly sandy to sandy gravelly silt (possibly till) (Figures 3-1 to 3-5).

Based upon the interpretive contour map of the upper surface of the competent bedrock (Figure 2-2) and the results of geophysical studies (surface seismic refraction and VLF traverses, and borehole logging), there appears to be a northeast trending structure (fracture zone) that extends from the southwest corner of the former Nike Site property to beyond the northeast corner of the property (refer to Section 3.6.2 for related details). As shown on Figure 2-2, this interpreted potential fracture zone is expressed as a nearly linear valley in the bedrock surface (perhaps due to preferential weathering during the glacial period) that deepens in the northeast direction. The floor of this valley appears to range from approximately +5 ft MSL beneath the southwestern portion of the site to lower than –40 ft MSL northeast beyond Perimeter Road in the offsite area.

6.2 HYDROGEOLOGY

The identified geological units have been divided into three hydrogeological zones (beginning with the uppermost zone): (1) the shallow ground-water zone (typically the glacio-fluvial sand unit), (2) the deep (D) ground-water zone (the silty gravelly sand to sandy gravelly silt [possibly

till] unit and the weathered bedrock zone), and (3) the competent bedrock ground-water zone (the upper approximately 0-30 ft (R) and 30-60 ft (R2) depth intervals of the competent bedrock). The silty gravelly sand / gravelly sand and weathered bedrock units are considered as a single ground-water zone (the deep zone) because: (1) no apparently continuous layer of lower permeability material (e.g. a clay layer) was encountered through this zone that could subdivide this zone, (2) the weathered bedrock where quartzite (hard) and phyllite (soft) are interbedded, forms a zone that is hydrogeologically similar because of the apparent horizontal and vertical variation observed which would allow for horizontal and vertical flow (hydraulic communication) through it, and (3) the two units are in direct hydraulic communication. All three of these ground-water zones are in direct hydraulic communication beneath the former PR-58 Nike Site where the main subsurface CVOC source has been detected. Further east (down gradient) beneath the adjacent Navy property, the shallow and deep ground-water zones are separated by a layer of silt to sandy silt (Figures 3-1 and 3-5).

The interpreted ground-water flow direction in the deep (D) ground-water zone is southeast and east from the vicinity of well cluster MW03-14 (CVOC plume source at the former Nike Site) to the vicinity of the Navy's Building 224 (Figure 3-7). Because of the slight ground-water mound east of the Navy's Building 224 in the vicinity of an old gravel/borrow pit, the ground-water flow east appears to diverge in the vicinity of Building 224 to the northeast and southeast. A slight ground-water mound beneath the area of the former missile silos results in a west ground-water flow beneath a relatively small portion of the study area located west of the former missile silos.

Based upon the January 2001 water level data, ground-water flow in the shallow competent bedrock (R) ground-water zone is interpreted to be approximately toward the southeast (Figure 3-8). The highest elevation in these data is for well EA-106R which is located along the northern boundary of the former Nike Site property. A slight ground-water mound beneath the area of the former missile silos results in a west ground-water flow beneath a relatively small portion of the study area located west of the former missile silos. North of EA-104, the ground-water flow is interpreted to be toward the northeast and offsite.

As previously stated in Section 6.1, there appears to be a northeast trending structure (fracture zone) that extends from the southwest corner of the former Nike Site property to beyond the northeast corner of the property (refer to Section 3.6.2 for related details). Additionally, the borehole geophysical logging results suggest that the majority of the logged fractures that are interpreted to be 'open', appear to be oriented in a generally northeast-southwest direction in this same portion of the former Nike Site. This potential fracture zone could then be potential preferential ground-water flow path that extends through the CVOC source area detected in the vicinity of MW03-14/EA-102. A historical spill of DNAPL in the vicinity of MW03-14/EA-102 could have also migrated down into and along this zone in bedrock. Because of the direct hydraulic communication between the bedrock and the overlying deep overburden soil, vertical ground-water flow between these zones could then provide an explanation for the northeast extension of a portion of the dissolved CVOC plume in the deep overburden and bedrock ground-water zones. Portions of the CVOC plume would also flow through the apparently fewer 'open' cross cutting (southeasterly and easterly) fractures and extend the dissolved plume toward the east and southeast beneath the adjacent Navy property.

6.3 NATURE AND EXTENT

6.3.1 Potential CVOC Source Areas

In general, the MW03-14 vicinity was the only main subsurface CVOC source area identified. Based upon the available data, the MW03-14D/EA-102 area of the deep ground-water zone appears to be the subsurface source area of the CVOC remaining from a historical release(s)/spill(s). Although the exact surface location of the original CVOC release(s)/spill(s) is not known, this subsurface area appears to now be where the source for the dissolved CVOC plume in ground water is located. Residual CVOC DNAPL may be present on the deep soil, or as ganglia between the deep soil particles or in fractures in bedrock, in the vicinity of the MW03-14D/R/R2 well cluster. If present, residual CVOC DNAPL would serve as a source for dissolved CVOC in the ground water as the water flows through it. Some of the original heavier-than-water, separate-phase (DNAPL) CVOC release(s)/spill(s) material may migrated along the upper surface of the competent bedrock toward the east and northeast from the MW03-14 area and may have since continued downward through fractures in the bedrock. Additionally as previously stated in Section 6.2, the potential northeast trending fracture zone in the bedrock could provide an explanation for the northeast migration of a portion of the dissolved CVOC plume in the deep overburden and bedrock ground-water zone. Because neither the spill date(s), location(s), quantity(s), composition(s), or presence/absence of DNAPL at greater depths than have been currently investigated are known, estimation of the distance the CVOC plume has traveled and/or naturally attenuated and may still travel and/or naturally attenuate would be little more than a guess based on those historical data gaps most of which could never be filled. However, as more ground-water sample results are obtained in the future and added to study area database, trends in the condition and concentration of the CVOC plume should become more apparent and meaningful to aid in projecting the plume's future extent and movement.

The results of soil and ground-water samples collected from EA-114D/R do not indicate the presence of the historical petroleum or chlorinated hydrocarbon spill site (second source area) believed by RIDEM to be in that area.

The former vehicle wash rack located west of Building T16CT was eliminated during previous studies as a potential CVOC source based on GC headspace screening of soil samples collected from beneath the drainage pit and along the drain line leading south from the wash rack to a catch basin.

CVOC were not detected in the ground-water sample from EA-103 (located adjacent to the 'pipe structure'). Based on this data, the 'pipe structure' (reportedly used historically as a training area by the Navy) does not appear to be a source for the CVOC plume.

CVOC were not detected in the ground-water sample from EA-105D (located within the area reportedly used by the Navy as the Disaster Recovery Training Area). Based on this data, the historical Navy use of this area does not appear to be a source for the CVOC plume.

6.3.2 VOC in Soil

Based upon the trace concentrations of CVOC detected in soil samples from above the water table during previous Navy investigation of the study area, well borings EA-101 and EA-102 may be located near a potential historical surface or vadose zone spill/release (source) area containing CVOC. Boring/well EA-102 is located in the vicinity of a former Peabody Industries drum storage area (Figures 1-2 and 1-4). Additionally, these borings are located approximately upgradient from MW03-14D where the highest concentrations of total CVOC have been detected in samples.

6.3.3 VOC in Ground Water

6.3.3.1 Deep (D) Ground-Water Zone

In general, Figures 4-1 and 4-2 show that the highest total and individual (respectively) CVOC concentrations were detected in the sample from MW03-14D (383,700 ug/L) which was comprised of the following six compounds: PCA, TCE, and cis-1,2-DCE, trans-1,2-DCE, 1,1,2-TCA, and PCE. The next highest total and individual (respectively) CVOC concentrations were detected in the sample from nearby well EA-102 (115,148 ug/L) located approximately 80 ft west of MW03-14D. West, southwest, and north (EA-103, EA-105, EA-107, EA-108, and EA-114D) across the former Nike Site from MW03-14D, the detected concentrations decrease to 'not detected'. As shown on Figure 4-1, the data indicate that the main detected total CVOC plume (greater than 1,000 ug/L) extends from the former Nike Site area (MW03-14D/EA-102) to east beneath the adjacent and down gradient Navy property (MW03-12D, MW03-08D, and MW03-06D), plus an extension of the plume with lower concentration (less than 50 ug/L total CVOC) toward the northeast and offsite (EA-112D, EA-113D, and EA-116D).

The data indicate that the southwestern and western (EA-105, -107, -108 and -114), northern (EA-106), eastern (MW-Z4-01; MW01-13D, and MW01-14D), and southeastern (EA-110D and -111D) extent of the monitoring well network continues to appear to be beyond or at the fringe of the CVOC plume in the deep ground water, and further, appears to be at good locations to monitor current and future conditions in those deep zone areas. Monitoring wells EA-106D (located at the north edge of the site property) and EA-116D and EA-113D (located north, offsite on private property) were installed to assess the CVOC plume extent north between the former Nike Site (and northwest from the MW-Z3-01 vicinity) and the five nearest offsite residential water supply wells. VOC were not detected from EA-106D. However, the total CVOC results for samples from deep wells north in the offsite area (35 ug/L at EA-112D and 45 ug/L at EA-116D) indicate that the edge of the plume extends beyond these wells. Additional monitoring wells are needed between these monitoring wells and residential properties with private water supply wells.

Based upon 49 monitoring wells with up to 4 years of data Table 4-5), detected total CVOC concentrations are decreasing or remaining approximately the same for samples from beneath the Navy's Study Area 01 and Sites 02/03 (all wells except MW02-11D, MW02-03D, MW03-

02D, MW03-09D, MW-Z3-01 and MW-Z3-02), and the Nike source area (MW03-14D, and MW03-13D where substantial CVOC decreases were indicated).

The Town of North Kingstown, RI, reviewed their water department records for the area north of Perimeter Road and identified eight possible locations of private wells (Figure 2-1). They confirmed these wells and received permission to sample seven of the wells. On 6 May 1997, the RIDOH sampled seven of the eight residential water supply wells for analysis of VOC (EPA Method 524). None of the VOC analytes were detected in samples from four of these wells located just north of Perimeter Road, nor in samples from the northeasternmost 2 wells along Fletcher Road. Trace concentrations of PCE (0.7 ug/L) and 1,1,1-trichloroethane (1 ug/L) were detected in the sample collected from "Matoes" well, both of which are below the RIDEM standards (5 ug/L and 200 ug/L, respectively). This well is located along Fletcher Road more than 2000 ft from the former Nike Site. Town of North Kingstown Water Department staff visited/contacted each of these residences to try to obtain documentation of the construction details for these eight residential wells, eg. total well depth and depth to the screened interval. However, no such information was found to be available by memory or in writing. The search for this information appears to be at an end for the area north of Perimeter Road.

6.3.3.2 Shallow Competent Bedrock (R) Ground-Water Zone

In general, Figures 4-3 and 4-4 show that the highest total and individual (respectively) CVOC concentrations were detected in the sample from MW03-14R (20, 811 ug/L) which was comprised of the following eight compounds: PCA; PCE; 1,1,2-TCA; TCE; 1,2-DCE total; 1,1-DCE; 1,1-DCA; and VC. The next highest total and individual (respectively) CVOC concentrations were detected in the sample from nearby well EA-104R (5,201 ug/L) located approximately 400-500 ft northeast of MW03-14R. Southwest (EA-108R and EA-114R) and north (EA-106R) across the former Nike Site from MW03-14D, the detected concentrations decrease to 'not detected'. As shown on Figure 4-3, the data indicate that the main detected total CVOC plume (greater than 1,000 ug/L) extends from the former Nike Site area (MW03-14R) to the northeast (EA-104R) and east beneath the adjacent and down gradient Navy property (MW03-12R and MW03-08R), plus an extension of the plume with lower concentration (less than 500 ug/L total CVOC) toward the northeast and offsite (EA-112R, EA-113R, and EA-116R).

The data indicate that the southwestern (EA-108R and EA-114R), northern (EA-106), and eastern to southeastern (MW01-13R, MW02-03R, EA-110R, and EA-111R) extent of the monitoring well network appears to be beyond or at the fringe of the CVOC plume in the shallow competent bedrock ground-water zone. Further, they appear to be at good locations to monitor current and future conditions in those rock zone areas. However, the total CVOC results for samples from rock wells near the west edge of the former Nike Site property (19 ug/L at EA-105R and 12 ug/L at EA-107R) indicate that the edge of the plume extends beyond these wells. Additionally, the TCE concentration detected in the sample from EA-105R (12 ug/L) exceeds both the MCL and RIDEM GA standards. Monitoring wells EA-106R (located at the north edge of the site property) and EA-112R, EA-113R, and EA-116R (located north,

offsite on private property) were installed to assess the CVOC plume extent north between the former Nike Site (and northwest from the MW-Z3-01 vicinity) and the five nearest offsite residential water supply wells. VOC were not detected from EA-106R. However, the total CVOC results for samples from rock wells north in the offsite area (146 ug/L at EA-112R, 467 ug/L at EA-113R, and 97 ug/L at EA-116D) indicate that the edge of the plume extends beyond these wells. Additional monitoring wells are needed between these monitoring wells and residential properties with private water supply wells.

The majority of the CVOC plume detected in the bedrock ground-water samples appears to indicate that the plume is migrating northeast and east from the vicinity of MW03-14R. This finding is similar to the finding from the CVOC data for the deep ground-water well samples, except that low CVOC concentrations have also been detected in rock wells near the western edge of the former Nike Site and the concentrations detected in samples from EA-104R and EA-113R are approximately 1-2 orders of magnitude higher than the concentrations detected in the related deep (D) well of each well pair. Similar to the deep ground-water zone results, these data indicate that a main CVOC source appears to be located in the vicinity of wells MW03-14D/R.

6.3.3.3 Deep Competent Bedrock (R2) Ground-Water Zone

There are only three monitoring wells completed in the deep competent bedrock ground-water zone. In the CVOC source area (MW03-14R2), the detected concentration of total CVOC was 15,088 ug/L (12,699 ug/L duplicate). Offsite, north of Perimeter Road, CVOC were not detected in the sample from EA-112R2, and only TCE (0.9 ug/L) was detected in the sample from EA-116R2.

6.3.3.4 Natural Bioremediation of CVOC

Compared to the available data developed by the Navy for previous sampling events, the data collected during the 2000 sampling event provide somewhat contradictory evidence for the presence or absence of reductive dechlorination. The redox zonation developed using this data indicate that redox conditions are generally more oxidized than they appeared during sampling in 1996 and 1998. This would tend to limit reductive dechlorination. Similarly, the natural attenuation screen also shows generally lower scores for the six wells used to screen for natural attenuation in 1996 and 2000.

However, the increase in concentration and aerial extent of vinyl chloride provides strong evidence that reductive dechlorination is occurring. Similarly, the TCE:DCE ratios also increased at approximately one third of the wells (installed through 1996) from 1996 to 2000. Biodegradation does not appear to be a significantly active attenuation process, although it may be occurring at a slow rate.

6.3.4 Metals in Ground Water

Nine of the monitoring wells were sampled and analyzed for TAL metals. Samples from these wells were analyzed for TAL metals to assess potential metals in ground water from the former

Nike Site to be migrating offsite, north of Perimeter Road, which is also the boundary between the areas classified by RIDEM as class GA ground water (north of Perimeter Road) and GB ground water (south of Perimeter Road). Monitoring wells EA-112D/R/R2 and EA-113D/R are located just north of the former Nike Site boundary (Perimeter Road) and near the south edge of the class GA ground water. Monitoring wells EA-104D/R and EA-106D/R are located just south of the former Nike Site boundary (Perimeter Road) and near the north edge of the class GB ground water area. None of these analytes detected in this sampling round exceeded the RIDEM GA groundwater objectives. Therefore, these data do not indicate the potential presence of a dissolved metals plume in this area from the former PR-58 Nike Site.

6.4 RECOMMENDATIONS

Based on the findings of this investigation, the following is recommended:

- No further investigation of the area in the vicinity of well cluster EA-114D/R that had been identified by RIDEM as a potential second petroleum hydrocarbon and/or CVOC spill site (source area).

- Installation and sampling of monitoring well EA-104R2.

- Additional characterization of the hydrogeology and the nature and extent of the CVOC plume in the deep and competent bedrock zones between the northernmost and westernmost monitoring wells and identified residential properties with private water supply wells.

- Coordination with the Town of North Kingstown Water Department to identify private-use ground-water supply wells located just west of the former PR-58 Nike Site.

- Resampling of the private-use ground-water supply wells located along Fletcher Road north of the former PR-58 Nike Site previously sampled by RIDOH on 6 May 1997, along with private-use ground-water supply wells located just west of the former PR-58 Nike Site that are identified by the Town of North Kingstown Water Department.

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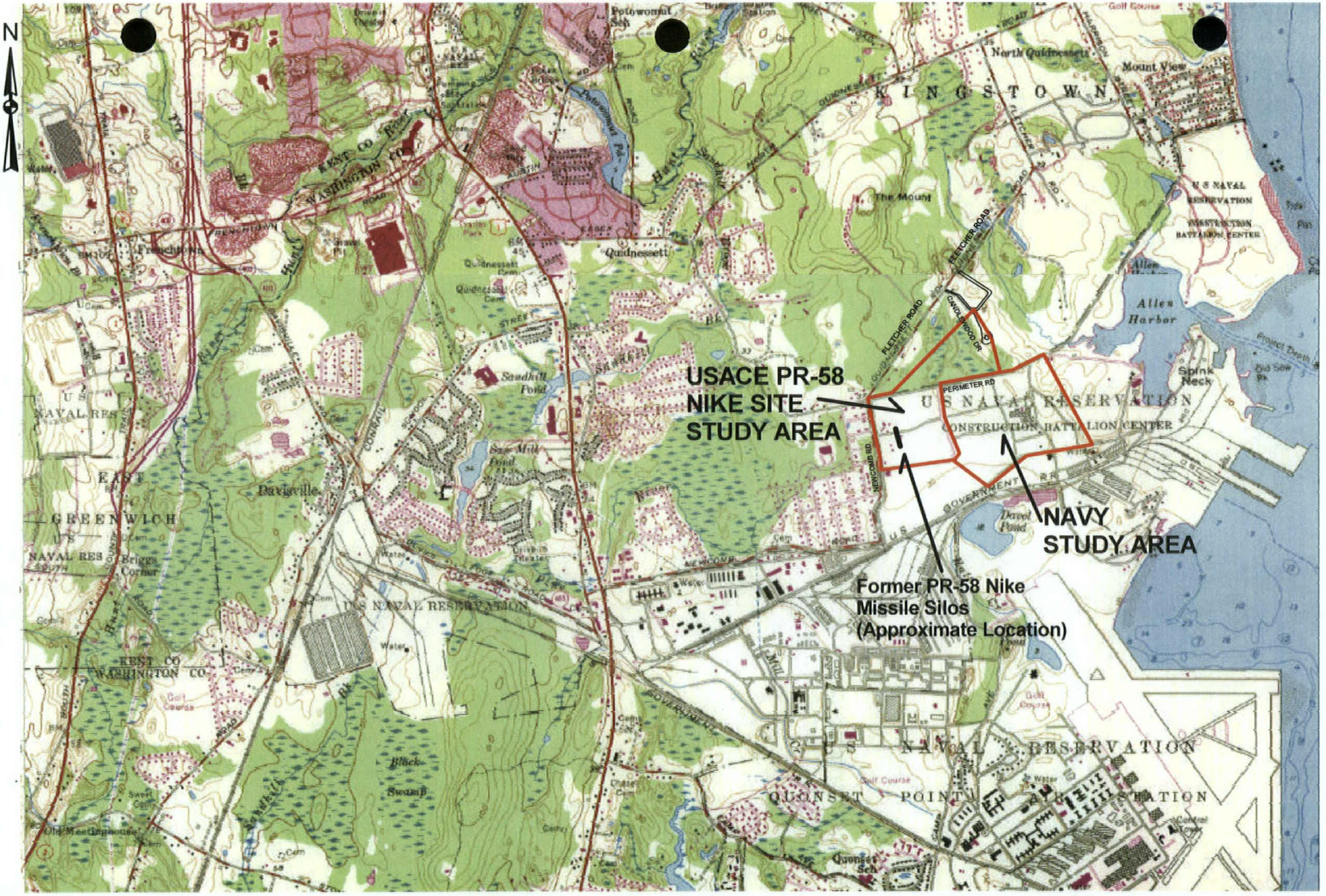
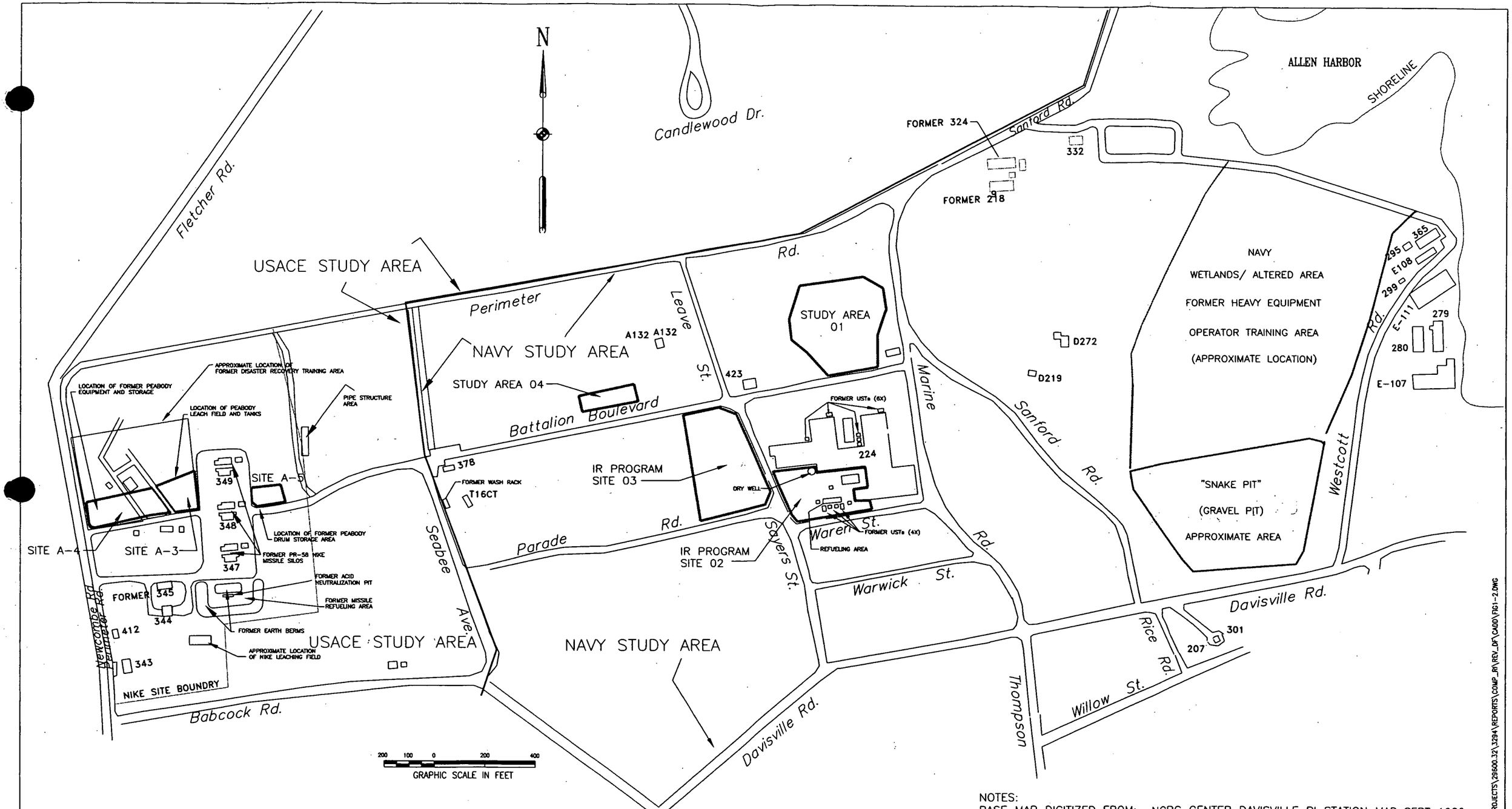


Figure 1-1 Site Locus Map
USACE Former Nike PR-58 Site/NCBC Davisville Site 03 Study Areas



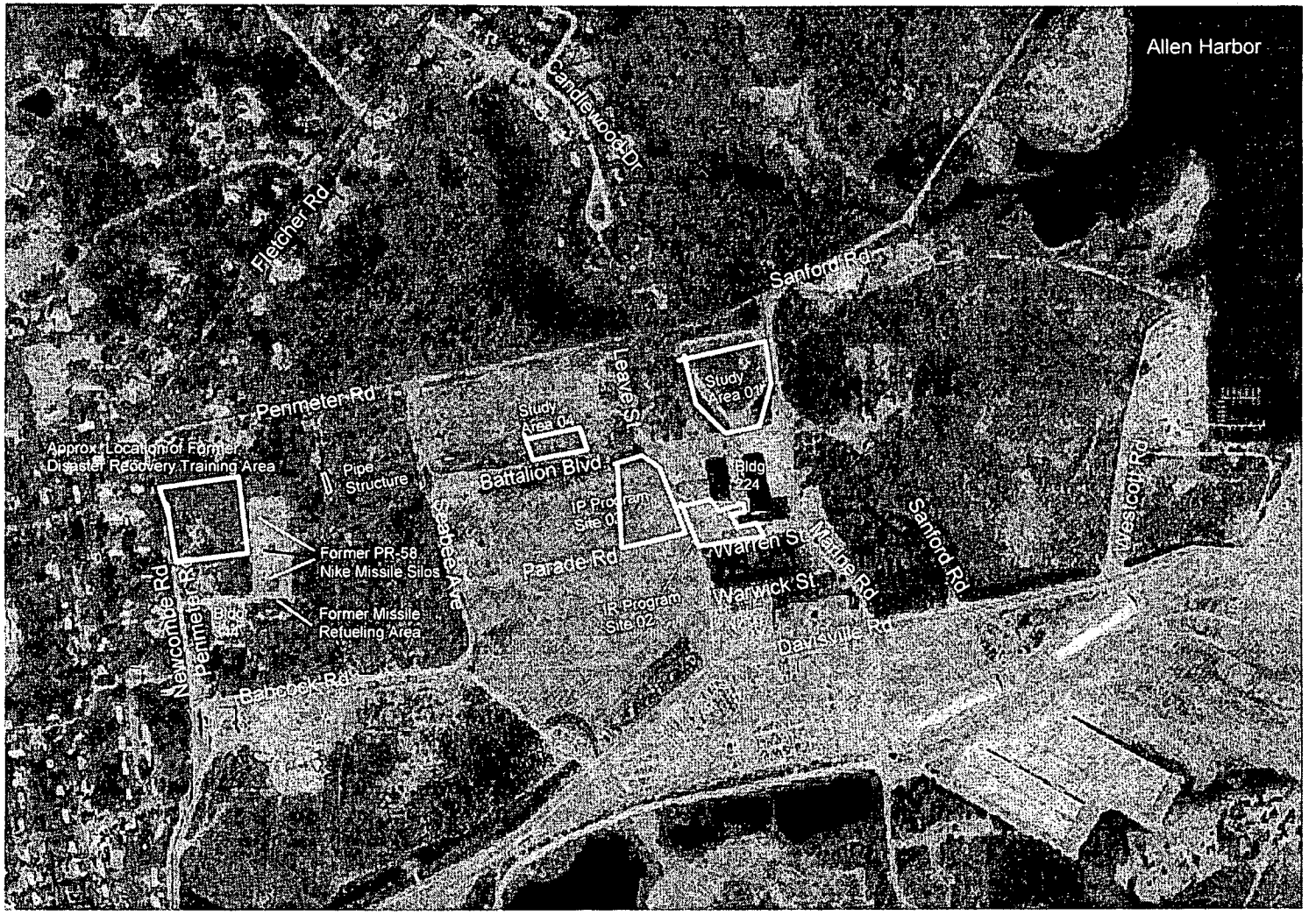
NOTES:
BASE MAP DIGITIZED FROM: NCBC CENTER DAVISVILLE RI STATION MAP SEPT 1992
MODIFIED FROM AERIAL PHOTO DATED 4/95

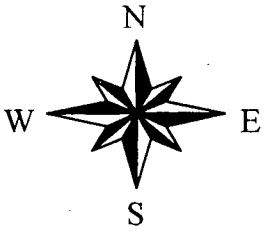
SITES A-1 THROUGH A-5 FROM SIRRINE CONFIRMATION STUDY, 1988.

FILE NAME: F:\PROJECTS\29600.32\3294\REPORTS\COMP_RI\REV_DF\CADD\FIG1-2.DWG

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	DESIGNED BY NAL	DRAWN BY RWC	DATE 01/23/01	PROJECT NO. 60957.56	USACE NED CHARACTERIZATION OF CVOC CONTAMINATION REPORT FORMER PR-58 NIKE SITE NORTH KINGSTOWN, RHODE ISLAND	INVESTIGATION AREA LOCATION MAP
	CHECKED BY JAS	PROJECT MGR. JAS	SCALE AS SHOWN	FILE NAME FIG1-2.DWG		FIGURE 1-2

Investigation Area Image Map

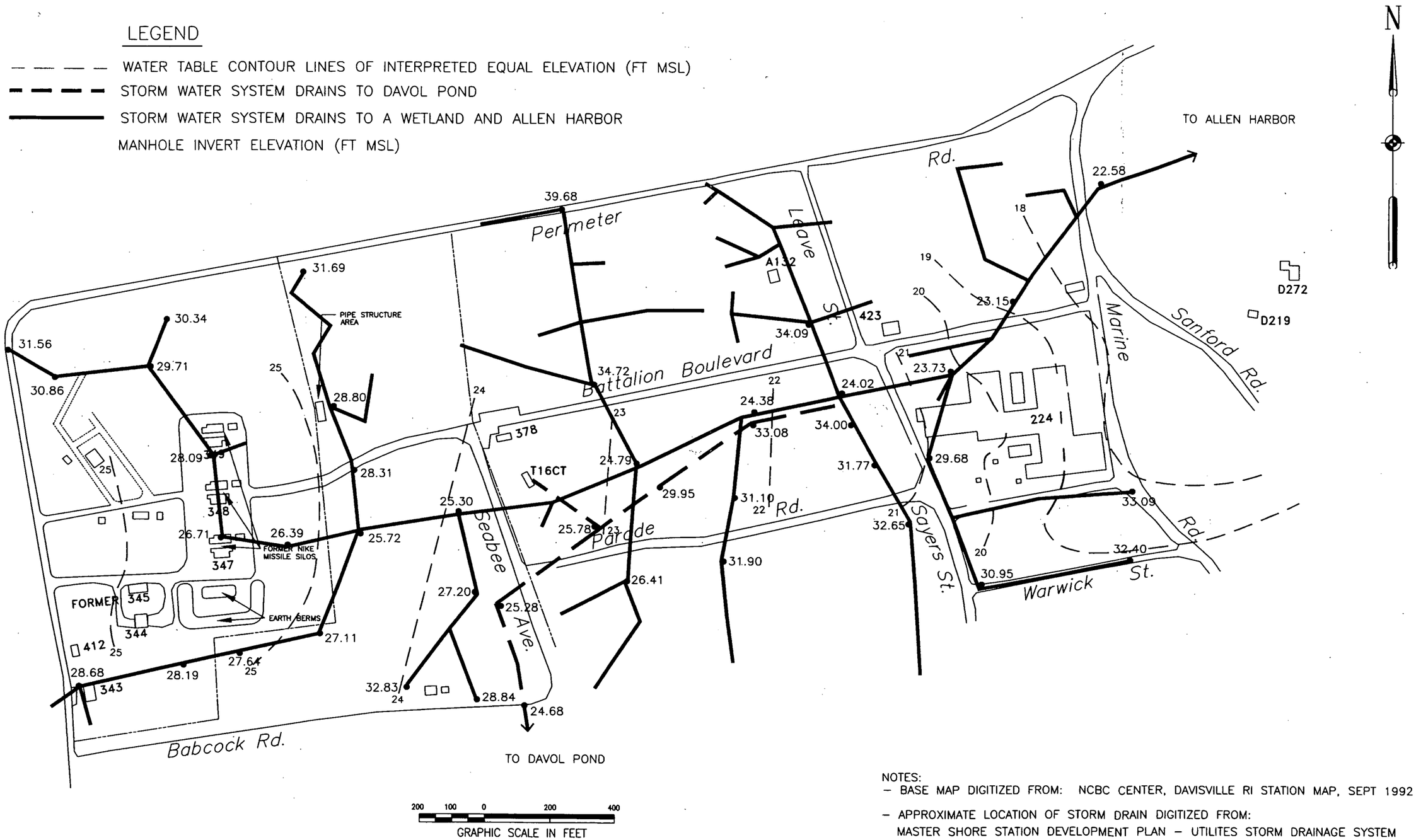




USACE NED
Characterization of CVOC Contamination Report
Former PR-58 Nike Site
North Kingstown
Rhode Island
Aerial Photograph dated 1995

2000 0 2000 4000 Feet

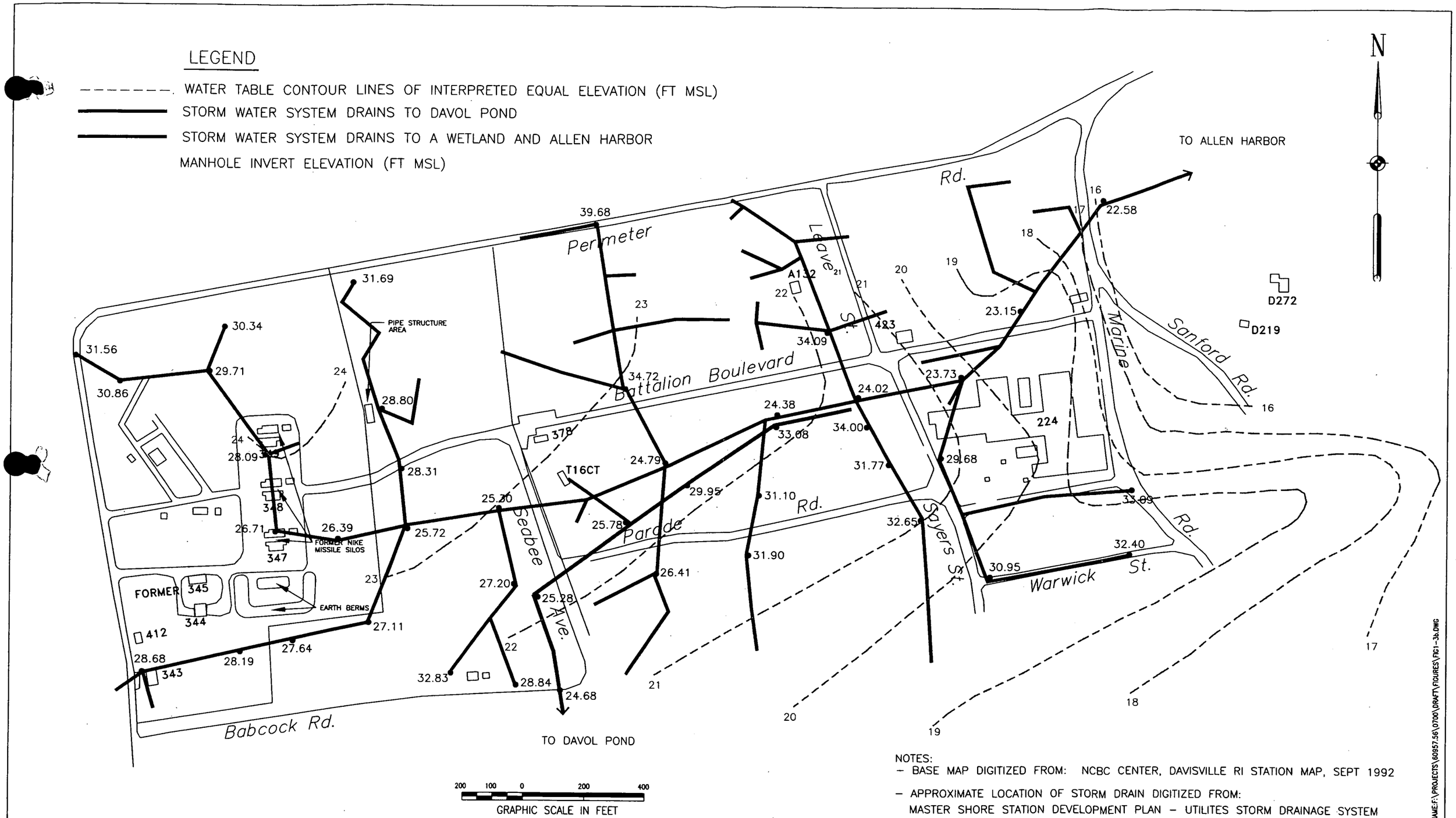
Figure 1-2A



NOTES:
- BASE MAP DIGITIZED FROM: NCBC CENTER, DAVISVILLE RI STATION MAP, SEPT 1992
- APPROXIMATE LOCATION OF STORM DRAIN DIGITIZED FROM: MASTER SHORE STATION DEVELOPMENT PLAN – UTILITES STORM DRAINAGE SYSTEM MANHOLE INVERT ELEVATION (FT MSL) PWD DRAWING #37111, REV. 6/85

FILE NAME:F:\PROJECTS\60957.56\0700\DRAFT\FIGURES\FIG1-3a.DWG

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	DESIGNED BY NAL	DRAWN BY JFW	DATE 1/05/01	PROJECT NO. 60957.56	USACE NED CHARACTERIZATION OF CVOC CONTAMINATION REPORT FORMER PR-58 NIKE SITE NORTH KINGSTOWN, RHODE ISLAND	STORM WATER DRAINAGE SYSTEM WITH INTERPRETED GROUND-WATER TABLE CONTOURS (MAY – JUNE 1995) FIGURE 1-3a
	CHECKED BY JAS	PROJECT MGR. JAS	SCALE AS SHOWN	FILE NAME FIG1-3a		



NOTES:
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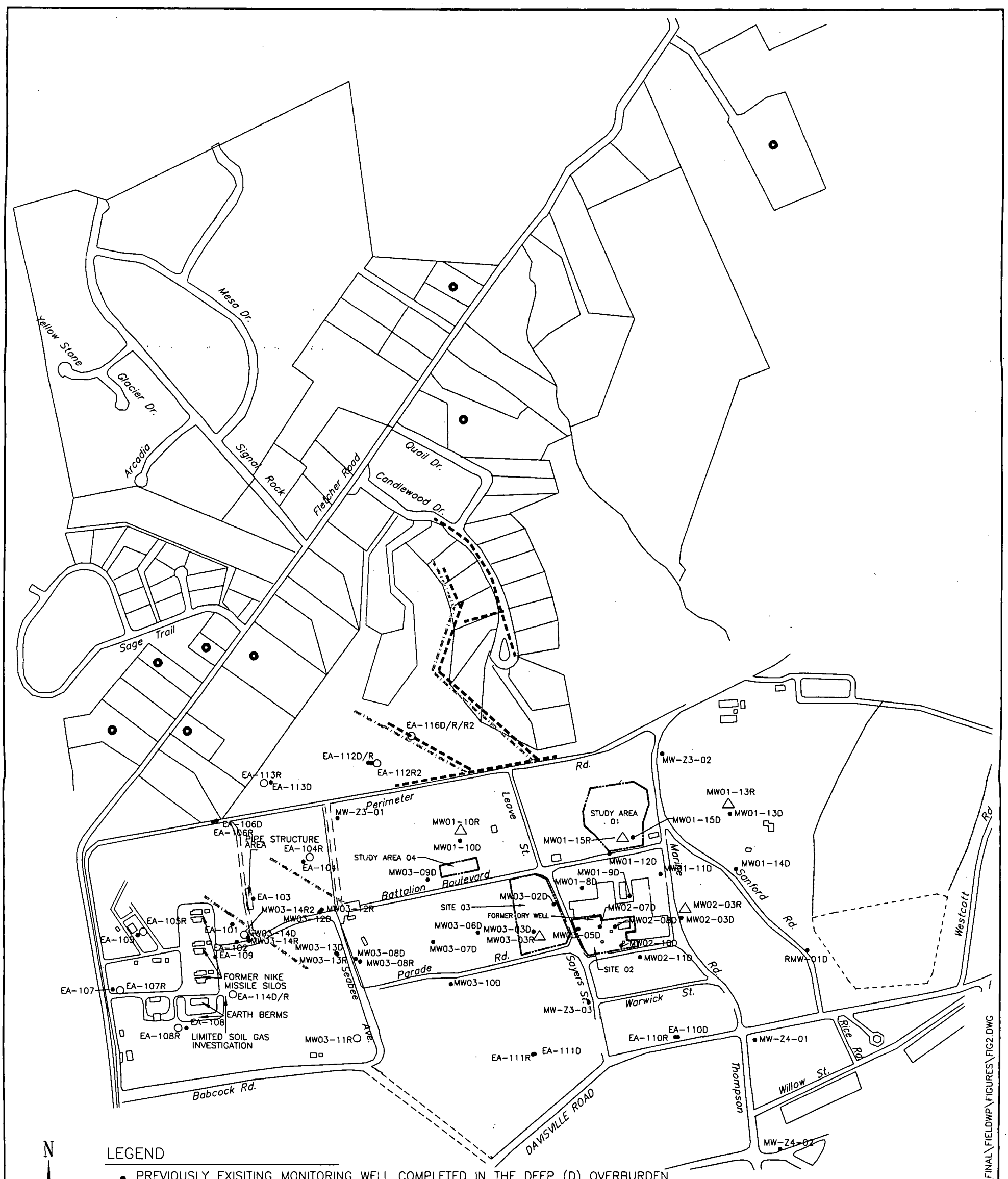
- APPROXIMATE LOCATION OF STORM DRAIN DIGITIZED FROM: MASTER SHORE STATION DEVELOPMENT PLAN – UTILITES STORM DRAINAGE SYSTEM MANHOLE INVERT ELEVATION (FT MSL) PWD DRAWING #37111, REV. 6/85

FILE NAME:F:\PROJECTS\60957.56\0700\DRAFT\FIGURES\FIG1-3b.DWG

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	DESIGNED BY NAL	DRAWN BY JFW	DATE 1/05/01	PROJECT NO. 60957.56	USACE NED CHARACTERIZATION OF CVOC CONTAMINATION REPORT FORMER PR-58 NIKE SITE NORTH KINGSTOWN, RHODE ISLAND	STORM WATER DRAINAGE SYSTEM WITH INTERPRETED GROUND-WATER TABLE CONTOURS (JULY 2000)
	CHECKED BY JAS	PROJECT MGR. JAS	SCALE AS SHOWN	FILE NAME FIG1-3a		FIGURE 1-3b



NOTES:

MONITORING WELL LOCATIONS ARE APPROXIMATE

BASE MAP (SOUTH OF PERIMETER RD) DIGITIZED FROM: NCBC CENTER DAVISVILLE RI STATION MAP, SEPT 1992, ADDITIONAL ROADS ADDED FROM AERIAL PHOTO DATED 4/95

OFFSITE AREA (NORTH OF PERIMETER RD) DIGITIZED FROM A DRAWING PROVIDED BY THE TOWN OF NORTH KINGSTOWN, RI.

PROPERTIES WITH PRIVATE USE WELLS FROM TOWN OF NORTH KINGSTOWN WATER DEPT.

G:\PROJECTS\60957.56\0001.WPS\FINAL\FIELDWP\FIG2.DWG

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

USACE NED
CHARACTERIZATION OF CVOC CONTAMINATION REPORT
FORMER PR-58 NIKE SITE
NORTH KINGSTOWN, RHODE ISLAND

OCTOBER 1999 – OCTOBER 2000
INVESTIGATION SITE MAP

PROJECT MGR.	DESIGNED BY	DRAWN BY	CHECKED BY	DATE	SCALE	PROJECT NO.	FILE NAME	DRAWING NO.	FIGURE
JAS	JAS	RWC	JAS	01/25/01	AS SHOWN	60957.56	FIG.2	–	2-1

N

LEGEND

-25 BEDROCK SURFACE CONTOURS INTERPRETIVE LINES OF EQUAL ELEVATION (FT MSL)

MW01-13R / MW01-13D MONITORING WELL LOCATION

APPROXIMATE LOCATION OF VERY LOW FREQUENCY (VLF) GEOPHYSICAL TRAVERSE WITH INTERPRETED FRACTURE ZONE ORIENTATION SHOWN.

LOCATION OF PROPERTY WITH PRIVATE USE WELL

ELEVATION LESS THAN -30 FT MSL

ELEVATION GREATER THAN +10 FT MSL

Notes:
Base map south of Perimeter Road from RIEDC Cad Files 1997.
Base Map north of Perimeter Road digitized from drawing from Town of North Kingstown, RI.
Properties with private use wells from Town of North Kingstown Water Dept.
Subsurface contours shown represent our evaluation of most probable conditions based upon interpretations of presently available data. Some variation from these conditions must be expected.

GRAPHIC SCALE IN FEET
100 50 0 100 200 300 400

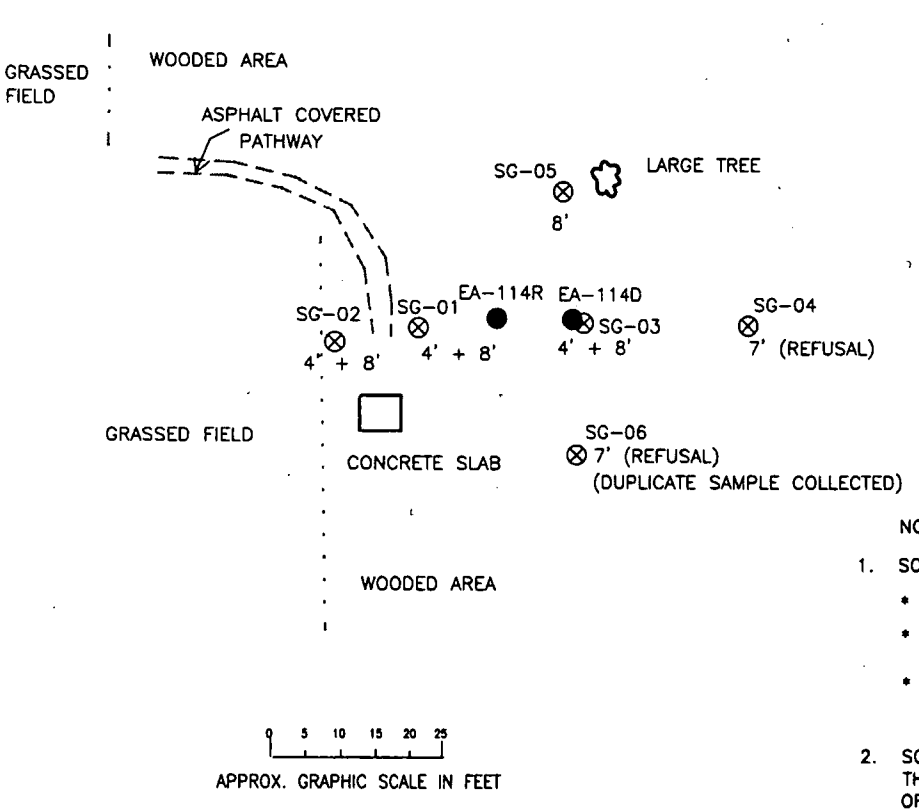
FILE: D:\CADD PROJECTS\PROJECTS\60957561BASEMAP-BEDROCK CONTOURS.DWG

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

USACE – NED
Characterization of CVOC Contamination Report
Former PR-58 Nike Site
North Kingstown, Rhode Island

Interpretive Contour Map of the Upper Surface of Competent Bedrock

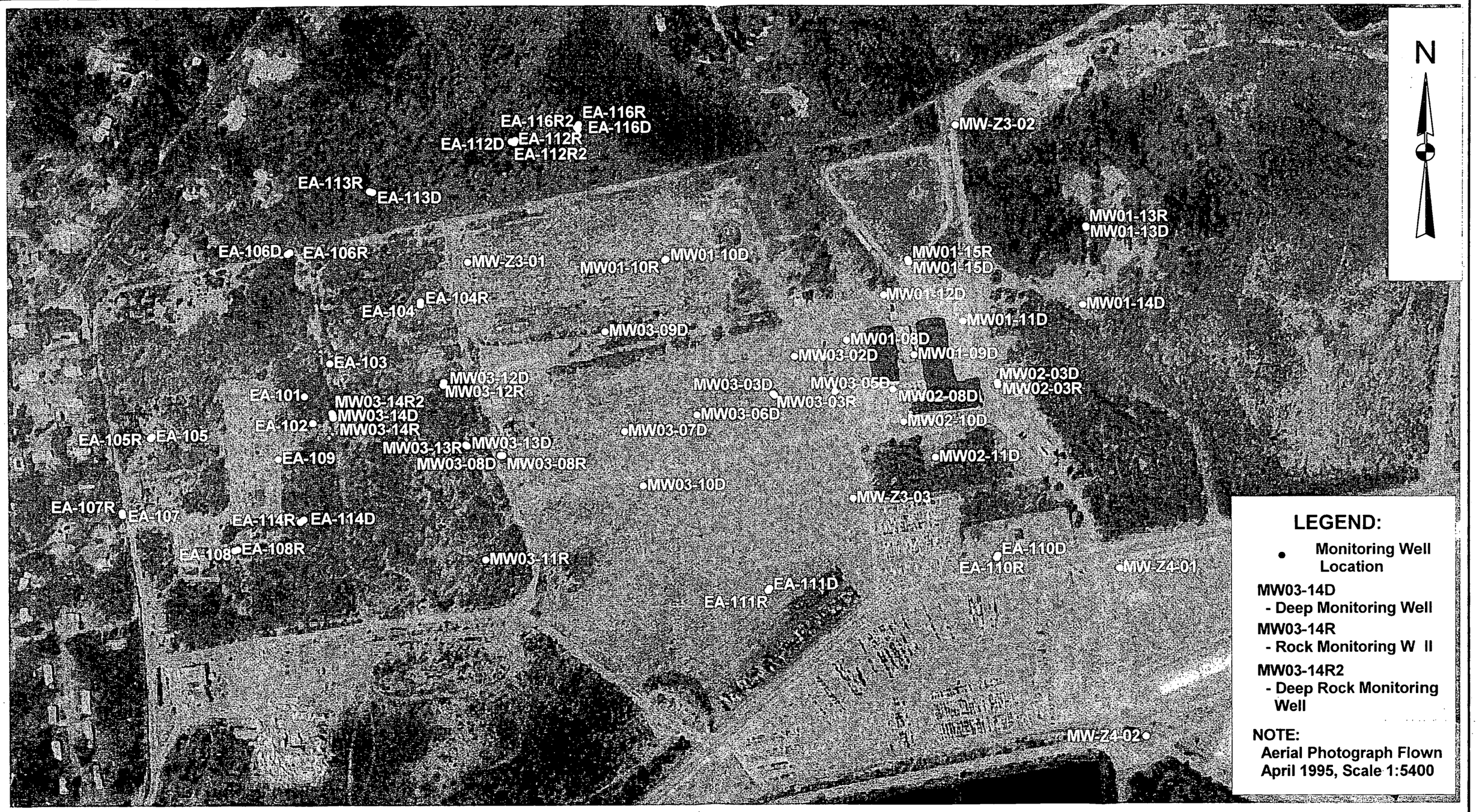
DESIGNED BY	DRAWN BY	DATE	PROJECT NO.	FILE NAME
JAS	RWC	02/07/01	60959.56	FIG2-2
CHECKED BY	PROJECT MGR.	SCALE	DRAWING NO.	FIGURE
JAS	JAS	1:500	–	2-2



NOTES:

1. SOIL GAS SAMPLES WERE COLLECTED AT 6 LOCATIONS ⊗ :
   - AT SG-01, -02, AND -03, SAMPLES WERE COLLECTED FROM 4 FT AND 8 FT BG.
   - AT SG-04, -05, AND -06, SAMPLES WERE COLLECTED ONLY FROM NEAR THE WATER TABLE OR REFUSAL.
   - FOR THE DEEPEST SAMPLE AT EACH LOCATION, A SMALL AMOUNT OF WATER WAS PULLED IN AND RETAINED IN THE WATER TRAP OF THE SAMPLING APPARATUS, CONFIRMING THAT THE SAMPLE DEPTH WAS NEAR THE WATER TABLE.
2. SG-01 AND SG-02 ARE LOCATED AT THE TWO SMALL PILES OF GRAVELLY SOIL THAT JOHN LEO (RIDEM) POINTED OUT ON 2 JUNE 1999 THAT COVER THE TWO AREAS OF STAINED SOIL HE HAD OBSERVED PREVIOUSLY.
3. BASED UPON THE DEPTH TO GROUND WATER MEASURED IN THE NEAREST MONITORING WELL (NMW-1 AND EA-108), IT WAS ESTIMATED THAT THE DEPTH TO GROUND WATER WAS APPROXIMATELY 7.5 TO 8.5 FT BG.
4. LOCATIONS SG-05 AND SG-06 WERE ATTEMPTED FIRST AT POINTS ABOUT 10 FT WEST OF THE SAMPLED LOCATIONS, BUT REFUSAL WAS ENCOUNTERED ABOUT 6 FT BG.
5. MONITORING WELLS EA-114D AND EA-114R (●) WERE LATER INSTALLED IN THIS SAMPLING AREA.

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	DESIGNED BY: JAS	DRAWN BY: RWC	DATE: 01/25/01	PROJECT NO.: 60957.56	USACE NED CHARACTERIZATION OF CVOC CONTAMINATION REPORT FORMER PR-58 NIKE SITE NORTH KINGSTOWN, RHODE ISLAND	PR-58 AREA SOIL GAS SAMPLING ACTIVITY 7 OCTOBER 1999 FIGURE 2-3
	CHECKED BY: JAS	PROJECT MGR.: JAS	SCALE: AS SHOWN	FILE NAME: SOIL GAS		



LEGEND:

- Monitoring Well Location

MW03-14D
- Deep Monitoring Well

MW03-14R
- Rock Monitoring W ll

MW03-14R2
- Deep Rock Monitoring Well

NOTE:
Aerial Photograph Flown April 1995, Scale 1:5400

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

200 0 200 400 Feet

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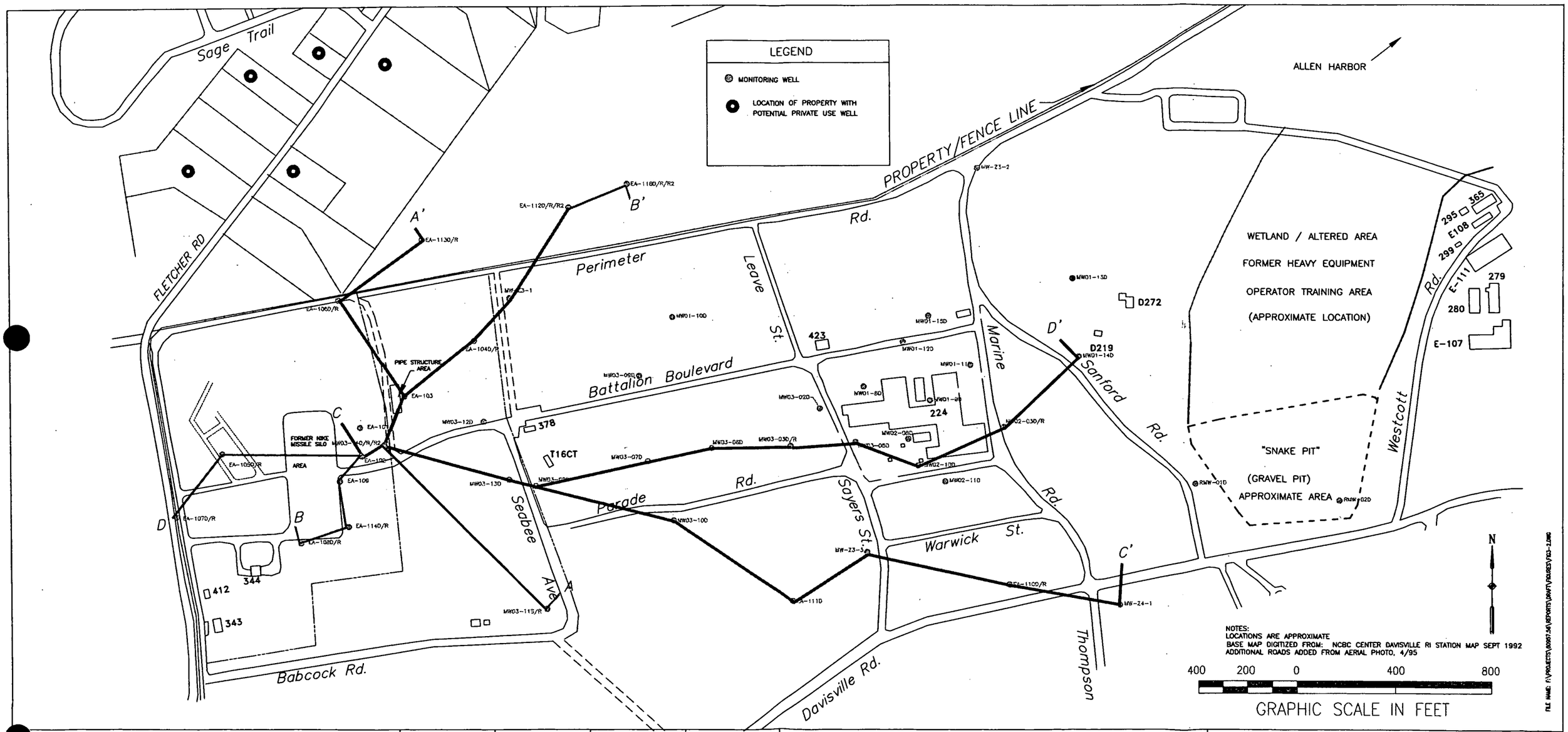
Characterization of CVOC Contamination Report
Former PR-58 Nike Site
North Kingstown, Rhode Island

Location of Ground-Water Monitoring Wells Sampled in September and October 2000

FIGURE 2-4



EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	DESIGNED BY: JAS	DRAWN BY: RWC/JDR	DATE: 01/11/01	PROJECT NO.: 60957.56
	CHECKED BY: JAS	PROJECT MGR.: JAS	SCALE: AS SHOWN	LAYER NAME: 0 (RED)

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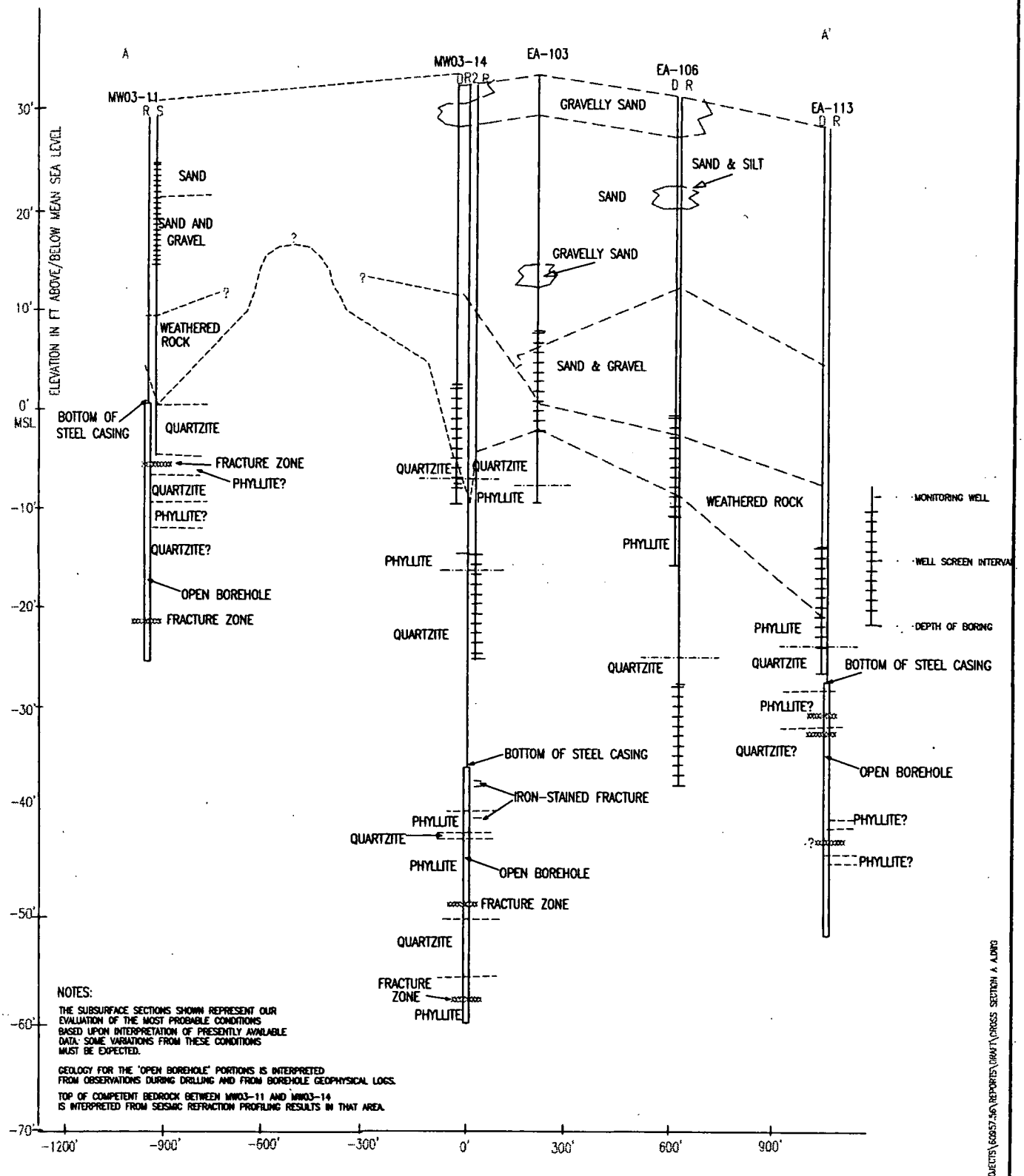
FORMER PR-58 NIKE SITE
NORTH KINGSTOWN, RHODE ISLAND

LOCATION OF GEOLOGICAL CROSS SECTIONS

FIGURE 3-1



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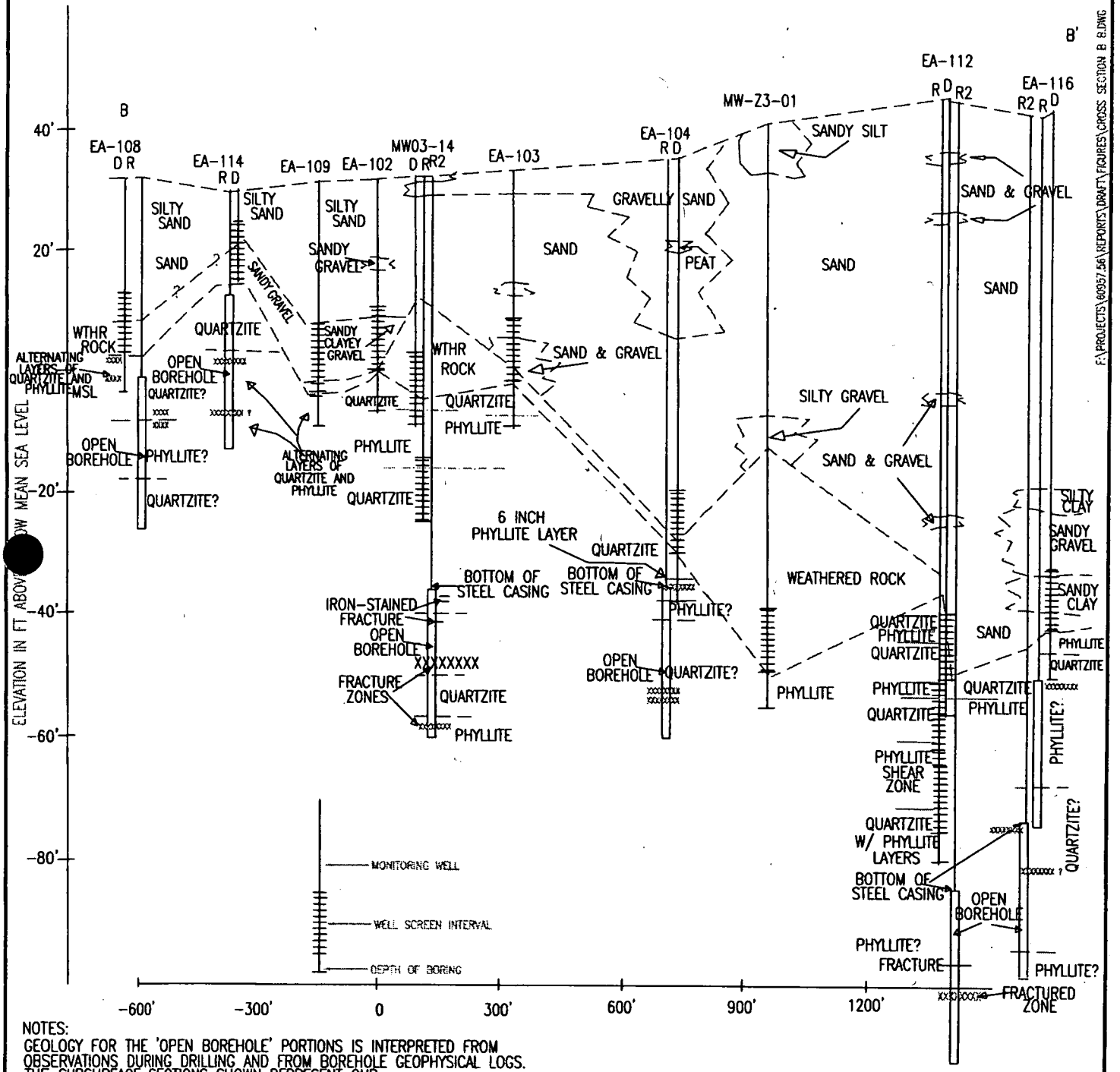
FORMER PR-58 NIKE SITE
NORTH KINGSTOWN, RHODE ISLAND

GEOLOGICAL CROSS SECTION A-A'

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
JAS	JAS	RWC	JAS	AS SHOWN	01/11/01	60957.56	3-2



NOTES:
GEOLOGY FOR THE 'OPEN BOREHOLE' PORTIONS IS INTERPRETED FROM OBSERVATIONS DURING DRILLING AND FROM BOREHOLE GEOPHYSICAL LOGS. THE SUBSURFACE SECTIONS SHOWN REPRESENT OUR EVALUATION OF THE MOST PROBABLE CONDITIONS BASED UPON INTERPRETATION OF PRESENTLY AVAILABLE DATA. SOME VARIATIONS FROM THESE CONDITIONS MUST BE EXPECTED.

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GEOLOGICAL CROSS SECTION B-B'

PROJECT MGR	DESIGNED BY	DRAWN BY	CHECKED BY	SCALE	DATE	PROJECT NO	FIGURE
JAS	JAS	RWC	JAS	AS SHOWN	01/12/01	60957.56	3-3

C

C'

ELEVATION IN FT ABOVE/BELOW MEAN SEA LEVEL

40'
20'
0 MSL
−20'
−40'
−60'
−80'

MW03−14
EA−102 DR2R
MW03−13 RD
MW03−08 RD
MW03−10D
EA−111 RD
MW−Z3−03
EA−110 RD
MW−Z4−01

SANDY GRAVEL
SAND
SANDY GRAVEL
SANDY CLAYEY GRAVEL
QUARTZITE
WEATHERED ROCK
QUARTZITE
PHYLLITE
QUARTZITE WITH BANDS OF PHYLLITE
BOTTOM OF STEEL CASING
IRON−STAINED FRACTURE
OPEN BOREHOLE
PHYLLITE
QUARTZITE
FRACTURE ZONE
PHYLLITE

SILTY
QUARTZITE
SAND
GRAVELLY SAND
SANDY GRAVEL
WEATHERED ROCK
QUARTZITE
QUARTZITE
PHYLLITE

SAND & SILT
SAND AND GRAVEL
SILT AND GRAVEL
SILT TO SANDY SILT
F−VF SAND
GRAVELLY SANDY SILT
QUARTZITE

GRAVELLY SAND
FINE SAND
SANDY SILTY CLAY
SANDY GRAVELLY CLAYEY SILT
?
REFUSAL

SANDY SILT
SILTY SAND
SILT
SILTY GRAVEL TO SILTY GRAVELLY SAND
?
QUARTZITE

GRAVELLY SAND
FINE SAND
SILT
SANDY SILT
SILTY GRAVEL REFUSAL
QUARTZITE

COMPETENT COREABLE ROCK

COMPETENT COREABLE ROCK

NOTES:

GEOLOGY FOR THE 'OPEN BOREHOLE' PORTIONS IS INTERPRETED FROM OBSERVATIONS DURING DRILLING AND FROM BOREHOLE GEOPHYSICS.

THE SUBSURFACE SECTIONS SHOWN REPRESENT OUR EVALUATION OF THE MOST PROBABLE CONDITIONS BASED UPON INTERPRETATION OF PRESENTLY AVAILABLE DATA. SOME VARIATIONS FROM THESE CONDITIONS MUST BE EXPECTED.

0 300' 600' 900' 1200' 1500' 1800' 2100' 2400' 2700' 3000' 3300'

SCALE IN FEET

F:\PROJECTS\29600.32\3294\REPORTS\COMP_RI\REV_DF\FIGURES\FIG3−5.DWG

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DESIGNED BY	DRAWN BY	DATE	PROJECT NO.
JAS	RWC	01/11/01	60957.56
CHECKED BY	PROJECT MGR.	SCALE	FILE NAME
JAS	JAS	AS SHOWN	FIG3−5.DWG

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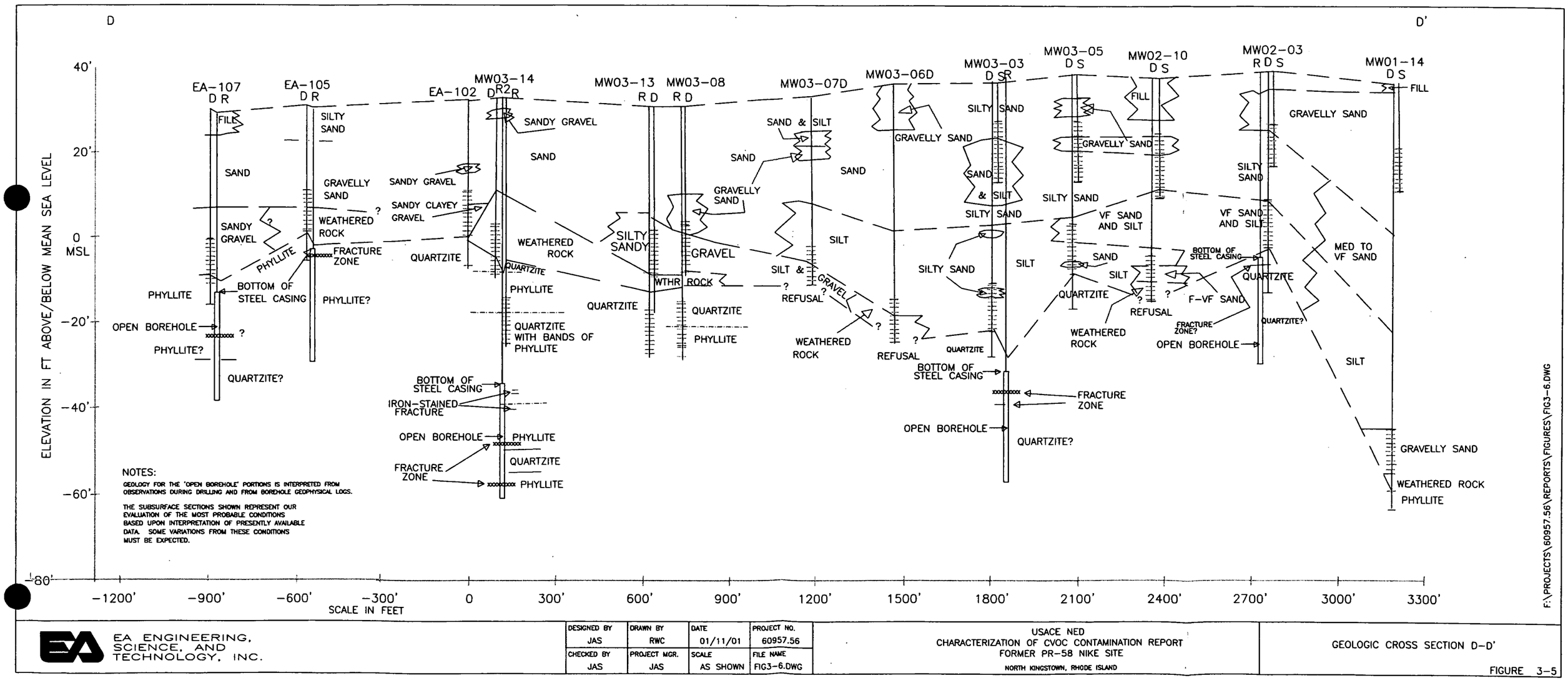
NORTH KINGSTOWN, RHODE ISLAND

GEOLOGIC CROSS SECTION C−C'

FIGURE 3−4



NOTES:

GEOLOGY FOR THE 'OPEN BOREHOLE' PORTIONS IS INTERPRETED FROM OBSERVATIONS DURING DRILLING AND FROM BOREHOLE GEOPHYSICAL LOGS.

THE SUBSURFACE SECTIONS SHOWN REPRESENT OUR EVALUATION OF THE MOST PROBABLE CONDITIONS BASED UPON INTERPRETATION OF PRESENTLY AVAILABLE DATA. SOME VARIATIONS FROM THESE CONDITIONS MUST BE EXPECTED.

F:\PROJECTS\60957.56\REPORTS\FIGURES\FIG3-6.DWG

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DESIGNED BY	DRAWN BY	DATE	PROJECT NO.
JAS	RWC	01/11/01	60957.56
CHECKED BY	PROJECT MGR.	SCALE	FILE NAME
JAS	JAS	AS SHOWN	FIG3-6.DWG

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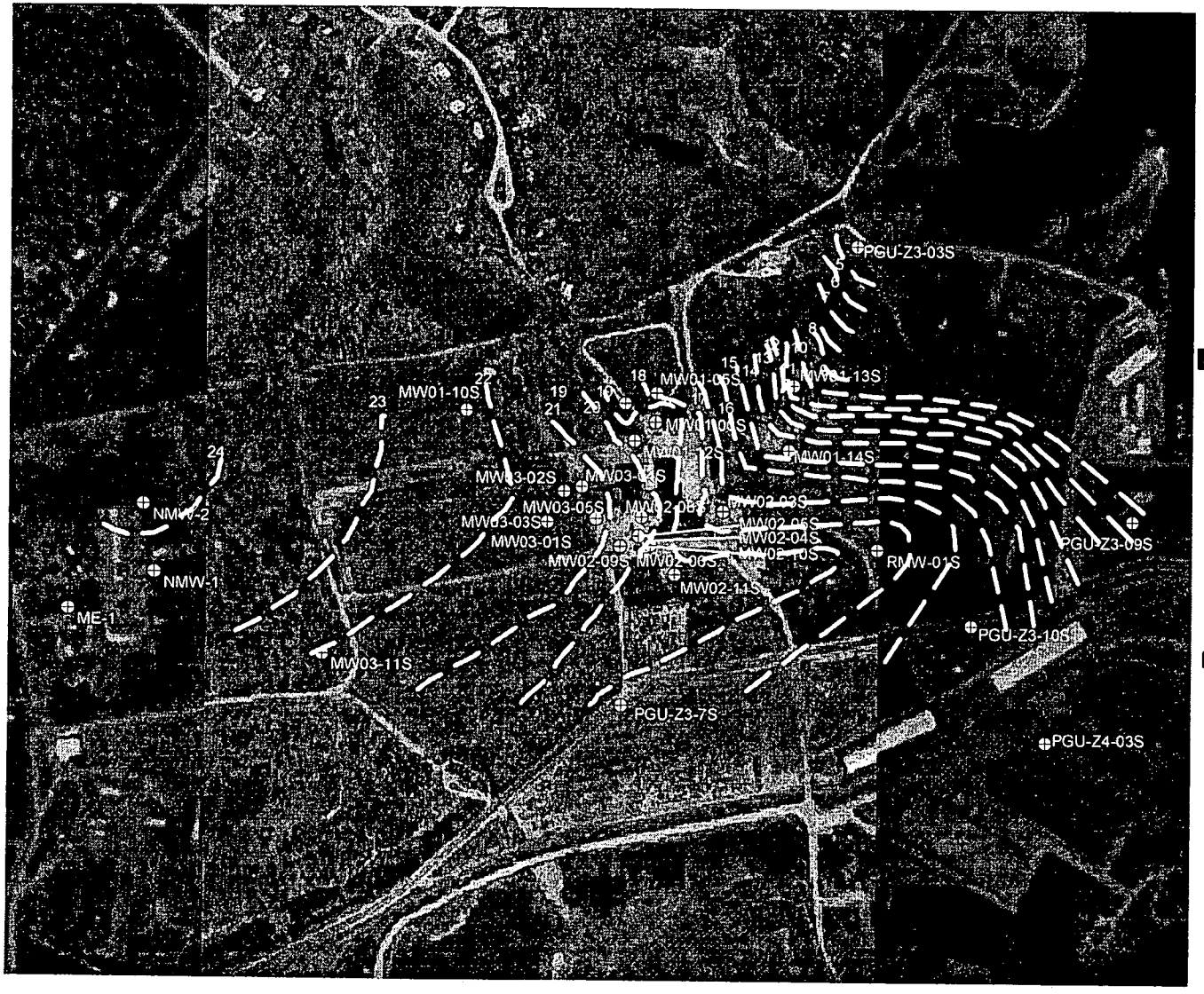
FORMER PR-58 NIKE SITE
NORTH KINGSTOWN, RHODE ISLAND

GEOLOGIC CROSS SECTION D-D'

FIGURE 3-5

Ground-Water Surface Contours
Shallow Wells
July 2000



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Contamination Report
Former PR-58 Nike Site
North Kingstown, Rhode Island

Legend:

⊕ **Monitoring Well Location**

— — — Interpretive Contour Line of Equal Water Surface Elevation (Feet MSL)

Note: Contours shown represent our evaluation of the probable conditions based upon interpretation of presently available data. Some variations from those conditions must be expected.

N
W E
S

Figure 3-6

Ground-Water Surface Contours
Deep Wells
July 2000

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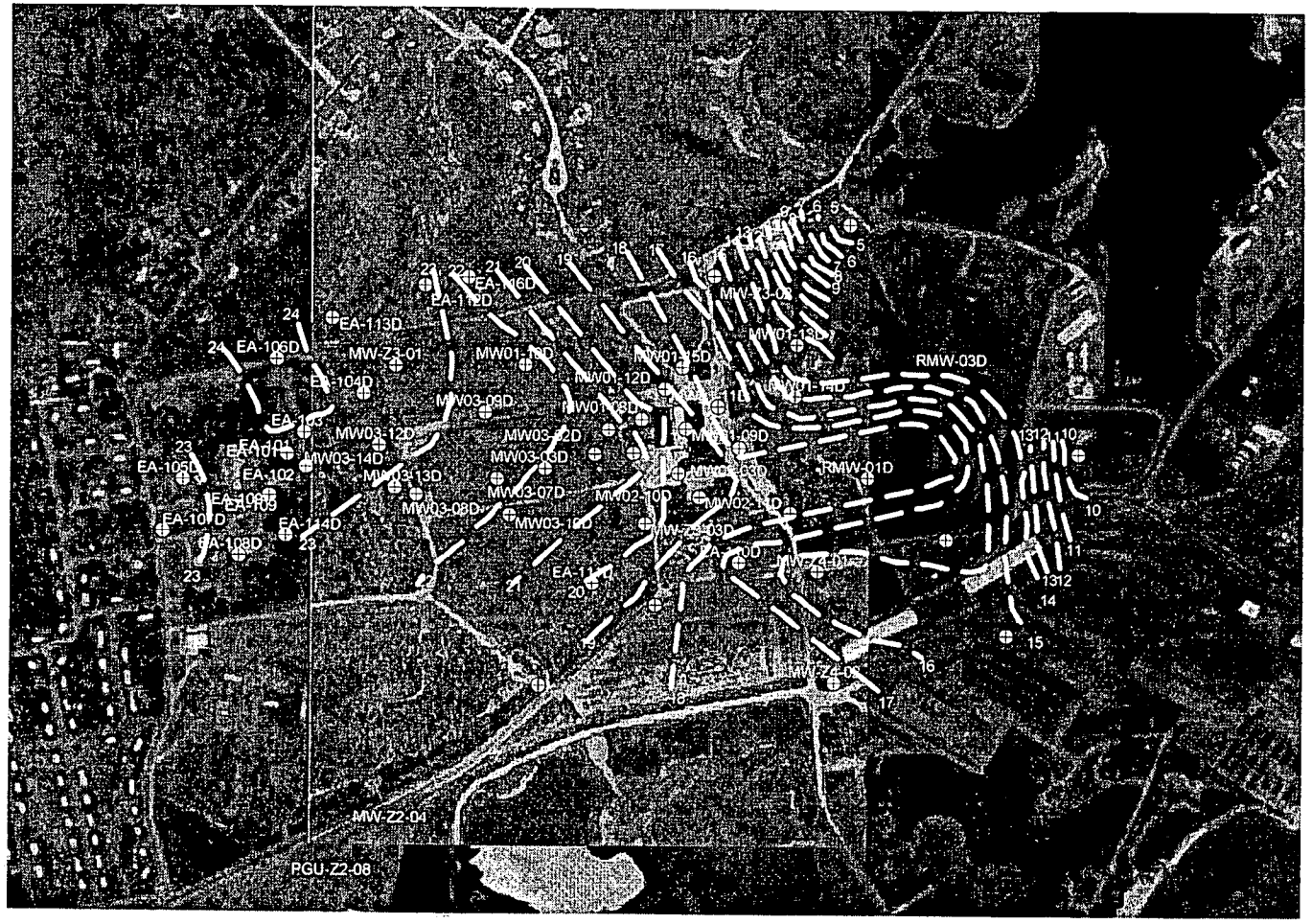
Former PR-58 Nike Site
North Kingstown, Rhode Island



2000 0 2000 4000 Feet

Legend:

⊕ Monitoring Well Location

— — Interpretive Contour Line of Equal Water Surface Elevation (Feet MSL)

Note: Contours shown represent our eveluation of the probable conditions based upon interpretation of presently available data. Some variations from those conditions must be expected.

N
W E
S

Figure 3-7

Ground-Water Surface Contours
Rock Wells
January 2001

2000 0 2000 4000 Feet

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North Kingstown, Rhode Island

Legend:

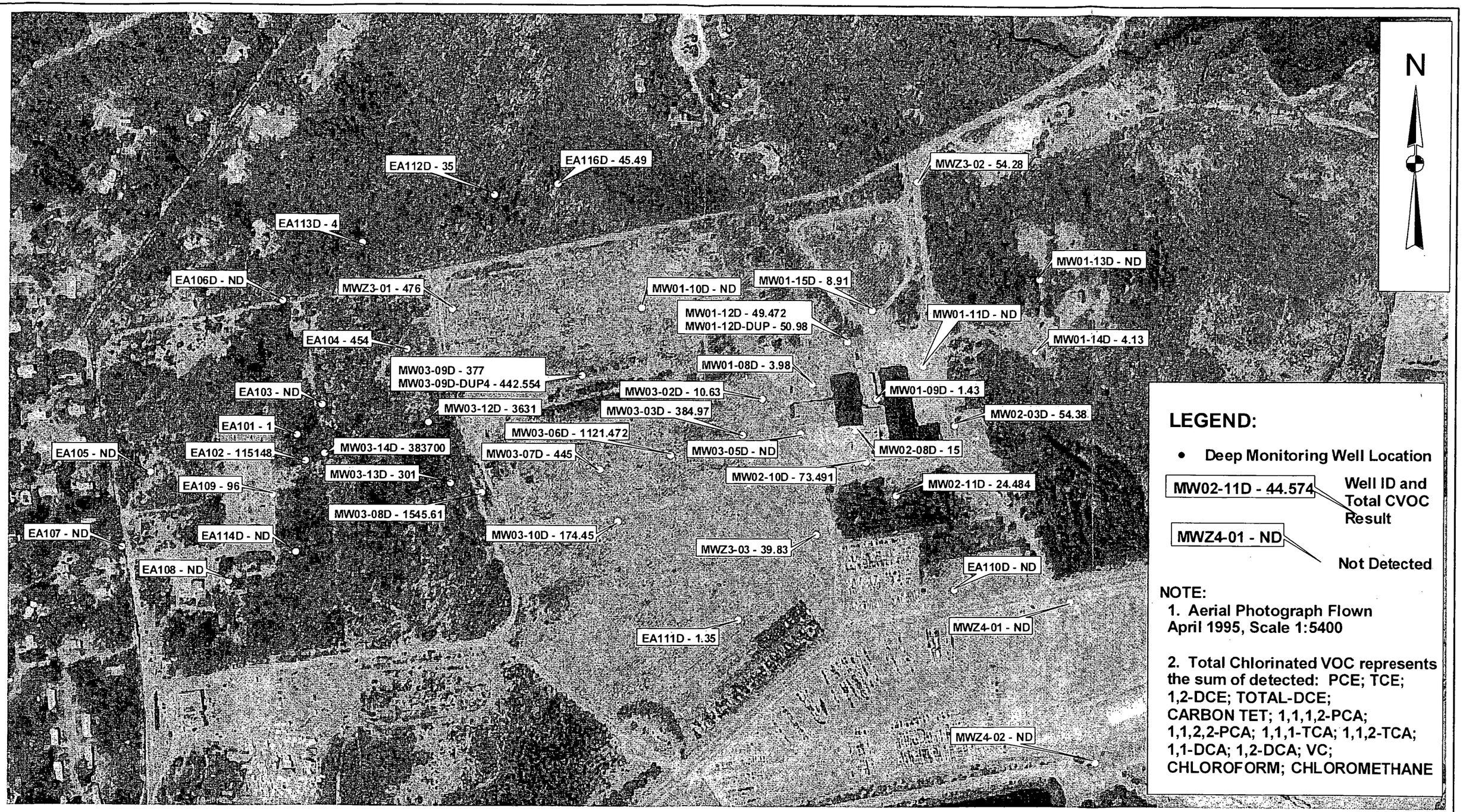
⊕ Monitoring Well Location

— — — Interpretive Contour Line of Equal Water Surface Elevation (Feet MSL)

Note: Contours shown represent our eveluation of the probable conditions based upon interpretation of presently availiable data. Some variations from those conditions must be expected.

N
W E
S

Figure 3-8



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300 0 300 600 Feet

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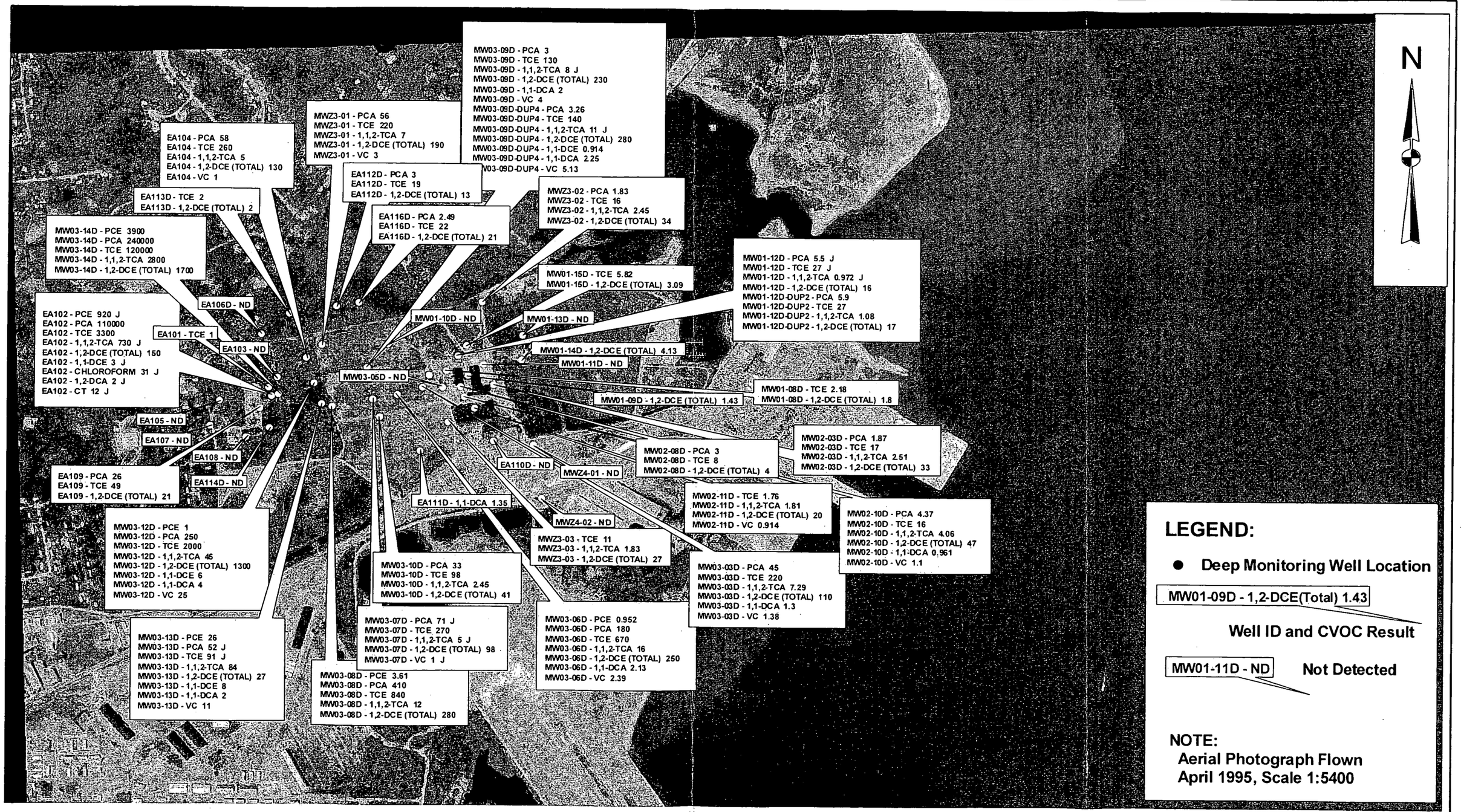
Former PR-58 Nike Site
North Kingstown, Rhode Island

Total CVOC (UG/L)
Detected in Ground-Water Samples
from Deep Monitoring Wells,
September - October 2000

FIGURE 4-1



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500 0 500 1000 1500 Feet

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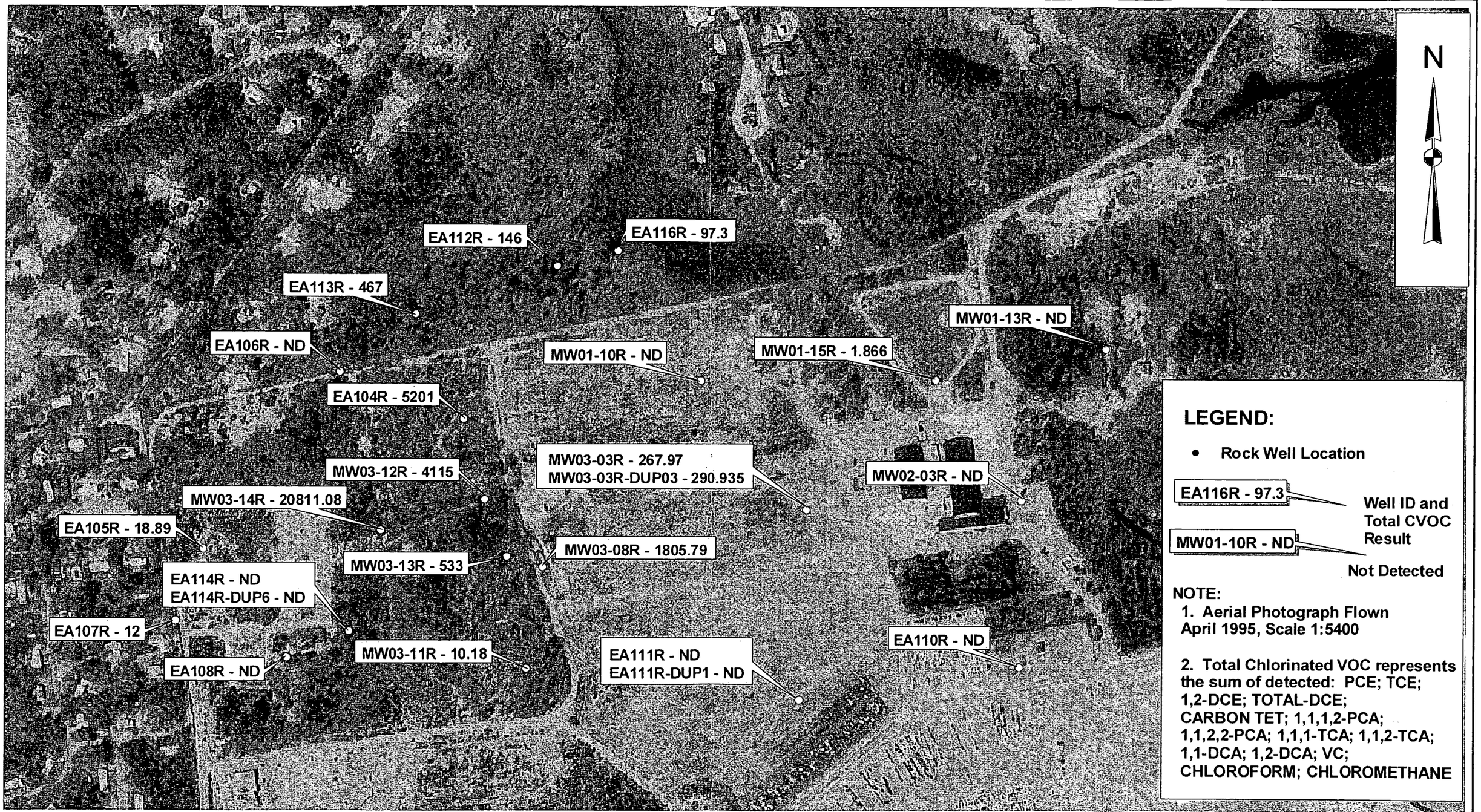
Former PR-58 Nike Site
North Kingstown, Rhode Island

CVOC (UG/L)
Detected in Ground-Water Samples from Deep Monitoring Wells, September - October 2000

FIGURE 4-2



EA ENGINEERING, SCIENCE, AND TECHNOLOGY

200 0 200 400 Feet

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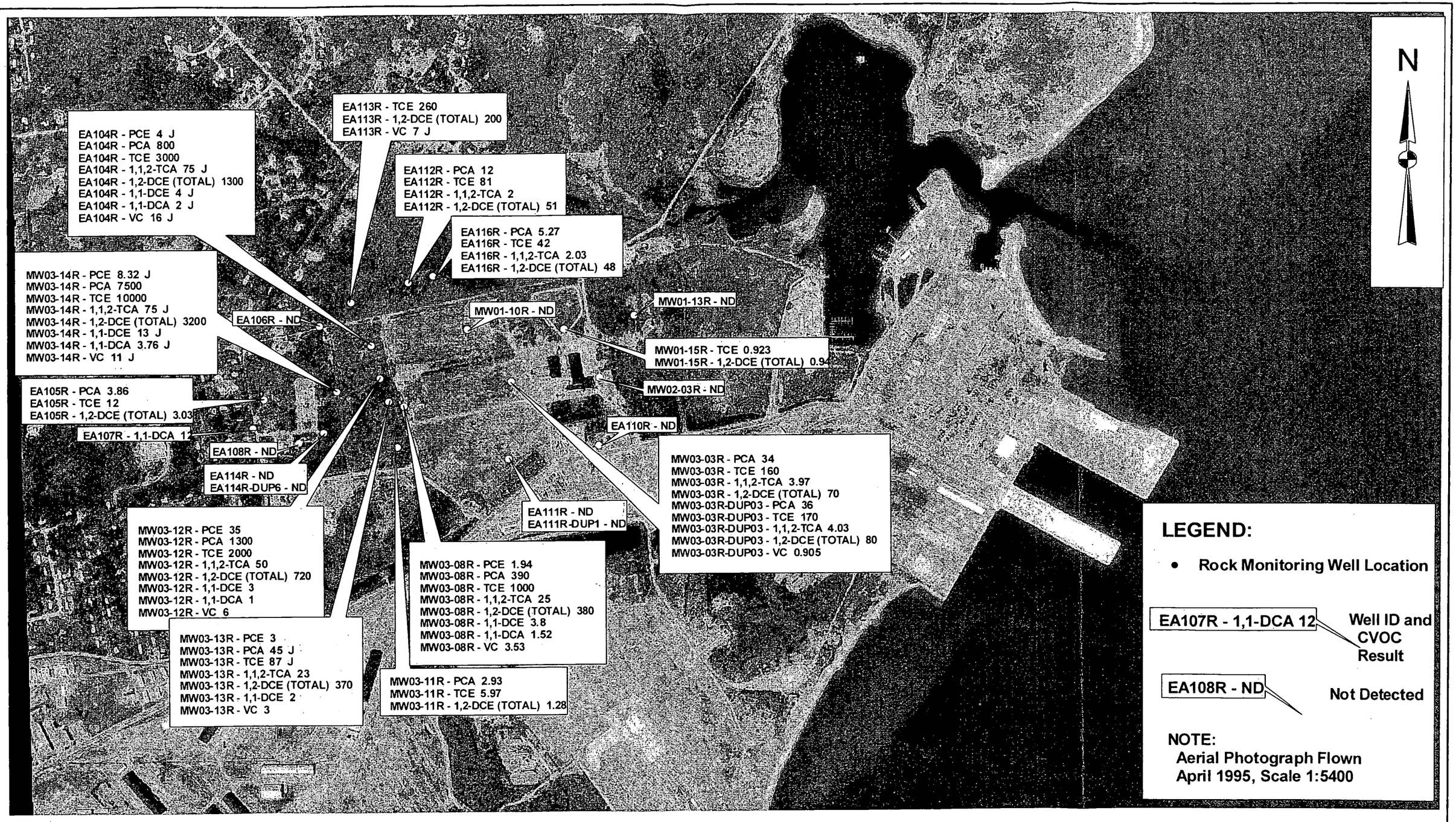
Characterization of CVOC Contamination Report
Former PR-58 Nike Site
North Kingstown, Rhode Island

Total CVOC (UG/L)
Detected in Ground-Water Samples
from Rock Wells,
September - October 2000

FIGURE 4-3



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500 0 500 1000 Feet

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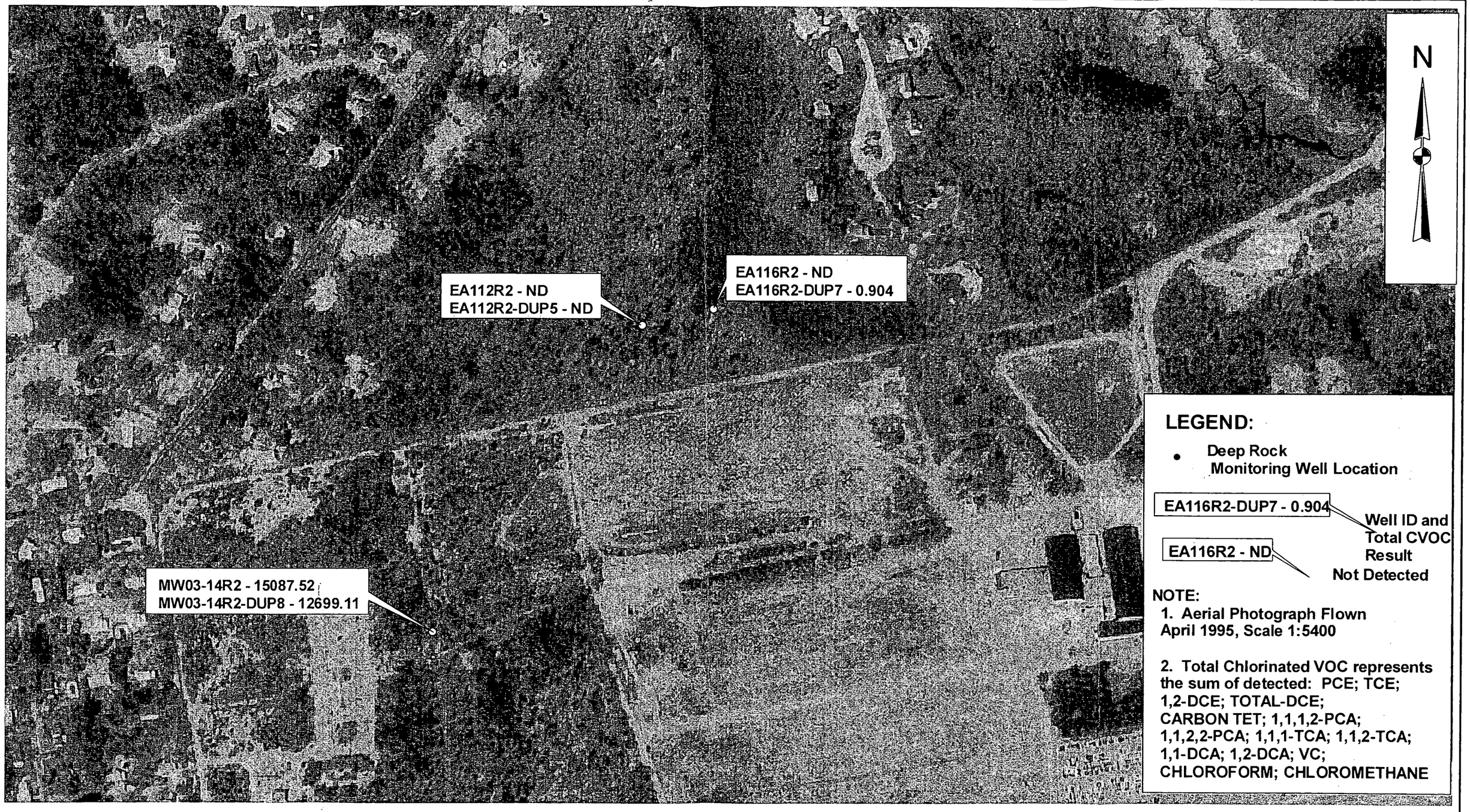
Former PR-58 Nike Site
North Kingstown, Rhode Island

CVOC (UG/L)
Detected in Ground-Water Samples
from Rock Monitoring Wells,
Sept mber - October 2000

FIGURE 4-4



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400 0 400 Feet

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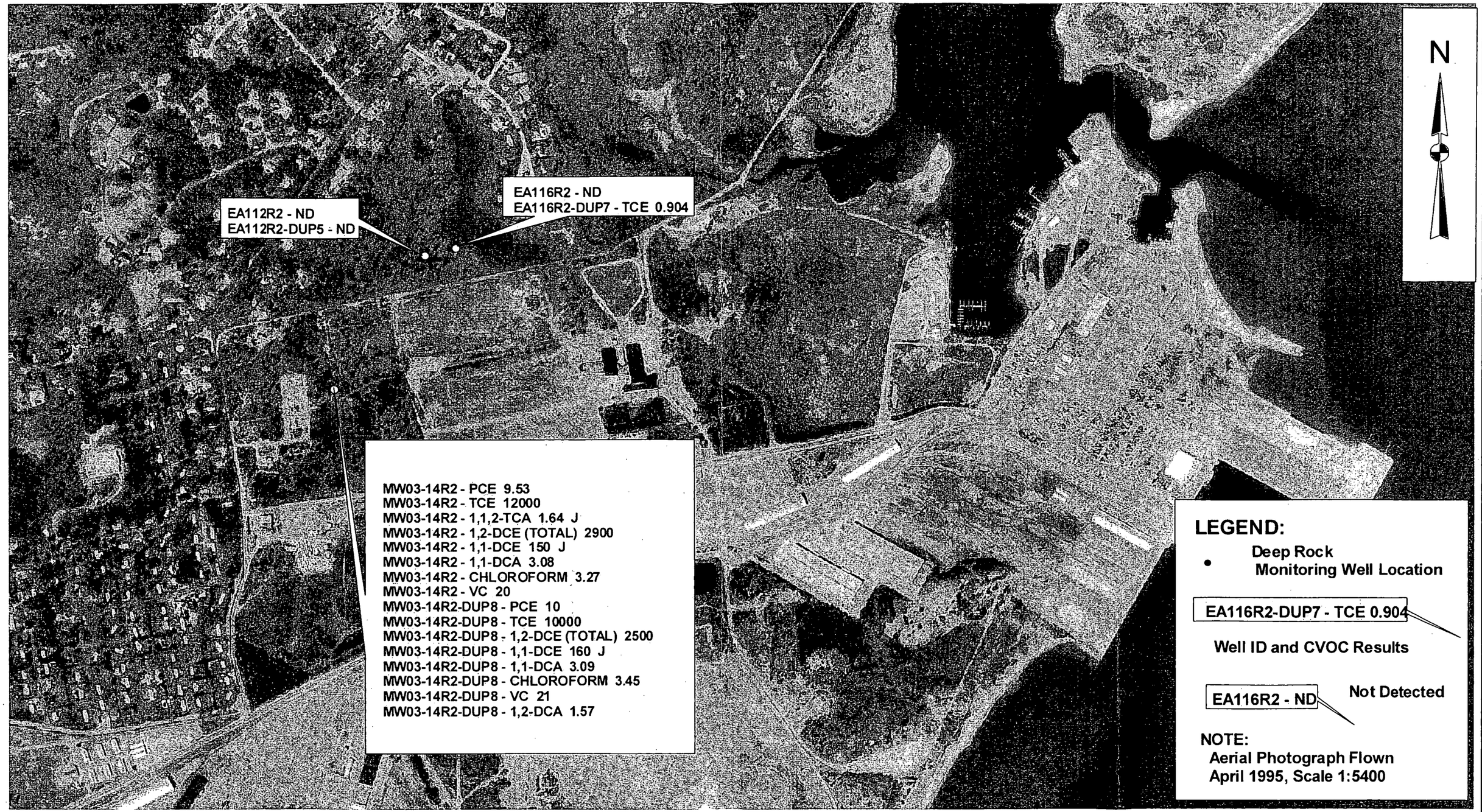
Former PR-58 Nike Site
North Kingstown, Rhode Island

Total CVOC (UG/L)
Detected in Ground-Water Samples
from Deep Rock Monitoring Wells,
September - October 2000

FIGURE 4-5



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500 0 500 Feet

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Former PR-58 Nike Site
North Kingstown, Rhode Island

CVOC (UG/L)
Detected in Ground-Water Samples
from Deep Rock Monitoring Wells,
September - October 2000

FIGURE 4-6

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

500 0 500 Feet

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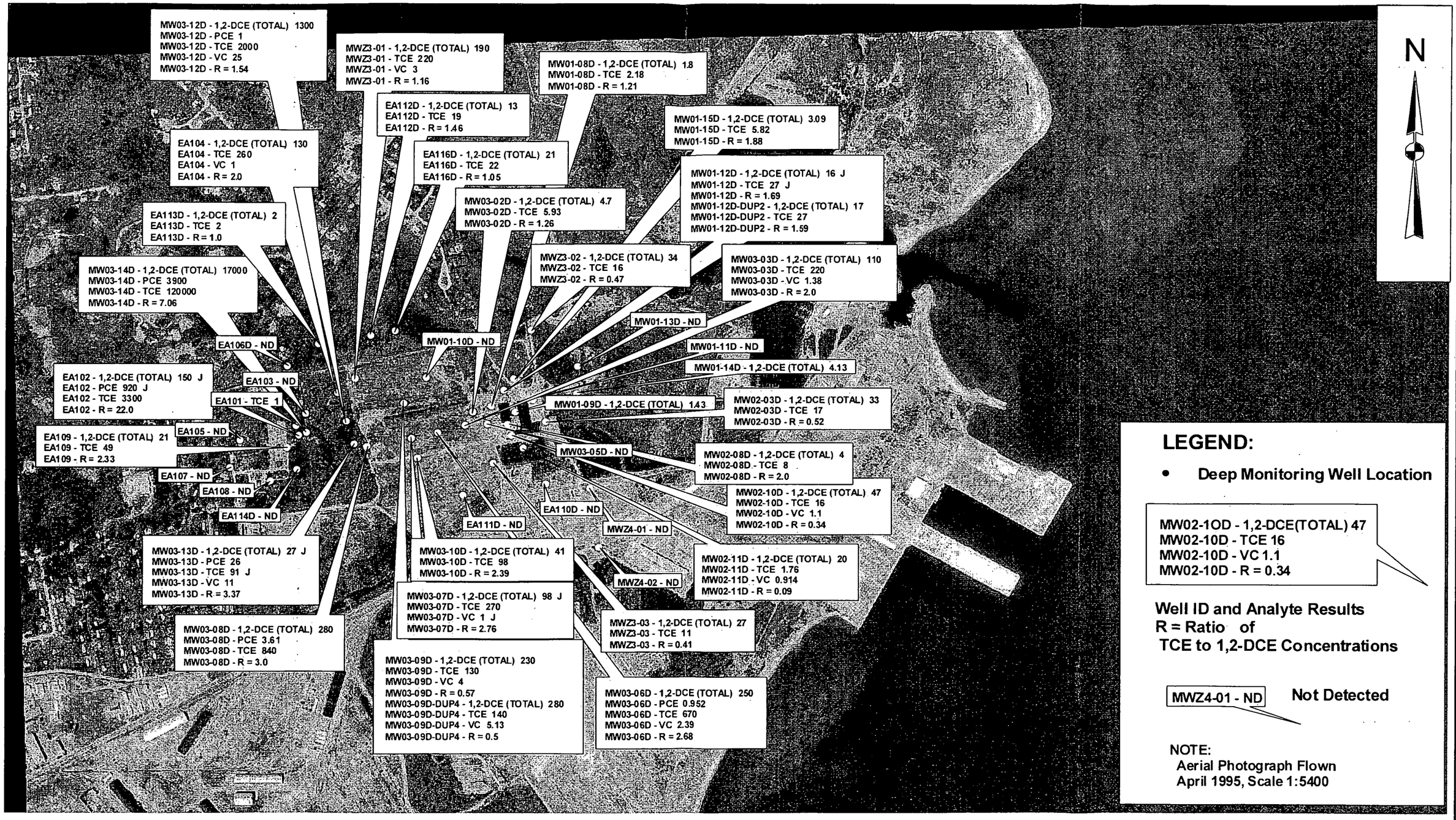
Characterization of CVOC Contamination Report
Former PR-58 Nike Site
North Kingstown, Rhode Island

Conceptual Model of Redox Zones
Based on October 2000 Sampling Data

FIGURE 5-1



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500 0 500 1000 Feet

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Characterization of CVOC Contamination Report
Former PR-58 Nike Site
North Kingstown, Rhode Island

Distribution of 1,2-DCE (Total), PCE, TCE, and Vinyl Chloride (UG/L) Detected in Ground-Water Samples from Deep Monitoring Wells, September - October 2000

FIGURE 5-2

TABLE 1-1
Target Compound List of Volatile Organic Compounds

Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane
2-Butanone
Carbon Disulfide
Carbon Tetrachloride*
Chlorobenzene*
Chloroethane*
Chloroform
Chloromethane*
Dibromochloromethane
1,1-Dichloroethane*
1,2-Dichloroethane*
1,1-Dichloroethene*
1,2-Dichloroethene (Total)*
1,2-Dichloropropane
cis-1,2-Dichloroethene*
cis-1,3-Dichloropropene
trans-1,3-Dichloropropene
Ethylbenzene
2-Hexanone
Methylene Chloride
M,p-Xylenes
4-Methyl-2-Pentanone
o-xylene
Styrene
1,1,2,2-Tetrachloroethane*
Tetrachloroethene*
Toluene
1,1,1-Trichloroethane*
1,1,2-Trichloroethane*
trans-1,2-Dichloroethene*
Trichloroethene*
Vinyl Chloride*
Xylene (Total)

Analytical Method SW8260

* - compounds included in the CVOC subset of these compounds.

TABLE 1-2
Summary of Monitoring Well Data
Former PR-58 Nike Site and NCBC Davisville Study Area 01 and Sites 02 and 03, North Kingstown, RI

Well Number	Date Installed	Rhode Island Grid Coordinates		Ground Elevation (FAMSL)	Top of Riser Elevation (FAMSL)	Screen Depth (FBGS)		Screen Elevation (FAMSL)		Geological Unit Screened
		North	East			Top	Bottom	Top	Bottom	
MW01-05S	6/18/93	194956.74	520705.25	32.8	35.26	10	20	22.77	12.77	(10')silty sand
MW01-06S	6/18/93	194819.04	520698.75	34.0	33.69	13	23	20.94	10.94	(10')silty sand and shale
MW01-07S	6/17/93	194905.59	520549.75	32.9	33.92	10	20	22.90	12.90	(10')silty sand
MW01-08D	10/6/95	194555.48	520460.59	38.08	37.50	35	45	3.08	-6.92	(10')silty sand
MW01-09D	10/12/95	194498.35	520719.25	39.72	39.18	37.5	41.5	2.22	-1.78	(4')till
MW01-10S	10/24/95	194871.09	519775.25	41.21	42.73	13	23	28.21	18.21	(10')f-c sand
MW01-10D	10/23/95	194868.80	519768.60	41.56	42.88	71	81	-29.44	-39.44	(10')till
MW01-10R	7/14/00	194865.72	519763.66	41.88	44.25	85	115	-43.12	-73.12	(30')bedrock
MW01-11D	10/18/95	194629.67	520904.95	39.25	38.98	37	42	2.25	-2.75	(5')silt
MW01-12S	10/10/95	194729.88	520597.28	36.34	36.01	14	24	22.34	12.34	(5')silt, (5')silty f sand-f gravel
MW01-12D	10/10/95	194730.73	520602.20	36.37	35.96	48	53	-11.63	-16.63	(5')till
MW01-13S	10/12/95	194994.25	521376.12	24.65	25.99	8	18	16.65	6.65	(6')f-c sand, (4') silty vf sand w/little f gravel
MW01-13D	10/11/95	194988.78	521372.36	24.68	26.29	64	74	-39.32	-49.32	(10')till
MW01-13R	7/17/00	194993.83	521371.40	24.70	26.74	78	105	-53.3	-80.3	(27')bedrock
MW01-14S	10/5/95	194684.87	521355.30	36.16	37.38	15	25	21.16	11.16	(10')gravelly sand
MW01-14D	10/4/95	194691.25	521358.93	36.25	37.62	81	89	-44.75	-52.75	(8')till
MW01-15D	10/13/95	194858.03	520699.72	32.76	32.39	46	51	-13.24	-18.24	(4')till, (1') weathered rock, schist, w/silty f sand
MW01-15R	7/20/00	194867.98	520696.62	32.88	32.88	56	81	-23.12	-48.12	(25')bedrock
NETW	N/A	194710.67	520373.56	32.1	32.23	N/A	N/A	N/A	N/A	N/A

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Well Number	Date Installed	Rhode Island Grid Coordinates		Ground Elevation (FAMSL)	Top of Riser Elevation (FAMSL)	Screen Depth (FBGS)		Screen Elevation (FAMSL)		Geological Unit Screened
		North	East			Top	Bottom	Top	Bottom	
MW02-01S	10/18/89	194709.77	520373.96	37.6	39.80	15.00	25.00	22.86	12.86	N/A
MW02-02S	10/24/89	194920.14	520878.26	40.6	43.42	21.00	31.00	19.62	9.62	(9')gravelly sand, (1')silty sand
MW02-03S	10/24/89	194396.01	521031.94	39.5	42.61	13.00	23.00	26.54	16.54	(2')gravelly sand, (8')silty sand
MW02-03D	05/25/93	194389.69	521033.70	39.5	41.22	31.50	41.50	8.04	-1.96	(10')VF sand and silt
MW02-03R	7/19/00	194378.98	521036.11	39.33	41.41	46	71	-6.67	-31.67	(25')bedrock
MW02-04S	10/24/89	194257.88	520658.62	38.5	38.19	16.00	26.00	22.48	12.48	(6')gravelly sand, (4')silty F sand
MW02-05S	10/24/89	194277.75	520620.95	38.5	38.17	16.50	26.50	21.96	11.96	(4')gravelly silty sand, (6')silty F sand
MW02-06S	10/25/89	194196.85	520644.23	37.4	36.98	16.00	26.00	21.41	11.41	(1')silty gravelly sand,(2')F sand, (7')silty F sand
MW02-07S	10/18/89	194367.26	520539.69	39.0	38.72	15.70	25.70	23.35	13.35	(1')silty gravelly sand, (9')N/A
MW02-07D	06/01/93	194361.31	520541.05	38.9	38.42	35.00	45.00	3.91	-6.09	(9')silty F sand, (1')silt and gravel
MW02-08S	05/21/93	194369.05	520634.63	38.9	38.64	11.80	26.80	27.09	12.09	(6') silt, (9') F-C sand
MW02-08D	05/21/93	194363.98	520636.48	39.0	38.63	35.90	45.90	3.10	-6.90	(10')VF sand
MW02-09S	05/20/93	194227.14	520528.54	38.5	37.93	12.00	27.00	26.51	11.51	(15')F sand
MW02-10S	05/20/93	194231.84	520677.63	37.6	37.01	13.00	28.00	24.64	9.64	(5')gravelly sand, (2')silty sand, (1')silt, (1')silty sand, (1')silt
MW02-10D	05/26/93	194236.43	520677.17	37.8	37.36	42.00	52.00	-4.20	-14.20	(2')silt, (4')F-VF sand, (4')weathered rock
MW02-11S	05/26/93	194090.70	520798.41	38.0	40.22	13.00	28.00	25.00	10.00	(15')F-C sand and gravel
MW02-11D	05/25/93	194097.67	520798.26	38.0	40.04	52.30	62.30	-14.30	-24.30	(4')sandy silt, (6')silty sand and weathered rock
MW03-01S	10/18/89	194313.02	520250.69	37.0	36.61	12.60	22.60	24.39	14.39	(4')sand, (6')silty sand
MW03-02S	05/26/93	194490.42	520255.22	36.2	38.37	8.50	23.50	27.72	12.72	(6.5')silty gravelly sand, (9.5')sand
MW03-02D	05/27/93	194492.96	520261.00	36.2	38.57	49.00	59.00	-12.78	-22.78	(5')gray silt, (5') gray silt w/rock fragments

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Well Number	Date Installed	Rhode Island Grid Coordinates		Ground Elevation (FAMSL)	Top of Riser Elevation (FAMSL)	Screen Depth (FBGS)		Screen Elevation (FAMSL)		Geological Unit Screened
		North	East			Top	Bottom	Top	Bottom	
MW03-03S	06/02/93	194343.26	520175.26	36.4	38.36	9.00	24.00	27.39	12.39	(5')sand, (10')sand and silt
MW03-03D	06/02/93	194347.61	520178.90	36.4	38.43	48	58	-11.61	-21.61	(1')silt, (2')silty sand, (7')silt
MW03-03R	7/20/00	194341.87	520184.01	36.94	38.51	70	95.2	-33.06	-58.26	(25.2')bedrock
MW03-04S	05/26/93	194512.30	520341.81	37.7	37.24	10.00	25.00	27.70	12.70	(3')silt, (4') F-M sand, (8')F sand
MW03-05S	05/26/93	194358.59	520408.72	38.4	37.89	11.00	26.00	27.37	12.37	(4')silty sand, (4')gravelly sand, (7')silty sand
MW03-05D	05/27/93	194355.40	520414.41	38.3	37.87	35.50	45.50	2.81	-7.19	(5')sand and silt, (4')silt, (1')sand
MW03-06D	03/24/94	194264.63	519886.21	36.0	38.19	51.50	61.50	-15.51	-25.51	(4.5')silt, (5.5')weathered rock
MW03-07D	03/25/94	194200.67	519607.54	33.1	35.41	35.50	45.50	-2.44	-12.44	(4.5')gray silt, (5.5')silt and gravel
MW03-08D	03/29/94	194108.30	519132.28	30.6	32.74	28.30	38.30	2.28	-7.72	(2')sand, (8')weathered rock
MW03-08R	05/23/95	194108.15	519140.54	30.3	32.15	46.5	56.5	-16.17	-26.17	(10')bedrock
MW03-09D	05/11/95	194590.17	519533.77	41.2	43.40	51	61	-9.81	-19.81	(3')sandy silt, (1')silty sand, (6') silt
MW03-10D	05/12/95	193987.68	519678.50	34.0	35.94	39	49	-4.98	-14.98	(5')F-VF sand, (5')till
MW03-11S	05/19/95	193697.68	519082.33	29.6	31.02	5	15	24.57	14.57	(3')silty sand, (7')silty sand and silty gravel
MW03-11R	7/6/00	193700.84	519074.15	29.58	31.27	28.2	55	1.38	-25.42	(26.8')bedrock
MW03-12D	05/25/95	194395.07	518914.70	34.5	36.11	25	35	9.5	-0.5	(10')weathered rock, schist with lenses of clay, silt and sand
MW03-12R	05/26/95	194384.12	518911.97	34.2	36.21	45	55	-10.8	-20.8	(10')weathered rock, schist with lenses of sand, silt and clay
MW03-13D	05/24/95	194146.39	519003.92	30.2	32.56	29	39	1.21	-8.79	(10')sand and gravel
MW03-13R	05/31/95	194150.84	518998.79	30.1	32.38	47.2	57.2	-17.08	-27.08	(10')bedrock
MW03-14D	11/20/96◆	194265.30	518494.75	32.4	34.00	30	40	2.44	-7.56	(6')weathered rock, (4')bedrock
MW03-14R	05/23/95	194256.75	518495.96	32.3	33.98	47	57	-14.66	-24.66	(10')bedrock
MW03-14R2	6/16/00	194274.97	518491.86	31.9	33.65	68	93	-36.1	-61.1	(25')bedrock

EA Engineering, Science, and Technology

Well Number	Date Installed	Rhode Island Grid Coordinates		Ground Elevation (FAMSL)	Top of Riser Elevation (FAMSL)	Screen Depth (FBGS)		Screen Elevation (FAMSL)		Geological Unit Screened
		North	East			Top	Bottom	Top	Bottom	
EA-101	6/17/96	194341.03	518387.13	30.8	32.29	23.5	33.5	7.3	-2.7	(10')till
EA-102	6/12/96	194235.92	518418.90	32.0	33.37	21.9	31.9	10.1	0.1	(3')sand, (7')till
EA-103	6/19/96	194468.54	518483.87	33.5	35.13	25.5	35.5	8.0	-2.0	(2.5')sand, (4.5')till, (3')weathered rock
EA-104	6/28/96	194695.73	518826.24	35.93	37.40	56	66	-20.07	-30.07	(8')F-M sand, (2')weathered rock
EA-104R	7/6/00	194707.91	518826.54	35.87	37.84	71	96	-35.13	-60.13	(25')bedrock
EA-105	6/5/96	194186.17	517798.45	30.64	31.95	20	30	10.64	0.64	(10')till
EA-105R	7/7/00	194180.03	517791.97	29.53	31.45	33	60	-3.47	-30.47	(27')bedrock
EA-106D	6/24/96	194892.57	518325.63	31.87	33.17	32	42	-0.13	-10.13	(2')till, (6') weathered rock, (2')bedrock
EA-106R	1/7/98	194899.05	518334.20	31.5	33.84	59	69	-27.5	-37.5	(10')bedrock
EA-107	6/26/96	193879.83	517684.09	29.86	31.34	31	41	-1.14	-11.14	(9')till, (1')bedrock
EA-107R	6/23/00	193890.33	517681.95	29.05	30.68	43	68.4	-13.95	-39.35	(25.4')bedrock
EA-108	6/7/96	193739.59	518114.54	32.24	33.5	19.25	29.25	12.99	2.99	(5')till, (5')weathered rock
EA-108R	6/21/00	193743.21	518126.84	31.56	33.11	33	58	-1.44	-26.44	(25')bedrock
EA-109	6/20/96	194096.18	518286.57	31.9	33.39	26	36	5.9	-4.1	(8')till, (2')weathered rock
EA-110D	1/12/98	193711.81	521033.01	38.1	40.15	75	85	-36.9	-46.9	(1')silt, (9')till
EA-110R	1/22/98	193704.08	521028.56	37.5	39.71	88	113	-50.5	-75.5	(25')bedrock
EA-111D	1/23/98	193585.90	520162.80	33.9	35.91	49.5	64.5	-15.6	-30.6	(4.5')silty clay, (10.5')till
EA-111R	1/30/98	193577.94	520156.71	33.9	35.71	65	90	-31.1	-56.1	(25')bedrock
EA-112D	1/30/98	195321.62	519176.54	45.9	48.06	86	96	-40.1	-50.1	(10')weathered rock
EA-112R	2/13/98	195326.33	519191.48	46.0	48.52	96.5	121.5	-50.5	-75.5	(25')bedrock
EA-112R2	6/26/00	195317.44	519187.76	45.24	46.84	130	156.6	-84.76	-111.36	(26.6')bedrock
EA-113D	2/18/98	195128.88	518645.89	28.7	31.42	42.5	52.5	-13.8	-23.8	(7')weathered rock, (3')bedrock
EA-113R	7/7/00	195132.44	518635.25	27.77	29.61	53	80	-25.23	-52.23	(27')bedrock

EA Engineering, Science, and Technology

Well Number	Date Installed	Rhode Island Grid Coordinates		Ground Elevation (FAMSL)	Top of Riser Elevation (FAMSL)	Screen Depth (FBGS)		Screen Elevation (FAMSL)		Geological Unit Screened
		North	East			Top	Bottom	Top	Bottom	
EA-114D	6/2/00	193858.82	518382.86	29.77	32.34	4.5	14.5	25.27	15.27	(3.5')silty sand, (6.5')silty sand and gravel
EA-114R	6/19/00	193849.66	518369.76	30.14	31.96	17.6	42.7	12.54	-12.56	(25.1')bedrock
EA-116D	6/12/00	195368.47	519431.78	43.95	45.79	75.2	85.2	-31.25	-41.25	(8.3')sandy clay and (1.7')silty sand
EA-116R	6/22/00	195386.41	519433.07	43.14	44.45	93.3	117	-50.16	-73.86	(23.7')bedrock
EA-116R2	6/26/00	195374.82	519425.62	44.04	45.88	117	142	-72.96	-97.96	(25')bedrock
ME-1	10/04/93	193908.69	517878.94	30.8	32.27	4.7	14.7	26.08	16.08	(2')fill, (8')sand and gravel
ME-2	10/05/93	194419.89	518886.95	35.2	37.31	10	19.9	25.24	15.24	(10')sand and gravel
ME-3	10/12/93	194481.56	517758.23	33.4	34.90	8	18	25.39	15.39	(6')F-C sand, (4')sand, weathered rock
ME-4	10/06/93	193611.62	518757:11	33.0	34.63	10	19.9	23.01	13.01	(5')sand and gravel, (5')sand, silt and gravel
NMW-1	11/19/87	194090.79	518283.74	32.5	34.23	5.68	15.73	26.23	16.18	(10')sand
NMW-2	11/20/87	194417.49	518230.69	33:4	35.08	6.06	16.14	26.59	16.51	(10')sand
NMW-3	11/20/87	194161.79	517992.32	33.1	35.01	7.40	17.56	25.09	14.93	(10')silty sand
NMW-4	11/23/87	193662.17	518127.64	30.7	32.59	4.09	14.12	26.10	16.07	(10.03')silty sand and sand
25MW-01S	7/20/94	194626.89	520610.72	38.5	38.13	20	30	17.65	7.65	(5')silty gravelly sand, (5')silty sand
26MW-01S	7/50/94	194503.05	520721.88	39.8	39.48	19	29	20.03	10.03	(10')sand
26MW-02S	7/21/94	194499.96	520708.21	39.9	39.53	20	30	19.07	9.07	(6')sand and silt, (4')sand
26MW-03S	7/21/94	194607.10	520703.23	39.1	38.73	20	30	18.25	8.25	(6')sand, silt, gravel, (4')silty sand
66MW-01S	7/19/94			38.8	39.30	20	30	18.83	8.83	N/A
RMW-01S	11/19/91	194212.68	521792.02	34.2	34.87	15.61	25.61	22.94	12.94	(10')VF-M sand and silt
RMW-01I	11/19/91	194216.40	521783.27	33.8	34.66	32.00	42.00	5.4	-4.6	(10')VF sand and silt
RMW-01D	11/19/91	194215.07	521788.19	34.1	35.23	50.98	60.98	-13.8	-23.8	(10')VF sand and silt
RMW-02S	11/21/91			23.8	25.5	4.79	14.79	18.98	8.98	(10')silty sand
RMW-02D	11/21/91			23.7	25.55	19.7	29.7	4.03	-5.97	(10')VF sandy silt

EA Engineering, Science, and Technology

Well Number	Date Installed	Rhode Island Grid Coordinates		Ground Elevation (FAMSL)	Top of Riser Elevation (FAMSL)	Screen Depth (FBGS)		Screen Elevation (FAMSL)		Geological Unit Screened
		North	East			Top	Bottom	Top	Bottom	
RMW-03S	11/26/91	194871.39	522499.65	11.8	13.49	1.94	11.94	12.95	2.95	(10')F sand and silt
RMW-03D	11/26/91	194874.54	522487.88	11.6	13.64	23.8	33.8	-8.95	-18.95	(10')silty F sand
MW-Z3-01	12/22/95	194859.93	519008.51	41.5	43.80	81	91	-39.5	-49.5	(10')weathered rock
MW-Z3-02	12/29/95	195381.56	520879.35	37.2	36.67	50	60	-12.8	-22.8	(10')till
MW-Z3-03	12/21/95	193937.32	520481.59	38.1	40.00	54	64	-15.9	-25.9	(5')silt, (5')till
MW-Z4-01	12/18/95	193661.88	521498.15	38.9	40.77	74.5	84.5	-35.6	-45.6	(9')silt, (1')till
MW-Z4-02	12/18/95	193011.77	521599.46	32.0	34.19	50	65	-18	-33	(15')till

Wells installed by:
NMW (all): Sirrine,1987
ME (all): Metcalf & Eddy,1993
RMW (all): RIPA,1991
MW01-05 through 07, NETW: Halliburton NUS,1993
MW02 (all) and MW03-01 through MW03-08D: TRC, 1989-1993
MW03-08R through MW03-14: EA, 1995
25-MW-1, 26-MW (all), 66-MW-1: Halliburton NUS, 1994
MW01-08D through MW01-15D: EA, 1995
EA 101 - EA 109: EA, 1996
EA-106R, EA 110 - EA 113: EA, 1998
MW-Z3-01 through MW-Z4-02, Stone and Webster, 1995
MW01-15R, MW02-03R, MW03-03R, MW03-11R,
MW03-14R2, EA-104R, EA-105R, EA-107R, EA-108R,
EA-112R2, EA-113R, EA-114D/R, EA-116D/R/R2, EA 2000

NOTES:
FBGS: feet below ground surface
FAMSL: feet above mean sea level
N/A: Not available
VF: Very Fine
F: Fine
M: Medium
C: Coarse
◆well replacement from PVC to stainless steel due to high CVOC detected 5/95

TABLE 1-3
Analytical Program for Ground-Water Samples (December 1996)

Description	Method
Volatile Organics by GC/MS	SW 8260
Alkalinity by Titration (pH 4.5)	EPA 310.1
Sulfate (SO4) by IC	EPA 300.0
Total Bromide by IC	EPA 300.0
Total Chloride by IC	EPA 300.0
Nitrate (NO_3) by IC	EPA 300.0
Nitrite (NO_2) by IC	EPA 300.0
Orthophosphate (PO_4) by IC	EPA 300.0
BOD	EPA 405.1
Total Calcium by ICP	EPA 200.7
Total Magnesium by ICP	EPA 200.7
Total Iron	EPA 200.7
Total Manganese	EPA 200.7
Total Sodium by ICP	EPA 200.7
Total Potassium by ICP	EPA 200.7
Total Ammonia NH_3	EPA 350.2
Total Kjeldahl Nitrogen (TKN)	EPA 351.3
Total Organic Carbon (TOC)	EPA 415.2
Total Phosphorus	EPA 365.2
COD	EPA 410.4
Total Inorganic Carbon (TIC)	EPA 415.2
Hydrogen Sulfide	EPA 376.2
Dissolved Ferrous iron	Hach Kit DR/ 700 *Method 8146
Dissolved Hydrogen	GC with RGD
Methane / Ethane / Ethene	GC with FID
Dissolved Carbon dioxide	Hach Digital Titrator *Method 8205
	Hach Drop Count titr; color disc colorimetry
DO, pH, Eh, temperature, conductivity, *turbidity * not measured via Flow-Through Cell	EPA 150.1 YSI 3800 / Horiba U-10 or equivalent HACH Turbidimeter

Note:* Standard Method for the Examination of Water and Wastewater, published by the American Public Health Association (APHA), the American Water Works Association (AWWA) and the Water Pollution Control Federation (WPCF).
FID - Flame Ionization Detetctor
IC -
ICP - Inductively Coupled Plas
RGD - Reduced Gas Detector

TABLE 1-4
Analytical Program for Ground-Water Samples (March 1998)

Description	Method
Volatile Organics by GC/MS	SW 8260
Sulfate (SO4) by IC	EPA 300.0
Total Chloride by IC	EPA 300.0
Nitrate (NO_3) by IC	EPA 300.0
Nitrite (NO_2) by IC	EPA 300.0
Dissolved Iron	EPA 200.7
Dissolved Manganese	EPA 200.7
Total Ammonia NH_3	EPA 350.2
Total Organic Carbon (TOC)	EPA 415.2
Total Inorganic Carbon (TIC)	EPA 415.2
Hydrogen Sulfide	EPA 376.2
Dissolved Ferrous iron	Hach Kit DR/ 700 *Method 8146
Dissolved Hydrogen	GC with RGD
Methane / Ethane / Ethene	GC with FID
Dissolved Carbon dioxide	Hach Digital Titrator *Method 8205
	Hach Drop Count titr; color disc colorimetry
DO, pH, Eh, temperature, conductivity, *turbidity * not measured via Flow-Through Cell	EPA 150.1 YSI 3800 / Horiba U-10 or equivalent HACH Turbidimeter

Note: * Standard Method for the Examination of Water and Wastewater, published by the American Public Health Association (APHA), the American Water Works Association (AWWA) and the Water Pollution Control Federation (WPCF).

TABLE 2-1 Summary of Soil Gas Samples Results - 7 October 1999

Former PR-58 Nike Site
North Kingstown, RI

Sample	Time (hours)	Injection Volume (uL)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	m&p Xylene (ppm)	O-Xylene (ppm)	Methylene Chloride (ppm)	trans 1,2-DCE (ppm)	cis 1,2-DCE (ppm)	1,1,1-TCA (ppm)	Carbon Tetrachloride (ppm)	TCE (ppm)	PCE (ppm)	PCA (ppm)
SG-01-04	10:51	500	< 0.55	< 0.53	< 0.59	< 0.58	< 0.58	< 3.91	< 1.38	< 1.42	< 0.02	< 0.002	< 0.03	< 0.01	< 0.01
SG-01-08	11:17	500	< 0.55	< 0.53	< 0.59	< 0.58	< 0.58	< 3.91	< 1.38	< 1.42	< 0.02	< 0.002	< 0.03	< 0.01	< 0.01
SG-02-04	11:44	500	< 0.55	< 0.53	< 0.59	< 0.58	< 0.58	< 3.91	< 1.38	< 1.42	< 0.02	< 0.002	< 0.03	< 0.01	< 0.01
SG-02-08	12:10	500	< 0.55	< 0.53	< 0.59	< 0.58	< 0.58	< 3.91	< 1.38	< 1.42	< 0.02	< 0.002	< 0.03	< 0.01	< 0.01
SG-03-04	12:44	500	< 0.55	< 0.53	< 0.59	< 0.58	< 0.58	< 3.91	< 1.38	< 1.42	< 0.02	< 0.002	< 0.03	< 0.01	< 0.01
SG-03-08	13:11	500	< 0.55	< 0.53	< 0.59	< 0.58	< 0.58	< 3.91	< 1.38	< 1.42	< 0.02	< 0.002	< 0.03	< 0.01	< 0.01
SG-04-07	13:42	500	< 0.55	< 0.53	< 0.59	< 0.58	< 0.58	< 3.91	< 1.38	< 1.42	< 0.02	< 0.002	< 0.03	< 0.01	< 0.01
SG-05-08	14:46	500	< 0.55	< 0.53	< 0.59	< 0.58	< 0.58	< 3.91	< 1.38	< 1.42	< 0.02	< 0.002	< 0.03	< 0.01	< 0.01
SG-06-07	15:42	500	< 0.55	< 0.53	< 0.59	< 0.58	< 0.58	< 3.91	< 1.38	< 1.42	< 0.02	< 0.002	< 0.03	< 0.01	< 0.01
SG-06-07-DUP	16:07	500	< 0.55	< 0.53	< 0.59	< 0.58	< 0.58	< 3.91	< 1.38	< 1.42	< 0.02	< 0.002	< 0.03	< 0.01	< 0.01
SG-06-07-SPIK	16:32	250	24.0	30.6	20.7	54.9	30.6	203	375	201.0	2.29	0.74	4.27	1.12	ns
Syringe Blank	16:58	500	< 0.55	< 0.53	< 0.59	< 0.58	< 0.58	< 3.91	< 1.38	< 1.42	< 0.02	< 0.002	< 0.03	< 0.01	< 0.01

ns - constituent not spiked
ppm - parts per million

TABLE 2-2
Well Development Ground-Water Quality Field Data (July 2000)
Former PR-58 Nike Site
North Kingstown, RI

Well Number	Date	Total Gallons Pumped	Time	pH	Temp (°C)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Depth To Water (FTBTOC)	Observations
MW03-11R	7/10/00	170	1540	6.54	10.76	0.138	21.0	0.45	9.29	
MW03-14R2	7/17/00	55	1800	11.95	12.55	1.26	--	0.10	72.9	
MW01-10R	7/20/00	175	1200	7.62	12.64	0.194	12.0	0.25	33.28	
MW01-13R	7/20/00	180	1600	7.35	12.27	0.169	43.0	0.39	39.99	
MW01-15R	7/25/00	125	1300	8.41	14.18	0.239	29.3	1.38	38.31	
MW02-03R	7/25/00	180	1320	6.63	14.12	0.184	14.0	0.17	24.06	
MW03-03R	7/24/00	122	1300	6.63	13.68	0.168	3.93	0.27	16.73	
EA-104R	7/11/00	185	1530	6.30	11.17	0.102	30.0	0.13	13.89	
EA-105R	7/11/00	166	1345	5.73	10.69	0.115	8.21	4.58	8.87	
EA-107R	7/10/00	30	1625	9.18	13.08	0.267	146	0.87	53.06	
EA-108R	7/7/00	240	1330	6.78	12.39	0.217	23.7	7.86	34.22	
EA-112R2	7/13/00	195	1415	10.11	12.70	0.297	74.0	0.13	--	
EA-113R	7/13/00	165	1730	7.86	10.83	0.203	6.15	0.02	11.33	
EA-114D	7/17/00	110	1255	5.84	12.40	0.085	7.61	0.50	12.36	
EA-114R	7/17/00	90	1215	6.54	11.27	0.124	4.0	0.64	--	

Well Number	Date	Total Gallons Pumped	Time	pH	Temp (°C)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Depth To Water (FTBTOC)	Observations
EA-116D	7/12/00	130	1815	6.43	11.06	0.203	34.0	0.20	33.64	
EA-116R	7/13/00	165	1145	6.55	10.77	0.197	3.99	0.07	22.35	
EA-116R2	7/12/00	290	1830	11.71	10.75	0.540	0.33	0.27	31.69	

Notes:
Equipment used: Hydrolab Quanta (pH, Temp, Conductivity, Salinity, Dissolved Oxygen), Grundfos Redi-flow pump, and HF Scientific DRT 15CE (Turbidity)
NTU - Nephlometric Turbidity Units
mg/L - milligrams per liter
°C - degrees Celsius
mS/cm - millisiemens/centimeter
mV - millivolts
NM = Not Measured
* - Instrument Malfunction
# - Increased flow rate on pump

TABLE 2-3
Target Compound List of Semivolatile Organic Compounds

Acenaphthene	Di-n-Butylphthalate
Acenaphthylene	2,4-Dinitrotoluene
Anthracene	2,6-Dinitrotoluene
Azobenzene	4,6-Dinitro-2-methylphenol
Benzo(a)Anthracene	Fluoranthene
Benzo(b)Fluoranthene	Fluorene
Benzo(k)Fluoranthene	Hexachlorobenzene
Benzo(a)Pyrene	Hexachlorocyclobutadiene
Benzo(g,h,i)Perylene	Hexachlorocyclopentadiene
Benzidine	Hexachloroethane
Benzoic Acid	Indeno(1,2,3-cd)Pyrene
Benzyl alcohol	Isophorone
bis(2-chloroethyl) Ether	2-Methylphenol
bis(2-chloroethoxy) Methane	4-Methylphenol
bis(2-Ethylhexyl)Phthalate	2-Methylnaphthalene
4-Bromophenyl-phenylether	Naphthalene
Butylbenzylphthalate	Nitrobenzene
Carbazole	2-Nitroaniline
4-Chloroaniline	3-Nitroaniline
2-Chloronaphthalene	4-Nitroaniline
4-Chloro-3-Methylphenol	2-Nitrophenol
2-Chlorophenol	4-Nitrophenol
4-Chlorophenyl-phenylether	N-Nitroso-Di-n-Propylamine
Chrysene	N-Nitrosodiphenylamine
Dibenzo(a,h)Anthracene	N-Nitrosodimethylamine
Dibenzofuran	2,2'-oxybis(1-chloropropane)
1,3-Dichlorobenzene	Petachlorophenol
1,4-Dichlorobenzene	Phenol
1,2-Dichlorobenzene	Phenanthrene
3, 3'-Dichlorobenzidine	Pyrene
2,4-Dichlorophenol	Pyridine
Di-n-Octyl Phthalate	1,2,4-Trichlorobenzene
Diethylphthalate	1,2,4-Trichlorophenol
Dimethyl Phthalate	2,4,6-Trichlorophenol
2,4-Dimethylphenol	2,4,5-Trichlorophenol

Analytical Method SW8270

TABLE 2-4
Target Analyte List (TAL)

Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc

Analytical Method ILM03.0

TABLE 2-5
Analytical Program for USACE Ground-Water Samples (September - October 2000)
PR-58 Nike Site
NCBC Davisville, RI

Description	Method	Well locations
Volatile Organics by GC/MS	SW 5030B/8260B	All
Alkalinity by Titration (pH 4.5)	EPA 310.1	All
Sulfate (SO4) by IC	EPA 300.0	All
Sulfide	EPA 376.2	All
Total Chloride by IC	EPA 300.0	All
Nitrate (NO_3) by IC	EPA 353.2	All
Nitrite (NO_2) by IC	EPA 353.2	All
Total manganese	EPA SW6010B	All
Methane	RSK-175	All
TCL SVOC by GC/MS	SW-3520C/8270C	EA-114D/R
TAL Inorganics (cold vapor atomic absorbtion, detection limit <0.08 ug/L) Hg only	SW846 7470A	EA-104D/R, EA-106D/R, EA-112D/R/R2, EA-113D/R, EA-114D/R
TAL Inorganics (inductively coupled plasma)	SW 3010A/6010B	EA-104D/R, EA-106D/R, EA-112D/R/R2, EA-113D/R, EA-114D/R
Dissolved Ferrous iron	Hach Kit DR/ 700 *Method 8146	All
DO, pH, Eh, temperature, conductivity, *turbidity * not measured via Flow-Through Cell	EPA 150.1 YSI 600XL or equivalent Lamotte Turbidimeter or equivalent	All

Note:* Standard Method for the Examination of Water and Wastewater, published by the American Public Health Association (APHA), the American Water Works Association (AWWA) and the Water Pollution Control Federation (WPCF).
FID - Flame Ionization Detetctor
IC -
ICP - Inductively Coupled Plas
RGD - Reduced Gas Detector

TABLE 2-6
Analytical Program for Navy Ground-Water Samples (September - October 2000)
Study Areas 01 and 04, and Sites 02 and 03
NCBC Davisville, RI

Description	Method
Volatile Organics by GC/MS	SW 5030B/8260B
Alkalinity by Titration (pH 4.5)	EPA 310.1
Sulfate (SO4) by IC	EPA 300.0
Sulfide	EPA 376.2
Total Chloride by IC	EPA 300.0
Nitrate (NO_3) by IC	EPA 353.2
Nitrite (NO_2) by IC	EPA 353.2
Total manganese	EPA SW6010B
methane	RSK-175
Dissolved Ferrous iron	Hach Kit DR/ 700 *Method 8146
DO, pH, Eh, temperature, conductivity, *turbidity * not measured via Flow-Through Cell	EPA 150.1 YSI 600XL or equivalent Lamotte Turbidimeter or equivalent

Note:* Standard Method for the Examination of Water and Wastewater, published by the American Public Health Association (APHA), the American Water Works Association (AWWA) and the Water Pollution Control Federation (WPCF).
FID - Flame Ionization Detetctor
IC -
ICP - Inductively Coupled Plas
RGD - Reduced Gas Detector

TABLE 2-7
Ground-Water Quality Field Parameters Measured Prior to Well Sampling (September - October 2000)

Well Number	Date	Temperature (EC)	pH	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Eh (mV)	Fe^{++} (mg/L)
EA-101	10/3/00	13.36	5.87	0.200	0.79	1.0	108.0	2.55
EA-102	10/3/00	12.72	5.59	0.113	0.60	2.5	118.2	0.20
EA-103	10/4/00	12.77	5.73	0.153	0.93	0.4	261.2	NA
EA-104D	9/30/00	11.43	5.53	80	0.36	5	*	0.0
EA-104R	9/30/00	12.75	6.13	0.170	0.72	0	-85.7	>5.10
EA-105D	9/29/00	13.40	5.36	91	7.30	0	*	0.0
EA-105R	9/29/00	11.44	5.59	0.116	1.03	0	-31.3	>5.10
EA-106D	9/30/00	10.90	5.80	0.158	1.48	31.8	217.9	0.16
EA-106R	9/30/00	13.62	7.21	196	1.20	0	*	0.82
EA-107D	9/27/00	12.11	5.51	90	8.70	0.12	815	0.0
EA-107R	9/27/00	13.00	8.38	0.285	1.64	7.08	-405.4	1.09
EA-108D	9/27/00	14.66	5.29	92	5.83	0.8	*	0.04
EA-108R	9/27/00	14.51	6.90	0.253	3.07	8.0	-196.0	2.14
EA-109	10/3/00	14.58	6.05	0.197	0.67	5.0	-63.8	10.0
EA-110D	9/26/00	13.45	7.02	0.191	1.61	12.9	-189.2	>5.10
EA-110R	9/26/00	13.82	8.48	206	0.22	1	122.6	0.0
EA-111D	9/27/00	21.32	6.27	0.113	1.06	2.7	-16.1	>5.10
EA-111R	9/27/00	15.54	7.64	28.68	2.1	3.5	-97.6	>5.10
EA-112D	10/1/00	12.05	6.53	0.205	0.38	0.35	30.3	11.72
EA-112R	10/4/00	11.65	6.32	0.190	0.38	1.2	-81.4	10.92

Well Number	Date	Temperature (EC)	pH	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Eh (mV)	Fe^{++} (mg/L)
EA-112R2	10/1/00	12.24	9.70	0.202	0.36	3.8	-297.0	0.04
EA-113D	10/2/00	12.10	6.14	0.191	0.04	28	226.1	0.42
EA-113R	10/2/00	11.13	8.04	0.200	0.28	15	-311	0.82
EA-114D	10/4/00	14.00	5.47	0.114	0.98	4.0	119.4	1.92
EA-114R	10/4/00	12.82	6.87	0.155	0.35	4	-211.8	NA
EA-116D	9/28/00	11.48	6.60	0.242	0.99	>1000	-36.3	0.33
EA-116R	9/28/00	12.27	7.63	211	10.75	3	-434	2.54
EA-116R2	9/28/00	13.26	12.17	2.016	0.87	1.7	-81.5	0.66 (Dup 0.66)
MW01-08D	9/30/00	15.10	7.16	0.174	0	29	-39.2	>5.10
MW01-09D	9/30/00	16.11	6.40	0.194	2.41	6	-2	2.76
MW01-10D	10/3/00	13.72	6.10	0.164	0.19	1.2	-20.5	10.28
MW01-10R	10/3/00	14.90	7.83	0.199	0.99	7.5	-316.0	2.74
MW01-11D	10/1/00	16.89	6.45	0.191	0.24	9	-40.0	6.12
MW01-12D	10/1/00	15.32	5.57	0.167	0	27.4	-16.8	2.89 (Dup 2.64)
MW01-13D	9/27/00	13.85	6.34	0.165	12.40	250	-33.0	1.75
MW01-13R	9/27/00	12.66	7.19	0.18	0.14	41	-67.0	1.0
MW01-14D	9/27/00	14.34	6.37	0.19	0.65	9	-32.8	2.43
MW01-15D	9/30/00	13.95	6.22	150.0	0.23	17	149.0	1.17
MW01-15R	9/30/00	13.99	9.60	0.210	1.73	95	-488	0.26
MW02-03D	9/29/00	14.91	6.28	0.164	0.35	34	7.9	2.88
MW02-03R	9/29/00	14.03	6.60	0.231	0.70	7.95	-86.2	1.91
MW02-08D	10/3/00	17.15	5.75	0.111	0.49	29	299	0.06
MW02-10D	9/29/00	15.73	7.15	0.196	0	90	-16.4	>5.10

Well Number	Date	Temperature (EC)	pH	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Eh (mV)	Fe^{++} (mg/L)
MW02-11D	9/29/00	12.22	7.29	0.193	0	5	-13.1	>5.10
MW03-02D	9/30/00	17.11	6.26	0.167	0.59	3.6	-9.3	>5.10
MW03-03D	9/30/00	14.67	7.01	0.190	0.25	8	-13.6	>5.10
MW03-03R	9/30/00	13.89	6.42	0.175	0.16	3.1	-36.3	>5.10
MW03-05D	10/2/00	16.87	5.38	0.112	3.61	45	303.1	0.0
MW03-06D	10/2/00	16.49	5.93	0.139	0.34	220	-32	3.92
MW03-07D	10/2/00	19.25	5.17	0.129	5.13	21	231	1.14
MW03-08D	10/2/00	13.98	5.43	0.078	1.10	9.2	101.9	0.02
MW03-08R	10/2/00	14.50	6.31	0.231	0.91	1.43	-43.3	1.15
MW03-09D	10/3/00	13.45	6.48	0.187	0.58	5	57	3.16 (Dup 6.46)
MW03-10D	10/2/00	17.94	5.51	0.094	0.94	1.5	137.4	0.03
MW03-11R	10/4/00	11.58	6.28	0.130	0.12	2.7	-41.9	1.92
MW03-12D	10/2/00	11.62	6.63	0.247	2.28	1.6	249.0	3.93
MW03-12R	10/2/00	11.50	5.69	0.122	0.62	5	90	0.34
MW03-13D	10/3/00	10.66	5.95	0.153	0.57	2.9	-24.9	2.42
MW03-13R	10/3/00	11.31	6.19	0.196	1.14	1.0	21.8	1.49
MW03-14D	9/28/00	12.14	6.64	0.364	1.04	120	-170.9	>5.10
MW03.-14R	9/29/00	11.84	7.10	0.269	10.10	12	-140.2	2.25
MW03-14R2	9/28/00	13.40	12.30	2.367	1.07	1.4	-167.5	0.56 (Dup 0.50)
MW-Z3-01	10/3/00	12.12	6.41	0.186	0.20	4.7	-136.5	10.68
MW-Z3-02	9/29/00	14.76	6.37	0.180	0.74	196	-24.6	2.38
MW-Z3-03D	9/28/00	15.00	6.88	0.113	0.60	4.9	-34.9	>5.10
MW-Z4-01	9/28/00	17.84	7.43	0.118	0.27	*	-75.4	0.73

Well Number	Date	Temperature (EC)	pH	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Eh (mV)	Fe^{++} (mg/L)
MW-Z4-02	10/3/00	16.41	7.47	0.185	0.24	7.5	-258.0	2.97

NOTES: This table shows the last set of parameters measured before removal of flow through cell prior to sample collection.

NA = Data not available
BC = degrees Celsius
mg/L = milligrams per litre
mS/cm = millisiemens/centimeter
NTU = Nephlometric Turbidity Units
mV = millivolt
* = Instrument Malfunction
NA = data not available

Fe^{++} readings taken with DR2000 Direct Reading Spectrophotometer by Hach (1,10 Phenanthroline method)
All other readings taken with YSI Water Quality Meter with flow through cell.

TABLE 3-1 SUMMARY OF DEPTH TO and ELEVATION OF TOP OF GEOLOGICAL UNITS

Former PR-58 Nike Site and NCBC Davisville Study Areas 01 and 04, Sites 02 and 03
North Kingstown, RI

Well Designation	Elevation Ground Surface (ft MSL)	Fill		Sand		Silt		Other*		Sand & Gravel		Rock: Weathered		Rock: Competent		Total Depth	
		Depth (ft bg)	Elevation (ft MSL)	Depth (ft bg)	Elevation (ft MSL)	Depth (ft bg)	Elevation (ft MSL)	Depth (ft bg)	Elevation (ft MSL)	Depth (ft bg)	Elevation (ft MSL)	Depth (ft bg)	Elevation (ft MSL)	Depth (ft bg)	Elevation (ft MSL)	Depth (ft bg)	Elevation (ft MSL)
EA-101	30.8	0.0	30.8	2.5	28.3			14.0	16.8	19.0	11.8	21.0	9.8	33.5	-2.7	41.0	-10.2
EA-102	32.0			0.0	32.0					24.0	8.0			32.0	0.0	39.0	-7.0
EA-103	33.5			0.0	33.5					28.0	5.5	33.0	0.5	35.5	-2.0	43.0	-9.5
EA-104	35.9			0.0	35.9							64.0	-28.1	66.5	-30.6	74.0	-38.1
EA-104R	35.9													68.0	-32.1	96.0	-60.1
EA-105	30.6			0.0	30.6							24.0	6.6	30.5	0.1	37.5	-6.9
EA-105R	29.5													32.0	-2.5	60.0	-30.5
EA-106D	31.9			0.0	31.9					19.0	12.9	34.0	-2.1	40.3	-8.4	47.0	-15.1
EA-106R	31.5													42.1	-10.6	69.1	-37.6
EA-107	29.9			0.0	29.9					24.0	5.9			39.9	-10.0	47.0	-17.1
EA-107R	29.0													40.0	-11.0	68.4	-39.4
EA-108	32.2			0.0	32.2							24.0	8.2	29.5	2.7	36.0	-3.8
EA-108R	31.6													30.0	1.6	58.0	-26.4
EA-109	31.9			0.0	31.9					24.0	7.9	34.0	-2.1	35.3	-3.4	41.0	-9.1
EA-110D	38.1			0.0	38.1	74.0	-35.9			76.0	-37.9			84.5	-46.4	93.0	-54.9
EA-110R	37.5													82.0	-44.5	113.0	-75.5
EA-111D	33.9			0.0	33.9	39.0	-5.1			54.0	-20.1			64.9	-31.0	73.0	-39.1
EA-111R	33.9													62.0	-28.1	90.0	-56.1
EA-112D	45.9			0.0	45.9							79.0	-33.1	97.0	-51.1	102.0	-56.1
EA-112R	46.0													82.0	-36.0	126.3	-80.3
EA-112R2	45.2													102.0	-56.8	156.6	-111.4
EA-113D	28.7			0.0	28.7					24.0	4.7	36.0	-7.3	49.5	-20.8	55.0	-26.3
EA-113R	27.8													50.0	-22.2	80.0	-52.2
EA-114D	29.8													14.5	15.3	14.5	15.3
EA-114R	30.1			0.0	30.1					8.0	22.1			14.5	15.6	42.7	-12.6
EA-116D	44.0			0.0	44.0	62.0	-18.0	77.0	-33.0	66.0	-22.0			86.0	-42.0	86.0	-42.0
EA-116R	43.1													87.0	-43.9	117.0	-73.9
EA-116R2	44.0													89.0	-45.0	142.0	-98.0
MW01-10D	41.6			0.0	41.6	59.0	-17.4	44.5	-2.9	69.0	-27.4			82.0	-40.4	89.0	-47.4
MW01-10R	41.9													81.0	-39.1	115.0	-73.1
MW01-12D	36.4			0.0	36.4	14.0	22.4	24.0	12.4	49.0	-12.6			53.5	-17.1	59.0	-22.6
MW01-13D	24.7			0.0	24.7	44.0	-19.3			59.0	-34.3			75.0	-50.3	82.0	-57.3
MW01-13R	24.7													75.0	-50.3	105.0	-80.3
MW01-14D	36.2	0.0	36.2	2.0	34.2	59.0	-22.8			81.0	-44.8	89.0	-52.8	95.0	-58.8	100.0	-63.8
MW01-15D	32.8			0.0	32.8	39.5	-6.7	29.5	3.3	44.5	-11.7	49.0	-16.2	51.0	-18.2	56.3	-23.45
MW01-15R	32.9													53.0	-20.1	81.0	-48.1
MW02-03D	39.5			0.0	39.5	31.0	8.5							42.0	-2.5	52.5	-13.0
MW02-03R	39.3													42.5	-3.2	71.0	-31.7
MW02-07D	38.9	0.0	38.9			5.0	33.9	12.0	26.9	44.0	-5.1			51.0	-12.1	51.0	-12.1
MW02-08D	38.9	0.0	38.9	8.0	30.9	8.5	30.4	14.5	24.4	45.0	-6.1			46.5	-7.6	56.5	-17.6
MW02-10D	37.8	0.0	37.8	10.0	27.8	29.0	8.8	44.0	-6.2			48.0	-10.2	53.5	-15.7	53.5	-15.7
MW03-03D	36.4			0.0	36.4	34.0	2.4							58.5	-22.1	64.5	-28.1
MW03-03R	36.9													67.0	-30.1	95.0	-58.1
MW03-05D	38.3			0.0	38.3	34.0	4.3							47.5	-9.2	56.0	-17.7
MW03-06D	36.0	0.0	36.0	2.0	34.0	35.0	1.0					55.0	-19.0	61.5	-25.5	61.5	-25.5
MW03-07D	33.1			0.0	33.1	25.3	7.8			40.0	-6.9			45.0	-11.9	45.0	-11.9
MW03-08D	30.6			0.0	30.6					30.0	0.6	36.0	-5.4			39.0	-8.4
MW03-08R	30.3													42.2	-11.9	59.0	-28.7
MW03-09D	41.2			0.0	41.2	59.0	-17.8	24.0	17.2	62.0	-20.8			69.0	-27.8	74.0	-32.8
MW03-10D	34.0			0.0	34.0	12.0	22.0	29.0	5.0	44.0	-10.0	50.0	-16.0	51.0	-17.0	57.0	-23.0
MW03-11S	29.6			0.0	29.6					8.0	21.6	20.0	9.6	29	0.6	34.0	-4.4
MW03-11R	29.6													25	4.6	55.0	-25.4
MW03-12D	34.5			0.0	34.5					4.0	30.5	16.0	18.5	37	-2.5	41.0	-6.5
MW03-12R	34.2													36	-1.8	56.0	-21.8
MW03-13D	30.2			0.0	30.2			25.0	5.2			39.0	-8.8	42.5	-12.3	47.5	-17.3
MW03-13R	30.1															58.5	-28.4
MW03-14D	32.4			0.0	32.4							20.5	11.9	37.0	-4.6	42.0	-9.6
MW03-14R	32.3															57.5	-25.2
MW03-14R2	31.9													40	-8.1	93.0	-61.1
MW-Z3-1	41.5			0.0	41.5					49.0	-7.5	54.0	-12.5	97.0	-55.5	97.0	-55.5
MW-Z3-3	38.1			0.0	38.1	24.0	14.1			59.0	-20.9			64.5	-26.4	64.5	-26.4
MW-Z4-1	38.9			0.0	38.9	29.0	9.9			84.0	-45.1			85.0	-46.1	85.0	-46.1

NOTES: ft bg = feet below grade
MSL = Mean Sea Level

* Fine to very fine sand for EA-102, MW01-10D, MW01-12D, MW01-15D, MW02-08D, MW02-10D, MW03-09D, and MW03-10D.
Fine to coarse sand (with sand and silt lenses at 24'-26 bg and 39-41'bg) for MW02-07D. Fine to coarse sand (14.5'-25.0' bg) for MW02-08D.
Low blow count silty sandy gravel to gravelly sand for MW03-13D.
Sandy clay (~77-83.5 ft bg) and silty sand (83.5-86 ft bg; with heaving sand during drilling) for EA-116D.

TABLE 3-2 Summary of Borehole Fracture and Ground-Water Flow Data Interpreted from Geophysical Logs Former PR-58 Nike Site and NCBC Davisville Study Area 01, Sites 02 and 03 North Kingstown, RI

Well ID	Fracture Trend from Acoustic Televiewer Log										Depth of GW Flow Zones Interpreted from Heat Pulse Flow Meter Log (ft bgs)		Fracture Zones (ft bgs)	Depth of Steel Casing (ft bgs)	Depth of the Sampling Pump Intake (ft bgs)
	NE-SW		NW-SE		E-W		N-S		Horizontal						
	Number of Fractures	Depth of Open* Fractures (ft bgs)	Number of Fractures	Depth of Open* Fractures (ft bgs)	Number of Fractures	Depth of Open* Fractures (ft bgs)	Number of Fractures	Depth of Open* Fractures (ft bgs)	Number of Fractures	Depth of Open* Fractures (ft bgs)	Ambient Conditions	Pumped Conditions**			
Former PR-58 Nike Site Area															
EA-104R	7	72, 72.3, 87.6, 90.9, 92.5(?)	2		1		2		1	71.5	upward flow from near borehole bottom to 75-79	71.5	72-72.3, 88-91?	71	74
EA-105R	4	40.8, 41.1, 44	1				1	34.5			downward from 33.5-34.5 to 38-40	34.5	34.5~2 in., 40.8-41.1	33	39
EA-107R	4	50.8					1				NVFA	low from bottom up to pump		43	53
EA-108R	5	39.7	1				1		1		trace	39.7		32	40
EA-112R2	3										NVFA	limited flow from145-149		130	146
EA-113R	4	58.9, 71.6	1		1				1	57.5	NVFA	71.6, 58.9		55	67
EA-116R	7	91.3, 91.4, 104, 109.6, 109.7									none significant	~90	91.3~2 in., 109.6~2 in.	90	93
EA-116R2	5	132.4, 134.2, 134.4									NVFA	122-130 (125?)	120-126.5?, 134.2~2 in.	117	125
MW03-11R	6	43.2(?)			5	34.8, 35.3	2	50.5			small upward flow from borehole bottom and out through 35	35	34.8-35.3	29	35
Former NCBC Davisville Site 03 Area															
MW01-10R	8	96.4	5	111.5	2		1		1		NVFA	96.4, 110-112	109.6-112.4 (4 fractures)	85	98
MW01-13R	2	99.1, 99.2	1		7	80.4, 80.6, 82.4, 91.5, 91.6					flow upward from 94-98 and out at 80	80.5, 82.5, 94-98, 101	80.5~2 in., 91.5~2 in.	78	91.5
MW01-15R	4	72.4	2	60.8, 60.9	3	72.7	3				flow upward from bottom and out at 72.5	72.4, 77.2(?)	72.4-72.7	56	70
MW02-03R	1		1		3	47.7			1		very small downward flow	47.7		45.5	50
MW03-03R	4	75.4, 88.2, 88.7	4	72.5(?), 73.7, 74.7, 75.5			1	78.3(?)	2	70, 72.8(?)	very small flow	69.5	72.5-72.8, 74.7-75.4, 88.2-88.7	69	75

NOTES:

* Those fractures that are represented on both the "time travel" and "amplitude" plots of the Acoustic Televiewer Log.

** Depth from which most of the ground-water flow was interpreted to have come is listed first for each well where more than one depth interval is listed.

Geophysical logs are provided in Geophysical Applications, Inc., Reports: Borehole Geophysics Logging Report, Former PR-58 Nike Site, North Kingstown, RI, and Former NCBC Davisville Site, North Kingstown, RI, dated 13 and 3 December 2000, respectively.

ft bgs = feet below ground surface

NE-SW = northeast-southwest

NW-SE = northwest-southeast

E-W = east-west

N-S = north-south

NVFA = No vertical flow apparent

TABLE 3-3
Summary of Bedrock Field Data
Former PR-58 Nike Site and NCBC Davisville Study Area 01, Site 03
North Kingstown, RI

Well Designation	Screened Interval (ft bg)	Cored Interval (ft bg)	Core Recovery (%)	Core RQD (%)	Pack Test Water Loss (gals) & Depth Interval (ft bg)	Rock Type and Interval (ft bg)
EA-101	23.5-33.5	36-41	100	NA	Not Tested	Qtzt 36.0-37.5 Phyl 37.5-38.4 Qtzt 38.4-40.0 Phyl 40.0-41.0
EA-102	31.9-21.9	34.5-39.5	99	74	Not Tested	Qtzt 34.5-35.9 Phyl 35.9-37.0 Qtzt 37.0-37.6 Phyl 37.6-38.3 Qtzt 38.3-39.5
EA-103	25.5-35.5	38-43	96	74	Not Tested	Qtzt 38.0-41.6 Phyl 41.6-43.0
EA-104	56-66	69-74	93	42	Not Tested	Qtzt
EA-105	20-30	32.5-37.5	100	90	Not Tested	Phyl
EA-106	32-42	42-47	52	8	Not Tested	Phyl
EA-106R	59-69	45.1-50.1	65	23	34.4 (45.2-50.5)	Phyl
		50.1-55.1	99	35	12.3 (50.2-55.5)	Phyl
		55.1-59.1	100	88	38.8 (55.2-60.5)	Phyl
		60.1-64.1	100	83	48.4 (60.6-65.8)	Qtzt
		64.1-69.1	93	73	0.1 (60.6-69.2)	Qtzt
EA-107	31-42	42-47	90	52	Not Tested	Phyl

Well Designation	Screened Interval (ft bg)	Cored Interval (ft bg)	Core Recovery (%)	Core RQD (%)	Pack Test Water Loss (gals) & Depth Interval (ft bg)	Rock Type and Interval (ft bg)
EA-108	19.25-29.25	31-36	93	59	Not Tested	Schist/Phyl 31.0-33.2 Qtzt 33.2-34.4 Phyl 34.4-36.0
EA-109	26-36	36-41	100	10	Not Tested	Interbedded Qtzt &Phyl
EA-110R	88-113	88-93	97	86	2.0 (89.4-94.7')	Qtzt
		93-98	100	62	137.8 (94.4-99.7')	Qtzt
		98-103	100	92	100.6 (99.4-104.7')	Qtzt
		103-108	100	98	6.8 (104.4-109.7')	Qtzt
		108-113	100	84	4.0 (104'-113')	Qtzt
EA-111D	49.5-64.5	68-73	60	18	Not Tested	Qtzt
EA-111R	65-90	65-70	80	13	3.8 (66-71.3')	Qtzt
		70-75	100	59	0.8 (71-76.3')	Qtzt
		75-80	100	52	0.9 (76-81.3')	Qtzt
		80-85	100	53	6.0 (81.3-86.6')	Qtzt 80.0-83.2 Phyl 83.2-85.0
		85-90	100	47	7.8 (81.3-90')	Phyl
EA-112D	86-96	97-102	80	17	Not tested	Qtzt 97.0-98.2 Phyl 98.2-102.0
EA-112R	96.5-121.5	85-90	100	37	Not Tested	Qtzt 85.0-88.1 Phyl 88.1-90.0
		90-93.5	100	74	Not Tested	Qtzt
		96.3-101.3	100	90	Not Tested	Phyl 96.3-98.8 Qtzt/Phyl 98.8-101.3
		101.3-106.3	100	57	106.4 (99.25-104.55)	Qtzt 101.3-106.0 Phyl 106.0
		106.3-111.3	100	68	43.5 (104.25-109.55)	Phyl
		111.3-116.3	100	73	37.6 (109.25-114.55)	Phyl
		116.3-121.3	100	100	3.6 (114.55-119.8)	Qtzt/Phyl
		121.3-126.3	100	92	1.7 (114.55-126.3)	Qtzt/Phyl

Well Designation	Screened Interval (ft bg)	Cored Interval (ft bg)	Core Recovery (%)	Core RQD (%)	Pack Test Water Loss (gals) & Depth Interval (ft bg)	Rock Type and Interval (ft bg)
EA-113D	42.5-52.5	50-55	100	50	Not Tested	Phyl 50.0-52.0 Banded gneiss 52.0-55.0
MW01-08D	35-45	49-53	95	53	Not Tested	Qtzt
MW01-09D	37.5-41.5	43-48	100	100	Not Tested	Qtzt
MW01-10D	71-81	84-89	90	33	Not Tested	Qtzt 84.0-85.2 Phyl 85.2-89.0
MW01-11D	37-42	45-50	100	58	Not Tested	Phyl 45.0-45.8 Qtzt 45.8-50.0
MW01-12D	48-53	54-59	78	64	Not Tested	Qtzt
MW01-13D	64-74	77-82	50	20	Not Tested	Interbedded Qtzt and Phyl
MW01-14D	81-89	98-100	100	75	Not Tested	Phyl
MW01-15D	46-51	51.5-56.2	--	--	Not Tested	Mica Schist/Phyl
MW03-08R	46.5-56.5	44-49	100	72	Not Tested	Schist
		49-54	100	64	0 (47-52')	Schist/Phyl
		54-59	100	69	1.3 (51-56')	Phyl
MW03-09D	51-61	69-74	100	60	Not Tested	Schistosic gneiss
MW03-10D	39-49	52-57	100	0	Not Tested	Schist and Qtzt
MW03-11S	5-15	29-34	100	74	Not Tested	Qtzt (Schist)
MW03-12D	25-35	21-26	40	0	Not Tested	Phyl /Qtzt (Schist/gneiss)
		29-30	16	0	Not Tested	Phyl /Qtzt
		34.5-37	60	0	Not Tested	Phyl (Schist)
		37-42	82	62	Not Tested	Phyl (Schist)

Well Designation	Screened Interval (ft bg)	Cored Interval (ft bg)	Core Recovery (%)	Core RQD (%)	Pack Test Water Loss (gals) & Depth Interval (ft bg)	Rock Type and Interval (ft bg)
MW03-12R	45-55	41-46	100	80	0 (43-48')	Phyl /Qtzt (Schist gneiss)
		46-51	98	92	0 (47.7-52.7)	Phyl /Qtzt (Schist gneiss)
		51-56	100	38	0 (50.5-55.5)	Phyl /Qtzt (Schist gneiss)
MW03-13D	29-39	42.5-47.5	100	90	Not Tested	Qtzt w/Phyl (Schist)
MW03-13R		43.5-48.5	96	98	0 (44.9-49.9)	Qtzt 43.5-48.2 Phyl 48.2-48.5
		48.5-53.5	100	96	0.1 (45-50)	Qtzt 48.5-50.9 Phyl 50.9-51.2 Qtzt 51.2-53.5
		53.5-58.5	100	100	0 (49.9-54.9)	Qtzt
MW03-14D	30-40	37.0-40.9	100	15	Not Tested	Qtzt 37.0-40.3 Phyl 40.3-41.0
		40.9-41.8	100	0	Not Tested	Phyl
MW03-14R	47-57	43.5-47.5	100	60	* 0 (43.7-48.5)	Phyl
		47.5-52.5	100	66	31.2 (49.5-54.5)	Phyl 47.5-48.8 Qtzt 48.8-52.5 w/ 3 Phyl bands
		52.5-57.5	98	78	Not Tested	Qtzt w/ Phyl bands

NOTES:
ft bg = feet below grade
RQD = percentage of the core that is 4 inches or more in length.
* = Apparent leak at or around packer (s). Could not quantify loss to rock.
Qtzt = Quartzite
Phyl = Phyllite

TABLE 3-4
Summary of Depth to Ground-Water Measurements
Former PR-58 Nike and NCBC Davisville Study Area 01 and Sites 02 and 03
North Kingstown, RI

Well Number	Stickup Ft. AGS	Elev. Top of Riser (FAMSL)	Depth to Water (ft bgs)									
			11/30/94-12/01/94	04/27/95	05/31/95-6/2/95	10/3/95	11/17/95	7/18/96	12/96	12/97	2/98	07/26/00-07/28/00
NETW	0.1	32.23	16.68	14.13	N.M.	N.M.	15.95	N.M.	N.M.	N.M.	N.M.	N.M.
MW01-05S	2.5	35.26	19.58	17.11	17.26	19.63	19.20	N.M.	N.M.	19.02	N.M.	17.36
MW01-06S	-0.3	33.69	17.58	15.03	15.12	17.65	17.21	N.M.	N.M.	N.M.	N.M.	13.54
MW01-07S	1.0	33.92	17.76	15.02	15.19	17.89	17.20	N.M.	N.M.	N.M.	N.M.	15.20
MW01-08D	-0.6	37.50	N.I.	N.I.	N.I.	N.I.	19.27	N.M.	16.08	N.M.	15.94	16.70
MW01-09D	-0.5	39.18	N.I.	N.I.	N.I.	N.I.	21.88	N.M.	19.56	21.52	19.36	19.36
MW01-10S	1.5	42.73	N.I.	N.I.	N.I.	N.I.	23.37	N.M.	N.M.	22.89	N.M.	20.08
MW01-10D	1.3	42.88	N.I.	N.I.	N.I.	N.I.	23.63	20.86	19.76	23.30	19.46	20.82
MW01-10R	2.1	43.96	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	22.69
MW01-11D	-0.3	38.98	N.I.	N.I.	N.I.	N.I.	23.28	N.M.	21.00	22.94	20.66	21.17
MW01-12S	-0.3	36.01	N.I.	N.I.	N.I.	N.I.	19.15	N.M.	N.M.	18.91	N.M.	16.84
MW01-12D	-0.4	35.96	N.I.	N.I.	N.I.	N.I.	19.06	N.M.	16.02	18.77	15.74	16.91
MW01-13S	1.3	25.99	N.I.	N.I.	N.I.	N.I.	15.98	N.M.	N.M.	15.85	N.M.	15.65
MW01-13D	1.6	26.29	N.I.	N.I.	N.I.	N.I.	14.72	N.M.	12.80	14.59	12.37	13.61
MW01-13R	1.8	26.74	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	12.92
MW01-14S	1.2	37.38	N.I.	N.I.	N.I.	N.I.	24.15	N.M.	N.M.	23.95	N.M.	23.35
MW01-14D	1.4	37.62	N.I.	N.I.	N.I.	N.I.	23.84	N.M.	21.80	23.75	21.60	22.86
MW01-15D	-0.4	32.39	N.I.	N.I.	N.I.	N.I.	15.96	N.M.	13.32	15.73	12.70	14.19
MW01-15R	-0.5	32.88	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	14.84
MW02-01S	2.2	39.80	21.88	19.21	19.26	21.70	22.60	N.M.	N.M.	21.28	N.M.	N.M.
MW02-02S	2.8	43.42	29.55	26.01	26.03	28.67	28.22	N.M.	N.M.	N.M.	N.M.	N.M.
MW02-03S	3.1	42.61	27.14	25.27	25.31	27.19	27.50	N.M.	N.M.	26.71	N.M.	25.14
MW02-03D	1.7	41.23	25.71	23.87	23.91	25.77	25.66	N.M.	23.80	25.37	23.34	23.49
MW02-03R	1.8	41.11	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	23.83
MW02-04S	-0.3	38.19	19.74	18.47	18.42	20.54	19.60	N.M.	N.M.	19.13	N.M.	18.10
MW02-05S	-0.3	38.17	20.59	18.29	18.23	20.36	20.37	N.M.	N.M.	19.96	N.M.	17.92
MW02-06S	-0.4	36.98	19.45	17.20	17.11	N.M.	19.24	N.M.	N.M.	18.79	N.M.	16.83
MW02-08S	-0.3	38.64	21.05	18.70	18.62	20.80	20.89	N.M.	N.M.	20.49	N.M.	18.36
MW02-08D	-0.4	38.63	20.95	18.75	18.69	20.87	20.94	N.M.	18.41	20.55	DC?	18.43
MW02-09S	-0.6	37.93	20.00	17.50	17.46	19.75	19.74	N.M.	N.M.	19.24	N.M.	17.21
MW02-10S	-0.6	37.01	19.62	17.38	17.32	19.41	19.45	N.M.	N.M.	19.04	N.M.	17.03
MW02-10D	-0.4	37.36	20.09	17.80	17.77	19.85	19.86	N.M.	17.40	19.47	18.21	17.48
MW02-11S	2.2	40.22	23.30	21.27	21.26	23.11	23.18	N.M.	N.M.	22.75	N.M.	20.95
MW02-11D	2.0	40.04	22.94	20.87	20.88	22.78	22.80	N.M.	20.68	N.M.	20.27	20.63
MW03-01S	-0.4	36.61	18.20	15.30	15.30	17.88	17.47	N.M.	N.M.	N.M.	N.M.	N.M.
MW03-02S	2.2	38.37	19.95	16.97	16.98	19.59	19.64	N.M.	N.M.	19.14	N.M.	16.83
MW03-02D	2.4	38.57	20.13	17.21	17.25	19.88	19.89	17.32	17.04	N.M.	16.42	17.14
MW03-03S	2.0	38.36	19.75	16.84	16.88	19.51	19.48	N.M.	N.M.	18.98	N.M.	16.66
MW03-03D	2.0	38.43	19.84	16.95	16.99	19.62	19.59	17.01	16.77	19.10	16.16	16.89
MW03-03R	1.3	38.21	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	17.44
MW03-04S	-0.5	37.24	18.97	16.11	16.11	18.64	18.72	N.M.	N.M.	N.M.	N.M.	16.01
MW03-05S	-0.5	37.89	19.58	16.92	16.91	19.35	19.38	N.M.	N.M.	18.86	N.M.	16.76
MW03-05D	-0.4	37.87	19.68	16.94	16.95	19.38	19.44	N.M.	16.50	18.95	16.32	16.82
MW03-06D	2.2	38.19	19.13	16.13	16.25	19.09	18.86	16.16	15.31	18.45	15.24	16.21
MW03-07D	2.3	35.41	16.07	12.90	13.07	16.10	N.M.	12.95	12.21	15.32	11.99	13.10
MW03-08D	2.1	32.74	13.05	9.54	9.85	13.26	N.M.	N.M.	8.62	12.30	8.36	10.18
MW03-08R	1.9	32.15	N.I.	N.I.	9.31	12.57	N.M.	9.11	N.M.	11.61	7.67	9.99
MW03-09D	2.2	43.40	N.I.	N.I.	20.34	23.76	N.M.	20.60	19.89	N.M.	19.57	20.51

TABLE 3-4
Summary of Depth to Ground-Water Measurements
Former PR-58 Nike and NCBC Davisville Study Area 01 and Sites 02 and 03
North Kingstown, RI

Well Number	Stickup Ft. AGS	Elev. Top of Riser (FAMSL)	Elevation of Water Surface (FAMSL)									
			11/30/94-12/01/94	04/27/95	05/31/95-6/2/95	10/3/95	11/17/95	7/18/96	12/96	12/97	2/98	07/26/00-07/28/00 01/10/01*
NETW	0.1	32.23	15.55	18.10	N.M.	N.M.	16.28	N.M.	N.M.	N.M.	N.M.	N.M.
MW01-05S	2.5	35.26	15.68	18.15	18.00	15.63	16.06	N.M.	N.M.	16.24	N.M.	17.90
MW01-06S	-0.3	33.69	16.11	18.66	18.57	16.04	16.48	N.M.	N.M.	N.M.	N.M.	20.15
MW01-07S	1.0	33.92	16.16	18.90	18.73	16.03	16.72	N.M.	N.M.	N.M.	N.M.	18.72
MW01-08D	-0.6	37.50	N.I.	N.I.	N.I.	N.I.	18.23	N.M.	21.42	N.M.	21.56	20.80
MW01-09D	-0.5	39.18	N.I.	N.I.	N.I.	N.I.	17.30	N.M.	19.62	17.66	19.82	19.82
MW01-10S	1.5	42.73	N.I.	N.I.	N.I.	N.I.	19.36	N.M.	N.M.	19.84	N.M.	22.65
MW01-10D	1.3	42.88	N.I.	N.I.	N.I.	N.I.	19.25	22.02	23.12	19.58	23.42	22.06
MW01-10R	2.1	43.96	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	21.27
MW01-11D	-0.3	38.98	N.I.	N.I.	N.I.	N.I.	15.70	N.M.	17.98	16.04	18.32	17.81
MW01-12S	-0.3	36.01	N.I.	N.I.	N.I.	N.I.	16.86	N.M.	N.M.	17.10	N.M.	19.17
MW01-12D	-0.4	35.96	N.I.	N.I.	N.I.	N.I.	16.90	N.M.	19.94	17.19	20.22	19.05
MW01-13S	1.3	25.99	N.I.	N.I.	N.I.	N.I.	10.01	N.M.	N.M.	10.14	N.M.	10.34
MW01-13D	1.6	26.29	N.I.	N.I.	N.I.	N.I.	11.57	N.M.	13.49	11.70	13.92	12.68
MW01-13R	1.8	26.74	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	13.82
MW01-14S	1.2	37.38	N.I.	N.I.	N.I.	N.I.	13.23	N.M.	N.M.	13.43	N.M.	14.03
MW01-14D	1.4	37.62	N.I.	N.I.	N.I.	N.I.	13.78	N.M.	15.82	13.87	16.02	14.76
MW01-15D	-0.4	32.39	N.I.	N.I.	N.I.	N.I.	16.43	N.M.	19.07	16.66	19.69	18.20
MW01-15R	-0.5	32.88	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	18.04
MW02-01S	2.2	39.80	17.92	20.59	20.54	18.10	17.20	N.M.	N.M.	18.52	N.M.	N.M.
MW02-02S	2.8	43.42	13.87	17.41	17.39	14.75	15.20	N.M.	N.M.	N.M.	N.M.	N.M.
MW02-03S	3.1	42.61	15.47	17.34	17.30	15.42	15.11	N.M.	N.M.	15.90	N.M.	17.47
MW02-03D	1.7	41.23	15.52	17.36	17.32	15.46	15.57	N.M.	17.43	15.86	17.89	17.74
MW02-03R	1.8	41.11	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	17.28
MW02-04S	-0.3	38.19	18.45	19.72	19.77	17.65	18.59	N.M.	N.M.	19.06	N.M.	20.09
MW02-05S	-0.3	38.17	17.58	19.88	19.94	17.81	17.80	N.M.	N.M.	18.21	N.M.	20.25
MW02-06S	-0.4	36.98	17.53	19.78	19.87	N.M.	17.74	N.M.	N.M.	18.19	N.M.	20.15
MW02-08S	-0.3	38.64	17.59	19.94	20.02	17.84	17.75	N.M.	N.M.	18.15	N.M.	20.28
MW02-08D	-0.4	38.63	17.68	19.88	19.94	17.76	17.69	N.M.	20.22	18.08	DC?	20.20
MW02-09S	-0.6	37.93	17.93	20.43	20.47	18.18	18.19	N.M.	N.M.	18.69	N.M.	20.72
MW02-10S	-0.6	37.01	17.39	19.63	19.69	17.60	17.56	N.M.	N.M.	17.97	N.M.	19.98
MW02-10D	-0.4	37.36	17.27	19.56	19.59	17.51	17.50	N.M.	19.96	17.89	19.15	19.88
MW02-11S	2.2	40.22	16.92	18.95	18.96	17.11	17.04	N.M.	N.M.	17.47	N.M.	19.27
MW02-11D	2.0	40.04	17.10	19.17	19.16	17.26	17.24	N.M.	19.36	N.M.	19.77	19.41
MW03-01S	-0.4	36.61	18.41	21.31	21.31	18.73	19.14	N.M.	N.M.	N.M.	N.M.	N.M.
MW03-02S	2.2	38.37	18.42	21.40	21.39	18.78	18.73	N.M.	N.M.	19.23	N.M.	21.54
MW03-02D	2.4	38.57	18.44	21.36	21.32	18.69	18.68	21.25	21.53	N.M.	22.15	21.43
MW03-03S	2.0	38.36	18.61	21.52	21.48	18.85	18.88	N.M.	N.M.	19.38	N.M.	21.70
MW03-03D	2.0	38.43	18.59	21.48	21.44	18.81	18.84	21.42	21.66	19.33	22.27	21.54
MW03-03R	1.3	38.21	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	20.77
MW03-04S	-0.5	37.24	18.27	21.13	21.13	18.60	18.52	N.M.	N.M.	N.M.	N.M.	21.23
MW03-05S	-0.5	37.89	18.31	20.97	20.98	18.54	18.51	N.M.	N.M.	19.03	N.M.	21.13
MW03-05D	-0.4	37.87	18.19	20.93	20.92	18.49	18.43	N.M.	21.37	18.92	21.55	21.05
MW03-06D	2.2	38.19	19.06	22.06	21.94	19.10	19.33	22.03	22.88	19.74	22.95	21.98
MW03-07D	2.3	35.41	19.34	22.51	22.34	19.31	N.M.	22.46	23.20	20.09	23.42	22.31
MW03-08D	2.1	32.74	19.69	23.20	22.89	19.48	N.M.	N.M.	24.12	20.44	24.38	22.56
MW03-08R	1.9	32.15	N.I.	N.I.	22.84	19.58	N.M.	23.04	N.M.	20.54	24.48	22.16
MW03-09D	2.2	43.40	N.I.	N.I.	23.06	19.64	N.M.	22.80	23.51	N.M.	23.83	22.89

TABLE 3-4
Summary of Depth to Ground-Water Measurements
Former PR-58 Nike and NCBC Davisville Study Area 01 and Sites 02 and 03
North Kingstown, RI

Well Number	Stickup Ft. AGS	Elev. Top of Riser (FAMSL)	Depth to Water (ft bgs)									
			11/30/94-12/01/94	04/27/95	05/31/95-6/2/95	10/3/95	11/17/95	7/18/96	12/96	12/97	2/98	07/26/00-07/28/00
MW03-10D	1.9	35.94	N.I.	N.I.	13.96	16.79	N.M.	13.78	13.02	N.M.	12.81	13.92
MW03-11R	1.4	30.98	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	9.76
MW03-11S	1.4	31.02	N.I.	N.I.	8.57	11.88	N.M.	8.54	N.M.	10.78	N.M.	9.07
MW03-12D	1.6	36.11	N.I.	N.I.	12.05	15.91	N.M.	12.34	10.62	15.42	10.38	12.84
MW03-12R	2.0	36.21	N.I.	N.I.	12.40	16.22	N.M.	12.61	N.M.	15.16	10.65	13.38
MW03-13D	2.4	32.56	N.I.	N.I.	9.26	12.82	N.M.	9.28	7.92	11.86	7.81	9.78
MW03-13R	2.3	32.38	N.I.	N.I.	9.34	12.71	N.M.	9.16	N.M.	11.76	7.56	9.96
MW03-14D	1.6	34.00	N.I.	N.I.	8.98	13.36	N.M.	9.27	7.05	11.95	6.47	10.01
MW03-14R	1.7	33.98	N.I.	N.I.	8.95	13.37	N.M.	9.25	N.M.	11.86	6.06	9.73
MW03-14R2	1.5	33.35	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	10.72
MW-Z3-01	2.3	43.80	N.I.	N.I.	N.I.	N.I.	N.I.	19.98	17.88	22.92	N.M.	20.01
MW-Z3-02	-0.5	36.67	N.I.	N.I.	N.I.	N.I.	N.I.	N.M.	20.67	N.M.	19.63	21.21
MW-Z3-03D	1.9	40.00	N.I.	N.I.	N.I.	N.I.	N.I.	N.M.	19.26	22.59	19.26	19.79
MW-Z4-01	1.9	40.77	N.I.	N.I.	N.I.	N.I.	N.I.	N.M.	22.76	23.82	22.35	22.88
MW-Z4-02	2.2	34.18	N.I.	N.I.	N.I.	N.I.	N.I.	N.M.	N.M.	N.M.	15.94	16.72
RMW-01S	-0.4	38.20	N.M.	N.M.	18.63	21.16	19.55	N.M.	N.M.	19.49	N.M.	19.25
RMW-01I	0.8	38.20	N.M.	N.M.	18.69	20.96	19.23	N.M.	N.M.	N.M.	N.M.	19.15
RMW-01D	1.1	38.26	N.M.	N.M.	19.34	21.41	19.81	N.M.	17.90	N.M.	17.65	19.61
RMW-02S	1.7	25.50	N.M.	N.M.	8.48	11.15	N.M.	N.M.	N.M.	N.M.	N.M.	N.M.
RMW-02D	1.9	25.55	N.M.	N.M.	8.46	11.11	N.M.	N.M.	6.00	N.M.	5.56	N.M.
RMW-03S	1.7	16.67	N.M.	N.M.	3.69	6.63	N.M.	N.M.	N.M.	N.M.	N.M.	N.M.
RMW-03D	2.0	16.82	N.M.	N.M.	3.36	6.90	N.M.	N.M.	N.M.	N.M.	1.81	N.M.
PGU-Z2-07	N.M.	29.49	N.I.	N.I.	N.I.	N.M.	N.M.	N.M.	N.M.	N.M.	4.95	N.M.
PGU-Z2-08D	2.4	27.70	N.I.	N.I.	N.I.	N.M.	N.M.	N.M.	N.M.	N.M.	8.22	9.42
PGU-Z3=1	N.M.	43.49	N.I.	N.I.	N.I.	23.09	N.M.	19.65	N.M.	22.65	17.29	19.49
PGU-Z3-2	N.M.	42.35	N.I.	N.I.	N.I.	23.23	23.20	N.M.	N.M.	22.83	18.81	20.01
PGU-Z3-3S	N.M.	15.41	N.I.	N.I.	N.I.	12.04	11.24	N.M.	N.M.	11.37	N.M.	11.39
PGU-Z3-3D	N.M.	15.19	N.I.	N.I.	N.I.	11.55	10.70	N.M.	N.M.	N.M.	9.70	10.78
PGU-Z3-5	N.M.	37.52	N.I.	N.I.	N.I.	18.92	N.M.	N.M.	N.M.	18.17	15.51	16.30
PGU-Z3-6	N.M.	40.73	N.I.	N.I.	N.I.	22.83	22.81	N.M.	N.M.	21.33	20.22	20.53
PGU-Z3-7S	N.M.	31.66	N.I.	N.I.	N.I.	14.55	N.M.	N.M.	N.M.	N.M.	N.M.	12.87
PGU-Z3-7D	N.M.	31.89	N.I.	N.I.	N.I.	14.80	N.M.	N.M.	N.M.	N.M.	12.65	13.10
PGU-Z3-8	N.M.	40.49	N.I.	N.I.	N.I.	24.83	24.69	N.M.	N.M.	24.36	22.46	23.05
PGU-Z3-9S	N.M.	20.31	N.I.	N.I.	N.I.	12.17	N.M.	N.M.	N.M.	10.56	N.M.	10.14
PGU-Z3-9D	N.M.	20.21	N.I.	N.I.	N.I.	12.82	N.M.	N.M.	N.M.	N.M.	8.27	10.99
PGU-Z3-10S	N.M.	42.80	N.I.	N.I.	N.I.	28.24	N.M.	N.M.	N.M.	N.M.	N.M.	26.24
PGU-Z3-10D	N.M.	42.79	N.I.	N.I.	N.I.	28.22	N.M.	N.M.	N.M.	N.M.	25.07	26.32
PGU-Z3-11	N.M.	27.43	N.I.	N.I.	N.I.	10.85	N.M.	N.M.	N.M.	N.M.	7.90	9.27
PGU-Z4-01	N.M.	38.14	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	20.22	22.88
PGU-Z4-02	N.M.	31.44	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	13.62	N.M.
PGU-Z4-03D	N.M.	28.71	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	11.97	13.25
EA-101	1.5	32.29	N.I.	N.I.	N.I.	N.I.	N.I.	7.39	5.10	10.20	4.62	8.35
EA-102	1.4	33.37	N.I.	N.I.	N.I.	N.I.	N.I.	8.32	6.07	N.M.	N.M.	9.38
EA-103	1.6	35.13	N.I.	N.I.	N.I.	N.I.	N.I.	10.46	8.15	13.45	7.72	11.15
EA-104	1.5	37.40	N.I.	N.I.	N.I.	N.I.	N.I.	13.22	11.15	16.24	10.81	13.43
EA-104R	1.7	37.54	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	15.10
EA-105	1.3	31.95	N.I.	N.I.	N.I.	N.I.	N.I.	7.66	5.22	9.39	4.71	8.96
EA-105R	1.6	31.15	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	8.16

TABLE 3-4
Summary of Depth to Ground-Water Measurements
Former PR-58 Nike and NCBC Davisville Study Area 01 and Sites 02 and 03
North Kingstown, RI

Well Number	Stickup Ft. AGS	Elev. Top of Riser (FAMSL)	Elevation of Water Surface (FAMSL)									
			11/30/94-12/01/94	04/27/95	05/31/95-6/2/95	10/3/95	11/17/95	7/18/96	12/96	12/97	2/98	07/26/00-07/28/00 01/10/01*
MW03-10D	1.9	35.94	N.I.	N.I.	21.98	19.15	N.M.	22.16	22.92	N.M.	23.13	22.02
MW03-11R	1.4	30.98	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	21.22
MW03-11S	1.4	31.02	N.I.	N.I.	22.45	19.14	N.M.	22.48	N.M.	20.24	N.M.	21.95
MW03-12D	1.6	36.11	N.I.	N.I.	24.06	20.20	N.M.	23.77	25.49	20.69	25.73	23.27
MW03-12R	2.0	36.21	N.I.	N.I.	23.81	19.99	N.M.	23.60	N.M.	21.05	25.56	22.83
MW03-13D	2.4	32.56	N.I.	N.I.	23.30	19.74	N.M.	23.28	24.64	20.70	24.75	22.78
MW03-13R	2.3	32.38	N.I.	N.I.	23.04	19.67	N.M.	23.22	N.M.	20.62	24.82	22.42
MW03-14D	1.6	34.00	N.I.	N.I.	25.02	20.64	N.M.	24.73	26.95	22.05	27.53	23.99
MW03-14R	1.7	33.98	N.I.	N.I.	25.03	20.61	N.M.	24.73	N.M.	22.12	27.92	24.25
MW03-14R2	1.5	33.35	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	22.63
MW-Z3-01	2.3	43.80	N.I.	N.I.	N.I.	N.I.	N.I.	23.82	25.92	20.88	N.M.	23.79
MW-Z3-02	-0.5	36.67	N.I.	N.I.	N.I.	N.I.	N.I.	N.M.	16.00	N.M.	17.04	15.46
MW-Z3-03D	1.9	40.00	N.I.	N.I.	N.I.	N.I.	N.I.	N.M.	20.74	17.41	20.74	20.21
MW-Z4-01	1.9	40.77	N.I.	N.I.	N.I.	N.I.	N.I.	N.M.	18.01	16.95	18.42	17.89
MW-Z4-02	2.2	34.18	N.I.	N.I.	N.I.	N.I.	N.I.	N.M.	N.M.	N.M.	18.24	17.46
RMW-01S	-0.4	38.20	N.M.	N.M.	19.57	17.04	18.65	N.M.	N.M.	18.71	N.M.	18.95
RMW-01I	0.8	38.20	N.M.	N.M.	19.51	17.24	18.97	N.M.	N.M.	N.M.	N.M.	19.05
RMW-01D	1.1	38.26	N.M.	N.M.	18.92	16.85	18.45	N.M.	20.36	N.M.	20.61	18.65
RMW-02S	1.7	25.50	N.M.	N.M.	17.02	14.35	N.M.	N.M.	N.M.	N.M.	N.M.	N.M.
RMW-02D	1.9	25.55	N.M.	N.M.	17.09	14.44	N.M.	N.M.	19.55	N.M.	19.99	N.M.
RMW-03S	1.7	16.67	N.M.	N.M.	12.98	10.04	N.M.	N.M.	N.M.	N.M.	N.M.	N.M.
RMW-03D	2.0	16.82	N.M.	N.M.	13.46	9.92	N.M.	N.M.	N.M.	N.M.	15.01	N.M.
PGU-Z2-07	N.M.	29.49	N.I.	N.I.	N.I.	N.M.	N.M.	N.M.	N.M.	N.M.	24.54	N.M.
PGU-Z2-08D	2.4	27.70	N.I.	N.I.	N.I.	N.M.	N.M.	N.M.	N.M.	N.M.	19.48	18.28
PGU-Z3-1	N.M.	43.49	N.I.	N.I.	N.I.	20.40	N.M.	23.84	N.M.	20.84	26.20	24.00
PGU-Z3-2	N.M.	42.35	N.I.	N.I.	N.I.	19.12	19.15	N.M.	N.M.	19.52	23.54	22.34
PGU-Z3-3S	N.M.	15.41	N.I.	N.I.	N.I.	3.37	4.17	N.M.	N.M.	4.04	N.M.	4.02
PGU-Z3-3D	N.M.	15.19	N.I.	N.I.	N.I.	3.64	4.49	N.M.	N.M.	N.M.	5.49	4.41
PGU-Z3-5	N.M.	37.52	N.I.	N.I.	N.I.	18.60	N.M.	N.M.	N.M.	19.35	22.01	21.22
PGU-Z3-6	N.M.	40.73	N.I.	N.I.	N.I.	17.90	17.92	N.M.	N.M.	19.40	20.51	20.20
PGU-Z3-7S	N.M.	31.66	N.I.	N.I.	N.I.	17.11	N.M.	N.M.	N.M.	N.M.	N.M.	18.79
PGU-Z3-7D	N.M.	31.89	N.I.	N.I.	N.I.	17.09	N.M.	N.M.	N.M.	N.M.	19.24	18.79
PGU-Z3-8	N.M.	40.49	N.I.	N.I.	N.I.	15.66	15.80	N.M.	N.M.	16.13	18.03	17.44
PGU-Z3-9S	N.M.	20.31	N.I.	N.I.	N.I.	8.14	N.M.	N.M.	N.M.	9.75	N.M.	10.17
PGU-Z3-9D	N.M.	20.21	N.I.	N.I.	N.I.	7.39	N.M.	N.M.	N.M.	N.M.	11.94	9.22
PGU-Z3-10S	N.M.	42.80	N.I.	N.I.	N.I.	14.56	N.M.	N.M.	N.M.	N.M.	N.M.	16.56
PGU-Z3-10D	N.M.	42.79	N.I.	N.I.	N.I.	14.57	N.M.	N.M.	N.M.	N.M.	17.72	16.47
PGU-Z3-11	N.M.	27.43	N.I.	N.I.	N.I.	16.58	N.M.	N.M.	N.M.	N.M.	19.53	18.16
PGU-Z4-01	N.M.	38.14	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	17.92	15.26
PGU-Z4-02	N.M.	31.44	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	17.82	N.M.
PGU-Z4-03D	N.M.	28.71	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	16.74	15.46
EA-101	1.5	32.29	N.I.	N.I.	N.I.	N.I.	N.I.	24.90	27.19	22.09	27.67	23.94
EA-102	1.4	33.37	N.I.	N.I.	N.I.	N.I.	N.I.	25.05	27.30	N.M.	N.M.	23.99
EA-103	1.6	35.13	N.I.	N.I.	N.I.	N.I.	N.I.	24.67	26.98	21.68	27.41	23.98
EA-104	1.5	37.40	N.I.	N.I.	N.I.	N.I.	N.I.	24.18	26.25	21.16	26.59	23.97
EA-104R	1.7	37.54	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	22.44
EA-105	1.3	31.95	N.I.	N.I.	N.I.	N.I.	N.I.	24.29	26.73	22.56	27.24	22.99
EA-105R	1.6	31.15	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	22.99

TABLE 3-4
Summary of Depth to Ground-Water Measurements
Former PR-58 Nike and NCBC Davisville Study Area 01 and Sites 02 and 03
North Kingstown, RI

Well Number	Stickup Ft. AGS	Elev. Top of Riser (FAMSL)	Depth to Water (ft bgs)									
			11/30/94-12/01/94	04/27/95	05/31/95-6/2/95	10/3/95	11/17/95	7/18/96	12/96	12/97	2/98	07/26/00-07/28/00
EA-106D	1.3	33.17	N.I.	N.I.	N.I.	N.I.	N.I.	8.33	5.80	11.59	5.11	8.85
EA-106R	2.3	33.84	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	5.59	7.00
EA-107D	1.5	31.34	N.I.	N.I.	N.I.	N.I.	N.I.	7.96	5.66	9.13	5.52	9.26
EA-107R	1.3	30.37	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	8.07
EA-108D	1.3	33.50	N.I.	N.I.	N.I.	N.I.	N.I.	8.21	5.82	10.52	5.64	9.90
EA-108R	1.2	32.79	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	8.78
EA-109D	1.5	33.39	N.I.	N.I.	N.I.	N.I.	N.I.	8.26	6.54	10.73	5.62	9.62
EA-110D	2.1	40.15	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	22.23	23.71
EA-110R	2.2	39.71	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	21.81	22.74
EA-111D	2.0	35.91	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	15.21	15.96
EA-111R	1.8	35.71	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	15.13	16.61
EA-112D	2.2	48.06	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	22.58	24.79
EA-112R	2.5	48.52	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	22.85	25.90
EA-112R2	1.3	46.54	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	24.29
EA-113D	2.7	31.42	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	3.31	7.56
EA-113R	1.5	29.31	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	6.71
EA-114D	2.3	32.03	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	9.06
EA-114R	1.5	31.67	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	7.64
EA-116D	1.6	45.51	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	23.64
EA-116R	1.0	44.15	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	23.11
EA-116R2	1.5	45.58	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	24.22
ME-1	1.5	32.27	N.M.	6.63	7.50	11.68	N.M.	7.59	N.M.	N.M.	N.M.	9.11
ME-2	2.1	37.31	N.M.	12.69	13.04	16.95	N.M.	13.37	N.M.	N.M.	N.M.	N.M.
ME-3	1.5	34.90	N.M.	8.61	9.64	14.44	N.M.	10.08	N.M.	N.M.	N.M.	N.M.
ME-4	1.6	34.63	N.M.	9.51	10.36	15.17	N.M.	11.06	N.M.	N.M.	N.M.	N.M.
NMW-1	1.7	34.23	N.M.	7.00	8.66	13.05	N.M.	8.75	N.M.	11.27	N.M.	10.39
NMW-2	1.7	35.08	N.M.	N.M.	9.54	14.00	N.M.	9.72	N.M.	12.77	N.M.	10.90
NMW-3	1.9	35.01	N.M.	N.M.	N.M.	N.M.	N.M.	N.M.	N.M.	N.M.	N.M.	N.M.
NMW-4	1.9	32.59	N.M.	6.30	7.11	11.62	N.M.	7.36	N.M.	N.M.	N.M.	N.M.

TABLE 3-4
Summary of Depth to Ground-Water Measurements
Former PR-58 Nike and NCBC Davisville Study Area 01 and Sites 02 and 03
North Kingstown, RI

Well Number	Stickup Ft. AGS	Elev. Top of Riser (FAMSL)	Elevation of Water Surface (FAMSL)									
			11/30/94-12/01/94	04/27/95	05/31/95-6/2/95	10/3/95	11/17/95	7/18/96	12/96	12/97	2/98	07/26/00-07/28/00 01/10/01*
EA-106D	1.3	33.17	N.I.	N.I.	N.I.	N.I.	N.I.	24.84	27.37	21.58	28.06	24.32
EA-106R	2.3	33.84	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	28.25	26.84
EA-107D	1.5	31.34	N.I.	N.I.	N.I.	N.I.	N.I.	23.38	25.68	22.21	25.82	22.08
EA-107R	1.3	30.37	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	22.30
EA-108D	1.3	33.50	N.I.	N.I.	N.I.	N.I.	N.I.	25.29	27.68	22.98	27.86	23.60
EA-108R	1.2	32.79	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	24.01
EA-109D	1.5	33.39	N.I.	N.I.	N.I.	N.I.	N.I.	25.13	26.85	22.66	27.77	23.77
EA-110D	2.1	40.15	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	17.92	16.44
EA-110R	2.2	39.71	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	17.90	16.97
EA-111D	2.0	35.91	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	20.70	19.95
EA-111R	1.8	35.71	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	20.58	19.10
EA-112D	2.2	48.06	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	25.48	23.27
EA-112R	2.5	48.52	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	25.67	22.62
EA-112R2	1.3	46.54	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	22.25
EA-113D	2.7	31.42	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	28.11	23.86
EA-113R	1.5	29.31	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	22.60
EA-114D	2.3	32.03	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	22.97
EA-114R	1.5	31.67	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	24.03
EA-116D	1.6	45.51	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	21.87
EA-116R	1.0	44.15	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	21.04
EA-116R2	1.5	45.58	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	N.I.	21.36
ME-1	1.5	32.27	N.M.	25.64	24.77	20.59	N.M.	24.68	N.M.	N.M.	N.M.	23.16
ME-2	2.1	37.31	N.M.	24.62	24.27	20.36	N.M.	23.94	N.M.	N.M.	N.M.	N.M.
ME-3	1.5	34.90	N.M.	26.29	25.26	20.46	N.M.	24.82	N.M.	N.M.	N.M.	N.M.
ME-4	1.6	34.63	N.M.	25.12	24.27	19.46	N.M.	23.57	N.M.	N.M.	N.M.	N.M.
NMW-1	1.7	34.23	N.M.	27.23	25.57	21.18	N.M.	25.48	N.M.	22.96	N.M.	23.84
NMW-2	1.7	35.08	N.M.	N.M.	25.54	21.08	N.M.	25.36	N.M.	22.31	N.M.	24.18
NMW-3	1.9	35.01	N.M.	N.M.	N.M.	N.M.	N.M.	N.M.	N.M.	N.M.	N.M.	N.M.
NMW-4	1.9	32.59	N.M.	26.29	25.48	20.97	N.M.	25.23	N.M.	N.M.	N.M.	N.M.

MONITORING WELL INSTALLATION
- RMW - RIPA
- NMW - Sirrine
- ME - Metcalf & Eddy
- MW01-05 through 07, NETW: Haliburton NUS
- MW02-(all), MW03-(01-08D) - TRC
- MW03-(08R-14) - EA ENGINEERING
- MW01-(08D-15D/R) - EA ENGINEERING
- EA 101 through EA-116 - EA ENGINEERING
- MW-Z3-01 through MW-Z4-01 - STONE & WEBSTER

PIEZOMETER INSTALLATION:
- P-GU-Z3-(all) - EA ENGINEERING

NOTES:
- N.I. - NOT INSALLED; N.M. - NOT MEASURED
- N.A. - NOT ACCESSABLE; WELL OBSTRUCTED
- FAMSL - FEET ABOVE MEAN SEA LEVEL
- FTOR - FEET FROM TOP OF RISER
- Ft. AGS - FEET ABOVE GROUND SURFACE
- FBGS - FEET BELOW GROUND SURFACE
- APRIL 1994 DATA FROM TRC (1994)
- DECEMBER 1996 FROM SAMPLING EVENT
- NS - NO SURVEY DATA AVAILABLE
- * = water level for rock wells collected on 01/10/01

TABLE 3-5
Summary of Vertical Hydraulic Gradients
Former PR-58 Nike Site and NCBC Davisville Study Area 01, Sites 02 and 03
North Kingstown, RI

WELL CLUSTER	DATE	VERTICAL DISTANCE*	HEAD DIFFERENCE**	GRADIENT
NUMBER		(ft)	(ft)	(ft/ft)
MW01-10S/D	11/17/95	53.80	-0.11	-0.0020
	12/97	54.28	-0.26	-0.0048
	7/00	55.92	-0.74	-0.0132
MW01-10D/R	7/00	83.12	-1.36	-0.0164
MW01-12S/D	11/17/95	30.99	0.04	0.0013
	12/97	31.23	0.09	0.0029
	7/00	30.97	-0.07	-0.0023
MW01-13S/D	11/17/95	54.33	1.56	0.0287
	12/97	54.46	1.56	0.0286
	7/00	49.97	2.04	0.0408
MW01-13D/R	7/00	81.96	0.32	0.0039
MW01-14S/D	11/17/95	61.98	0.55	0.0089
	12/97	62.18	0.44	0.0071
	7/00	72.10	0.49	0.0068
MW02-03S/D	04/26/94	15.49	0.04	0.0026
	12/01/94	12.43	0.05	0.0040
	04/27/95	14.30	0.02	0.0014
	06/02/95	14.26	0.02	0.0014
	10/03/95	12.38	0.04	0.0032
	11/17/95	12.07	0.46	0.0381
	12/97	12.86	-0.04	-0.0031
	7/00	22.10	1.65	0.0747
MW02-03D/R	7/00	42.68	0.19	0.0045
MW02-07S/D	04/26/94	22.91	-0.04	-0.0017
	12/01/94	19.06	-0.03	-0.0016
	04/27/95	21.61	-0.06	-0.0028
	06/02/95	21.69	-0.08	-0.0037
	10/03/95	19.31	-0.05	-0.0026
	11/17/95	19.26	-0.03	-0.0016
MW02-08S/D	04/26/94	23.17	-0.25	-0.0108
	12/01/94	19.49	0.09	0.0046
	04/27/95	21.84	-0.06	-0.0027
	06/02/95	21.92	-0.08	-0.0036
	10/03/95	19.74	-0.08	-0.0041
	11/17/95	19.65	-0.06	-0.0031
	12/97	20.05	-0.07	-0.0035
MW02-10S/D	04/26/94	30.11	-0.10	-0.0033
	12/01/94	26.59	-0.12	-0.0045
	04/27/95	28.83	-0.07	-0.0024
	06/02/95	28.89	-0.10	-0.0035
	10/03/95	26.80	-0.09	-0.0034
	11/17/95	26.76	-0.06	-0.0022
	12/97	27.17	-0.08	-0.0029
	7/00	26.23	-0.45	-0.0172

TABLE 3-5
Summary of Vertical Hydraulic Gradients
Former PR-58 Nike Site and NCBC Davisville Study Area 01, Sites 02 and 03
North Kingstown, RI

WELL CLUSTER	DATE	VERTICAL DISTANCE*	HEAD DIFFERENCE**	GRADIENT
NUMBER		(ft)	(ft)	(ft/ft)
MW02-11S/D	04/26/94	39.51	0.19	0.0048
	12/01/94	36.22	0.18	0.0050
	04/27/95	38.25	0.22	0.0058
	06/02/95	38.26	0.20	0.0052
	10/03/95	36.41	0.15	0.0041
	11/17/95	36.34	0.20	0.0055
	7/00	40.25	0.32	0.0080
MW03-02S/D	04/26/94	40.45	-0.01	-0.0002
	12/01/94	36.20	0.02	0.0006
	04/27/95	39.18	-0.04	-0.0010
	06/02/95	39.17	-0.07	-0.0018
	10/03/95	36.56	-0.09	-0.0025
	11/17/95	36.51	-0.05	-0.0014
MW03-03S/D	04/26/94	39.38	-0.04	-0.0010
	12/01/94	35.22	-0.02	-0.0006
	04/27/95	38.13	-0.04	-0.0010
	06/02/95	38.09	-0.04	-0.0011
	10/03/95	35.46	-0.04	-0.0011
	11/17/95	35.49	-0.04	-0.0011
	12/97	35.98	-0.05	-0.0014
	7/00	32.27	-0.23	-0.0071
MW03-03D/R	7/00	62.48	-1.93	-0.0309
MW03-05S/D	04/26/94	24.41	-0.03	-0.0012
	12/01/94	20.50	-0.12	-0.0059
	04/27/95	23.16	-0.04	-0.0017
	06/02/95	23.17	-0.06	-0.0026
	10/03/95	20.73	-0.05	-0.0024
	11/17/95	20.70	-0.08	-0.0039
	12/97	21.22	-0.11	-0.0052
	7/00	18.95	-0.06	-0.0032
MW03-08D/R	06/02/95	44.06	-0.05	-0.0011
	10/03/95	40.65	0.10	0.0025
	12/97	41.61	0.10	0.0024
	2/98	46.46	0.10	0.0022
	7/00	29.35	0.77	0.0262
MW03-12D/R	06/02/95	39.86	-0.25	-0.0063
	10/03/95	36.00	-0.21	-0.0058
	07/18/96	39.57	-0.17	-0.0043
	12/97	36.49	0.36	0.0099
	2/98	41.53	-0.17	-0.0041
	7/00	28.64	0.23	0.0080
MW03-13D/R	06/02/95	45.38	-0.26	-0.0057
	10/03/95	41.82	-0.07	-0.0017
	07/18/96	45.36	-0.06	-0.0013
	12/97	42.78	-0.08	-0.0019
	2/98	46.83	0.07	0.0015
	7/00	-12.30	0.23	-0.0187
MW03-14D/R	06/02/95	44.68	0.01	0.0002
	10/03/95	40.30	-0.03	-0.0007
	07/18/96	44.39	0.00	0.0000
	12/97	41.71	0.07	0.0017
	2/98	47.19	0.39	0.0083
	7/00	29.67	-0.27	-0.0091

TABLE 3-5
Summary of Vertical Hydraulic Gradients
Former PR-58 Nike Site and NCBC Davisville Study Area 01, Sites 02 and 03
North Kingstown, RI

WELL CLUSTER	DATE	VERTICAL DISTANCE*	HEAD DIFFERENCE**	GRADIENT
NUMBER		(ft)	(ft)	(ft/ft)
MW03-14R/R2	7/00	72.85	-1.62	-0.0222
RMW-01 S/D	05/31/95	38.37	-0.65	-0.0169
	10/03/95	35.84	-0.19	-0.0053
	11/17/95	37.45	-0.20	-0.0053
	7/00	5.27	-0.36	-0.0683
RMW-02 S/D	05/31/95	17.99	0.07	0.0039
	10/03/95	15.32	0.09	0.0059
RMW-03 S/D	05/31/95	26.93	0.48	0.0178
	10/03/95	23.99	-0.12	-0.0050
EA-104D/R	7/00	61.09	R not recovered	
EA-105D/R	7/00	26.93	R not recovered	
EA-106D/R	2/98	60.56	0.19	0.0031
	7/00	41.35	-0.62	-0.0150
EA-107D/R	7/00	-42.77	R not recovered	
EA-108D/R	7/00	23.81	-0.44	-0.0185
EA-110D/R	2/98	80.92	-0.02	-0.0002
	7/00	86.71	1.41	0.0163
EA-111D/R	2/98	64.30	-0.12	-0.0019
	7/00	59.56	-0.03	-0.0005
EA-112D/R	2/98	88.48	0.19	0.0021
	7/00	87.79	-0.35	-0.0040
EA-112R/R2	7/00	122.70	0.85	0.0069
EA-113D/R	7/00	46.89	1.14	0.0243
EA-114D/R	7/00	9.23	0.10	0.0108
EA-116D/R	7/00	84.14	1.05	0.0125
EA-116R/R2	7/00	108.01	-1.63	-0.0151

Note: 1994 data are from TRC (1994)

* - Vertical distance is the distance between the water level in the shallower monitoring well and the middle of the screened interval in the deeper monitoring well.

** - Head Difference is the difference in the depth of water in shallower monitoring well and deeper monitoring well.

Negative sign indicates discharging of the shallower zone to the deeper zone.

TABLE 3-6
Summary of Hydraulic Conductivity Estimated From Slug Test Data
PR-58 Nike Site and NCBC Davisville Study Area 01, Sites 02 and 03
North Kingstown, RI

Well Designation	Screen Internal (FBGS)		Hydraulic Conductivity K (ft/d)	Geologic Unit Screened
	TOP	BOTTOM		
MW01-08D	35	45	28.4/18.0†	(10')silty sand
MW01-09D	37.5	41.5	1.2	(4')till
MW01-11D	37	42	2.8/2.9	(5')silt
MW01-12S	14	24	250.3‡	(5')silt, (5')silty f sand-f gravel
MW01-12D	48	53	17.1/13.1	(5')till
MW01-13S	8	18	0.2/1.0	(6')f-c sand, (4') silty vf sand w/little f gravel
MW01-13D	64	74	1.4/1.1	(10')till
MW01-14D	81	89	0.5/0.6	(8')till
MW01-15D	46	51	7.0/17.1†	(4')till, (1') weathered rock, schist, w/silty f sand
MW02-03D	31.5	41.5	6.3	(10')VF silt and sand
MW02-07D	35	45	0.9	(9')silty fine sand, (1')silt and gravel
MW02-08S	11.8	26.8	26.1/25.9	(6') silt, (9') F-C sand
MW02-08D	35.9	45.9	1.7	(10')VF sand
MW02-09S	12	27	223/217.2	(15')F sand
MW02-10S	13	28	47.6/52.8	(15')VF-F sand
MW02-10D	42	52	2.9	(2')sandy silt, (4')silty sand, (4')sand
MW02-11S	13	28	38.8/43.9	(15')F-C sand
MW02-11D	52.3	62.3	15/10.3	(4')sandy silt, (6')silty sand
MW03-02S	8.5	23.5	93.9	(6.5')silty gravelly sand, (9.5')sand
MW03-02D	49	59	1.2	(5')silt, (5')silt with rock fragments
MW03-03S	9	24	16.1/18.8	(5')sand, (10')silty sand
MW03-03D	47.7	57.7	10.4/8.9	(1')silt, (4')F sand, (5')silt
MW03-04S	10	25	33.1/32.6	(3')silt, (4') F-M sand, (8')F sand
MW03-05S	11	26	185.6/193.8	(1')F sand, (7')gravelly sand, (7')F-M sand

Well Designation	Screen Internal (FBGS)		Hydraulic Conductivity K (ft/d)	Geologic Unit Screened
	TOP	BOTTOM		
MW03-05D	35.5	45.5	2.4	(10')sandy silt
MW03-06D	51.5	61.5	1.5/1.3	(4.5')silt, (5.5')gravelly silt
MW03-07D	35.5	45.5	1.2/1.7	(4.5')silt, (5.5')silt and gravel
MW03-08D	28.3	38.3	26.0/26.3	(7.2')gravelly sand, (2.8')sandy silt and gravel
MW03-08R	46.5	56.5	0.3	(10')rock
MW03-09D	51	61	12.6	(3')sandy silt, (1')silty sand, (6') silt
MW03-10D	39	49	2.9	(6')sandy silt, (4')gravelly silt
MW03-11D	5	15	2.9	(3')silty sand, (7')silty sand and gravel
MW03-12D	25	35	4.3	(10')sand, silt, and gravel
MW03-12R	45	55	0.4	(10')sand, silt and gravel
MW03-13D	29	39	>26.0	(2')F sand, (2')gravelly sand, (6')silty sand and gravel
MW03-14D	30	40	1.3	(10')sand, silt, and gravel
MW03-14R	47	57	1.4	(10')rock
ME-1*	4.7	14.7	10.3	(2')fill, (8')sand and gravel
ME-2*	10	19.9	105.0	(10')sand and gravel
ME-3*	8	18	111.2	(6')F-C sand, (4') sand and gravel
ME-4*	10	19.9	24.5	(5')sand and gravel, (5')sand, silt and gravel
NMW-1*	5.68	15.73	30.0	(10')sand
NMW-2*	6.06	16.14	36.5	(10')sand
NMW-3*	7.4	17.56	30.3	(10')silty sand
NMW-4*	4.09	14.12	105	(10.03')silty sand and sand
EA-101	23.5	33.5	14.3/18.5	(10')till
EA-102	21.9	31.9	10.0/17.1	(10')till
EA-103	25.5	35.5	4.3/7.1	(7')till, (3') weathered rock
EA-104	56	66	8.6/3.6	(8')f-m snd, (2')weathered rock
EA-105	20	30	4.3/10.0	(10')till
EA-106D	32	42	11.4/10.0	(2')till, (6.5')till/weathered rock, (1.5') bedrock
EA-106R	59	69	128.3/174.0	(10')bedrock

Well Designation	Screen Internal (FBGS)		Hydraulic Conductivity K (ft/d)	Geologic Unit Screened
	TOP	BOTTOM		
EA-107	31	41	10.0/15.7	(9')till, (1')bedrock
EA-108	19.25	29.25	6.4/5.0	(5')till, (5')weathered rock
EA-109	26	36	6.4/8.6	(8')till, (2')weathered rock
EA-110D	75	85	28.5/47.1	(6.5')till, (1')boulder, (2.5')weathered rock
EA-111D	49.5	64.5	24.2/18.5	(4.5')silty clay, (10.5')till
EA-112D	86	96	7.1	(10')bedrock
EA-114D	4.5	14.5	1.4/2.4/35.6	(3.5')silty sand, (6.5')silty sand and gravel
EA-116D	75.2	85.2	7.1/4.3/10.0	(8.3')sandy clay, (1.7')silty sand

Notes: For wells where two slug tests were run, both results are presented.
Site 01 Slug tests were performed in November 1995.
Data for the Site 02 wells and wells MW03-02S through MW03-08D are from TRC (1994).
* - Slug test data for Nike Site wells from ME-1 through ME-4 are from Metcalf and Eddy (1993) and wells from NMW-1 through NMW-4 are from Sirrine Environmental (1987).
EA-101 through EA-109 (except EA-106R, installed in 1998) were slug tested in August 1996.
EA-106R, EA-110 through EA-112 were slug tested in April 1998.
† - The points on the plot between displacement and time of MW01-08DF and MW01-15DF/R were scattered (Appendix J).
‡ - The points on the plot between displacement and time of MW01-09DR and MW01-12SR were few (Appendix J).

FBGS = Feet below ground surface
ft/d = feet per day
VF = very fine
F = fine
M = medium
C = coarse

TABLE 4-1
Location of Residential Water Supply Wells North of Former PR-58 Nike Site
North Kingstown, RI

Address		Property Owner	Location (Plat/Lot)
290	Fletcher Road	Eidson, William B.	165/003
469	Fletcher Road	McGuinness, Adelaide	162/011
550	Fletcher Road	Matoes Jr., Samuel J.	084/041
750	Fletcher Road	Petteruti, Ross A.	084/006
757	Fletcher Road	DeVecchio, Thomas J.	159/008
787	Fletcher Road	Morris, Eleanor G.	159/007
796	Fletcher Road	Soares, Carolyn V..	084/009
855	Fletcher Road	Michaelson, Jeffrey S.	159/005

Source: Town of North Kingstown, RI
Refer to Figure 2-1

TABLE 4-2

Background Inorganics Concentrations In Ground-Water Established for Adjacent NCBC Davisville North Kingstown, RI

Parameter	Background Value (µg/L)
Aluminum	5315
Antimony	6
Arsenic	6.4
Barium	80.5
Beryllium	1.3
Cadmium	3
Calcium	13,302
Chromium	214
Cobalt	24.9
Copper	25.8
Iron	25,500
Lead	4.8
Magnesium	5,126
Manganese	3,292
Mercury	ND (0.2)
Nickel	154
Potassium	3843
Selenium	2.2
Silver	1
Sodium	12,346
Thallium	4.1
Vanadium	24.4
Zinc	89.9

NOTE: Data is from Stone & Webster's *Final Background Inorganics Ground Water Study* Report dated September 1996 and the finalized (December 1996) Table 7-4 from that report prepared for the Navy, Northern Division (Stone and Webster 1996).

Table 4-3A
Summary of Volatile Organic Compounds Detected in 2000 Soil Samples (ug/kg)

Sample ID	EA-116D	EA-116D	SS-EA114R	SS-EA114R	SS-EA114R-DUP1
Depth of sample in ft below grade	23-25	83-85	0-2	9-11	9-11
Site ID	NIKE	NIKE	NIKE	NIKE	NIKE
Date of sample collection	06/08/2000	06/08/2000	06/14/2000	06/14/2000	06/14/2000
1,1,1-TRICHLOROETHANE	125 U	125 U	125 U	125 U	125 U
1,1,2,2-TETRACHLOROETHANE	125 U	125 U	125 U	125 U	125 U
1,1,2-TRICHLOROETHANE	125 U	125 U	125 U	125 U	125 U
1,1-DICHLOROETHANE	125 U	125 U	125 U	125 U	125 U
1,1-DICHLOROETHENE	125 U	125 U	125 U	125 U	125 U
1,2-DICHLOROETHANE	125 U	125 U	125 U	125 U	125 U
1,2-DICHLOROPROPANE	125 U	125 U	125 U	125 U	125 U
2-BUTANONE	250 U	250 U	**660**	250 U	250 U
2-HEXANONE	250 U	250 U	250 U	250 U	250 U
4-METHYL-2-PENTANONE	250 U	250 U	250 U	250 U	250 U
ACETONE	250 R	250 R	250 R	250 R	250 R
BENZENE	125 U	125 U	125 U	125 U	125 U
BROMODICHLOROMETHANE	125 U	125 U	125 U	125 U	125 U
BROMOFORM	125 U	125 U	125 U	125 U	125 U
BROMOMETHANE	125 U	125 U	125 U	125 U	125 U
CARBON DISULFIDE	125 U	125 U	125 U	125 U	125 U
CARBON TETRACHLORIDE	125 U	125 U	125 U	125 U	125 U
CHLOROBENZENE	125 U	125 U	125 U	125 U	125 U
CHLOROETHANE	125 U	125 U	125 U	125 U	125 U
CHLOROFORM	125 U	125 U	125 U	125 U	125 U
CHLOROMETHANE	125 U	125 U	125 U	125 U	125 U
CIS-1,2-DICHLOROETHENE	125 U	125 U	125 U	125 U	125 U
CIS-1,3-DICHLOROPROPENE	125 U	125 U	125 U	125 U	125 U
DIBROMOCHLOROMETHANE	125 U	125 U	125 U	125 U	125 U
ETHYLBENZENE	125 U	125 U	125 U	125 U	125 U
M,P-XYLENES	250 U	250 U	250 U	250 U	250 U
METHYLENE CHLORIDE	970 U	620 U	570 U	170 U	290 U
O-XYLENE	125 U	125 U	125 U	125 U	125 U
STYRENE	125 U	125 U	125 U	125 U	125 U
TETRACHLOROETHENE	125 U	125 U	125 U	125 U	125 U
TOLUENE	125 U	125 U	125 U	125 U	125 U
TOTAL 1,2-DICHLOROETHENE	250 U	250 U	250 U	250 U	250 U
TRANS-1,2-DICHLOROETHENE	125 U	125 U	125 U	125 U	125 U
TRANS-1,3-DICHLOROPROPENE	125 U	125 U	125 U	125 U	125 U
TRICHLOROETHENE	125 U	125 U	125 U	125 U	125 U
VINYL CHLORIDE	125 U	125 U	125 U	125 U	125 U
XYLENES (TOTAL)	375 U	375 U	375 U	375 U	375 U

NOTE:
Results are bolded if above analytical detection limits.

Table 4-3B
Summary of Metals
Detected in 2000
Soil Samples (mg/kg)

Sample ID	EA-116D	EA-116D	SS-EA114R	SS-EA114R	SS-EA114R-DUP1
Depth of sample in ft below grade	23-25	83-85	0-2	9-11	9-11
Site ID	NIKE	NIKE	NIKE	NIKE	NIKE
Date of sample collection	06/08/2000	06/08/2000	06/14/2000	06/14/2000	06/14/2000
ALUMINUM	6510	8740	11300	9220	8890
ANTIMONY	0.19 U	0.17 U	0.39 U	0.17 U	0.17 U
ARSENIC	2.6	0.47 U	1.5	1.4	1.3
BARIUM	12.6	11.9 U	11.8 U	20.3	18.7
BERYLLIUM	0.44	0.39	0.45	1	1.1
CADMIUM	0.04 U	0.03 U	0.04 U	0.13 U	0.14 U
CALCIUM	1890 U	1040 U	583 U	735 U	601 U
CHROMIUM	10.6	11.5	9.7	12.5	12.1
COBALT	5.6	8	4.3	11.2	10.3
COPPER	19.3	14.4	8.1	32.1	33.6
IRON	16100	17900	14200	24800	25400
LEAD	7 U	6.2 U	8.2 U	12.9 U	12.5 U
MAGNESIUM	2440	4620	1590	3600	3890
MANGANESE	186	140	91.5	315	332
NICKEL	10.3	17.6	7.5	16.4	15.6
POTASSIUM	746 U	1240 U	410 U	1400 U	1280 U
SELENIUM	0.39 U	1.4 U	0.4 U	1.4 U	1.4 U
SILVER	3.8	4.1	3.5	6	6.2
SODIUM	41.8 U	40.5 U	28.8 U	34.9 U	34.1 U
THALLIUM	0.92 U	0.54 U	0.31 U	0.75 U	0.93 U
VANADIUM	12.4	15.4	16	17.5	16.7
ZINC	32	56.1	26.8	63.6	61.7
MERCURY	0.01 U	0.02 U	0.04 U	0.02 U	0.02 U

Table 4-3C
Summary of Semi-Volatile Organic Compounds Detected in 2000 Soil Samples (ug/kg)

Sample ID	SS-EA114R	SS-EA114R	SS-EA114R-DUP1
Depth of sample in ft below grade	0-2	9-11	9-11
Site ID	NIKE	NIKE	NIKE
Date of sample collection	06/14/2000	06/14/2000	06/14/2000
1,2,4-TRICHLOROBENZENE	183.59853 U	170.90365 U	177.40982 U
1,2-DICHLOROBENZENE	183.59853 U	170.90365 U	177.40982 U
1,3-DICHLOROBENZENE	183.59853 U	170.90365 U	177.40982 U
1,4-DICHLOROBENZENE	183.59853 U	170.90365 U	177.40982 U
2,2'-OXYBIS(1-CHLOROPROPANE)	183.59853 U	170.90365 U	177.40982 U
2,4,5-TRICHLOROPHENOL	378.67197 U	352.48878 U	365.90775 U
2,4,6-TRICHLOROPHENOL	183.59853 U	170.90365 U	177.40982 U
2,4-DICHLOROPHENOL	183.59853 U	170.90365 U	177.40982 U
2,4-DIMETHYLPHENOL	183.59853 U	170.90365 U	177.40982 U
2,4-DINITROPHENOL	378.67197 UJ	352.48878 UJ	365.90775 UJ
2,4-DINITROTOLUENE	183.59853 U	170.90365 U	177.40982 U
2,6-DINITROTOLUENE	183.59853 U	170.90365 U	177.40982 U
2-CHLORONAPHTHALENE	183.59853 U	170.90365 U	177.40982 U
2-CHLOROPHENOL	183.59853 U	170.90365 U	177.40982 U
2-METHYLNAPHTHALENE	183.59853 U	170.90365 U	177.40982 U
2-METHYLPHENOL	183.59853 U	170.90365 U	177.40982 U
2-NITROANILINE	378.67197 U	352.48878 U	365.90775 U
2-NITROPHENOL	183.59853 U	170.90365 U	177.40982 U
3,3'-DICHLOROBENZIDINE	183.59853 U	170.90365 U	177.40982 U
3-NITROANILINE	378.67197 U	352.48878 U	365.90775 U
4,6-DINITRO-2-METHYLPHENOL	378.67197 UJ	352.48878 UJ	365.90775 UJ
4-BROMOPHENYL PHENYL ETHER	183.59853 U	170.90365 U	177.40982 U
4-CHLORO-3-METHYLPHENOL	183.59853 U	170.90365 U	177.40982 U
4-CHLOROANILINE	183.59853 U	170.90365 U	177.40982 U
4-CHLOROPHENYL PHENYL ETHER	183.59853 U	170.90365 U	177.40982 U
4-METHYLPHENOL	183.59853 U	170.90365 U	177.40982 U
4-NITROANILINE	378.67197 U	352.48878 U	365.90775 U
4-NITROPHENOL	378.67197 U	352.48878 U	365.90775 U
ACENAPHTHENE	183.59853 U	170.90365 U	177.40982 U
ACENAPHTHYLENE	183.59853 U	170.90365 U	177.40982 U
ANTHRACENE	183.59853 U	170.90365 U	177.40982 U
AZOBENZENE	183.59853 U	170.90365 U	177.40982 U
BENZIDINE	183.59853 U	170.90365 U	177.40982 U
BENZO(A)ANTHRACENE	183.59853 U	170.90365 U	177.40982 U
BENZO(A)PYRENE	183.59853 U	170.90365 U	177.40982 U
BENZO(B)FLUORANTHENE	183.59853 U	170.90365 U	177.40982 U
BENZO(K)FLUORANTHENE	183.59853 U	170.90365 U	177.40982 U
BENZO[G,H,I]PERYLENE	183.59853 UJ	170.90365 UJ	177.40982 UJ
BENZOIC ACID	**490 J**	352.48878 UJ	365.90775 UJ
BENZYL ALCOHOL	183.59853 U	170.90365 U	177.40982 U

Table 4-3C
Summary of Semi-Volatile Organic Compounds Detect d in 2000 Soil Samples (ug/kg)

Sample ID	SS-EA114R	SS-EA114R	SS-EA114R-DUP1
Depth of sample in ft below grade	0-2	9-11	9-11
Site ID	NIKE	NIKE	NIKE
Date of sample collection	06/14/2000	06/14/2000	06/14/2000
BIS(2-CHLOROETHOXY) METHANE	183.59853 U	170.90365 U	177.40982 U
BIS(2-CHLOROETHYL) ETHER	183.59853 U	170.90365 U	177.40982 U
BIS(2-ETHYLHEXYL) PHTHALATE	183.59853 U	170.90365 U	177.40982 U
BUTYL BENZYL PHTHALATE	183.59853 U	170.90365 U	177.40982 U
CARBAZOLE	183.59853 U	170.90365 U	177.40982 U
CHRYSENE	183.59853 U	170.90365 U	177.40982 U
DI-N-BUTYL PHTHALATE	183.59853 U	**36**	177.40982 U
DI-N-OCTYLPHTHALATE	183.59853 U	170.90365 U	177.40982 U
DIBENZO(A,H)ANTHRACENE	183.59853 UJ	170.90365 UJ	177.40982 UJ
DIBENZOFURAN	183.59853 U	170.90365 U	177.40982 U
DIETHYL PHTHALATE	183.59853 U	170.90365 U	177.40982 U
DIMETHYL PHTHALATE	183.59853 U	170.90365 U	177.40982 U
FLUORANTHENE	183.59853 U	170.90365 U	177.40982 U
FLUORENE	183.59853 U	170.90365 U	177.40982 U
HEXACHLOROBENZENE	183.59853 U	170.90365 U	177.40982 U
HEXACHLOROBUTADIENE	183.59853 U	170.90365 U	177.40982 U
HEXACHLOROCYCLOPENTADIENE	183.59853 UJ	170.90365 UJ	177.40982 UJ
HEXACHLOROETHANE	183.59853 U	170.90365 U	177.40982 U
INDENO(1,2,3-CD)PYRENE	183.59853 UJ	170.90365 UJ	177.40982 UJ
ISOPHORONE	183.59853 U	170.90365 U	177.40982 U
N-NITROSO-DI-N-PROPYLAMINE	183.59853 U	170.90365 U	177.40982 U
N-NITROSODIMETHYLAMINE	183.59853 U	170.90365 U	177.40982 U
N-NITROSODIPHENYLAMINE	183.59853 U	170.90365 U	177.40982 U
NAPHTHALENE	183.59853 U	170.90365 U	177.40982 U
NITROBENZENE	183.59853 U	170.90365 U	177.40982 U
PENTACHLOROPHENOL	**40**	352.48878 U	365.90775 U
PHENANTHRENE	183.59853 U	170.90365 U	177.40982 U
PHENOL	183.59853 U	170.90365 U	177.40982 U
PYRENE	183.59853 U	170.90365 U	177.40982 U
PYRIDINE	183.59853 U	170.90365 U	177.40982 U

NOTE:
Results are bolded if above analytical detection limits.

TABLE 4-4
Volatile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	EA101	EA102	EA103	EA104	EA104R	EA105
Site or Study Area	NIKE	NIKE	NIKE	NIKE	NIKE	NIKE
Date of Sample Collection	10/03/2000	10/03/2000	10/04/2000	09/30/2000	09/30/2000	09/29/2000
Analyte						
1,1,1-TRICHLOROETHANE	1 U	1 U	1 U	1 U	1 UJ	1 U
1,1,2,2-TETRACHLOROETHANE	1 U	110000	1 U	58	800	1 U
1,1,2-TRICHLOROETHANE	1 U	730 J	1 U	5	75 J	1 U
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	2 J	1 U
1,1-DICHLOROETHENE	1 U	3 J	1 U	1 U	4 J	1 U
1,2-DICHLOROETHANE	1 U	2 J	1 U	1 U	1 UJ	1 U
1,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U	1 UJ	1 U
2-BUTANONE	5 R	5 R	5 R	5 R	5 R	5 R
2-HEXANONE	5 U	5 U	5 U	5 U	5 UJ	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 UJ	5 U
ACETONE	5 R	5 R	5 R	5 R	5 R	5 R
BENZENE	1 U	1 U	1 U	1 U	1 UJ	1 U
BROMODICHLOROMETHANE	1 U	1 U	1 U	1 U	1 UJ	1 U
BROMOFORM	1 U	1 U	1 U	1 U	1 UJ	1 U
BROMOMETHANE	1 U	1 U	1 U	1 U	1 UJ	1 U
CARBON DISULFIDE	1 U	1 U	1 U	1 U	1 UJ	1 U
CARBON TETRACHLORIDE	1 U	12 J	1 U	1 U	1 UJ	1 U
CHLOROBENZENE	1 U	1 U	1 U	1 U	1 UJ	1 U
CHLOROETHANE	1 U	1 U	1 U	1 U	1 UJ	1 U
CHLOROFORM	1 U	31 J	1 U	1 U	1 UJ	1 U
CHLOROMETHANE	1 U	1 U	1 U	1 U	1 UJ	1 U
CIS-1,2-DICHLOROETHENE	1 U	94 J	1 U	86	880	1 U
CIS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 UJ	1 U
DIBROMOCHLOROMETHANE	1 U	1 U	1 U	1 U	1 UJ	1 U
ETHYLBENZENE	1 U	1 U	1 U	1 U	1 UJ	1 U
M,P-XYLENES	2 U	2 U	2 U	2 U	2 UJ	2 U
METHYLENE CHLORIDE	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1.27
O-XYLENE	1 U	1 U	1 U	1 U	1 UJ	1 U
STYRENE	1 U	1 U	1 U	1 U	1 UJ	1 U
TETRACHLOROETHENE	1 U	920 J	1 U	1 U	4 J	1 U
TOLUENE	1 U	1 U	1 U	1 U	1 UJ	1 U
TOTAL 1,2-DICHLOROETHENE	2 U	150 J	2 U	130	1300	2 U
TRANS-1,2-DICHLOROETHENE	1 U	54 J	1 U	40	400	1 U
TRANS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 UJ	1 U
TRICHLOROETHENE	1	3300	1 U	260	3000	1 U
VINYL CHLORIDE	1 U	1 U	1 U	1	16 J	1 U
XYLENES (TOTAL)	3 U	3 U	3 U	3 U	3 UJ	3 U
TOTAL BTEX						
TOTAL CHLORINATED CVOCS	1	115148		454	5201	

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-4
Volatile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	EA105R	EA106D	EA106R	EA107	EA107R	EA108
Site or Study Area	NIKE	NIKE	NIKE	NIKE	NIKE	NIKE
Date of Sample Collection	09/29/2000	09/30/2000	09/30/2000	09/27/2000	09/27/2000	09/27/2000
Analyte						
1,1,1-TRICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	3.86	1 U	1 U	1 U	1 U	1 U
1,1,2-TRICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	12	1 U
1,1-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U	1 U	1 U
2-BUTANONE	5 R	5 R	5 R	5 R	5 R	5 R
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 R	5 R	5 R	5 R	14 J	5 R
BENZENE	1 U	1 U	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE	1 U	1 U	1 U	1 U	1 U	1 U
BROMOFORM	1 U	1 U	1 U	1 U	1 U	1 U
BROMOMETHANE	1 U	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE	1 U	1 U	1 U	1 U	1 U	1 U
CARBON TETRACHLORIDE	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROBENZENE	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	2.08	1 U	1 U	1 U	1 U	1 U
CIS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	1 U	1 U	1 U	1 U	1 U	1 U
M,P-XYLENES	2 U	2 U	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	1.3	1 U	2.32	1 U	2.33 U	1 U
O-XYLENE	1 U	1 U	1 U	1 U	1 U	1 U
STYRENE	1 U	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	3.03	2 U	2 U	2 U	2 U	2 U
TRANS-1,2-DICHLOROETHENE	0.936	1 U	1 U	1 U	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	12	1 U	1 U	1 U	1 U	1 U
VINYL CHLORIDE	1 U	1 U	1 U	1 U	1 U	1 U
XYLENES (TOTAL)	3 U	3 U	3 U	3 U	3 U	3 U
TOTAL BTEX						
TOTAL CHLORINATED CVOCS	18.89				12	

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-4
Volatile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	EA108R	EA109	EA110D	EA110R	EA111D	EA111R
Site or Study Area	NIKE	NIKE	Site 03	Site 03	Site 03	Site 03
Date of Sample Collection	09/27/2000	10/03/2000	09/26/2000	09/26/2000	09/27/2000	09/27/2000
Analyte						
1,1,1-TRICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	1 U	26	1 U	1 U	1 U	1 U
1,1,2-TRICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1.35	1 U
1,1-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U	1 U	1 U
2-BUTANONE	5 R	5 R	5 R	5 R	5 R	5 R
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U
ACETONE	5 R	5 R	5 R	5 R	5 R	5 R
BENZENE	1 U	1 U	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE	1 U	1 U	1 U	1 U	1 U	1 U
BROMOFORM	1 U	1 U	1 U	1 U	1 U	1 U
BROMOMETHANE	1 U	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE	1 U	1 U	1 U	1.15	1 U	1 U
CARBON TETRACHLORIDE	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROBENZENE	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	1 U	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	1 U	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	1 U	13	1 U	1 U	1 U	1 U
CIS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	1 U	1 U	1 U	1 U	1 U	1 U
M,P-XYLENES	2 U	2 U	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	1 U	1 UJ	1.39 U	1.32 U	1 U	1 U
O-XYLENE	1 U	1 U	1 U	1 U	1 U	1 U
STYRENE	1 U	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U
TOLUENE	1 U	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	2 U	21	2 U	2 U	2 U	2 U
TRANS-1,2-DICHLOROETHENE	1 U	7	1 U	1 U	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	1 U	49	1 U	1 U	1 U	1 U
VINYL CHLORIDE	1 U	1 U	1 U	1 U	1 U	1 U
XYLENES (TOTAL)	3 U	3 U	3 U	3 U	3 U	3 U
TOTAL BTEX						
TOTAL CHLORINATED CVOCS		96			1.35	

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-4
Volatile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	EA111R-DUP1	EA112D	EA112R	EA112R2	EA112R2-DUP5
Site or Study Area	Site 03	NIKE	NIKE	NIKE	NIKE
Date of Sample Collection	09/27/2000	10/01/2000	10/04/2000	10/01/2000	10/01/2000
Analyte					
1,1,1-TRICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	1 U	3	12	1 U	1 U
1,1,2-TRICHLOROETHANE	1 U	1 U	2	1 U	1 U
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U	1 U
2-BUTANONE	5 R	5 R	5 R	5 R	5 R
2-HEXANONE	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U
ACETONE	5 R	5 R	5 R	5 R	5 R
BENZENE	1 U	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
BROMOFORM	1 U	1 U	1 U	1 U	1 U
BROMOMETHANE	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE	1 U	1 U	1 U	1 U	1 U
CARBON TETRACHLORIDE	1 U	1 U	1 U	1 U	1 U
CHLOROBENZENE	1 U	1 U	1 U	1 U	1 U
CHLOROETHANE	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	1 U	10	38	1 U	1 U
CIS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	1 U	1 U	1 U	1 U	1 U
M,P-XYLENES	2 U	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	1 U	1 UJ	1 UJ	2.59 J	1 UJ
O-XYLENE	1 U	1 U	1 U	1 U	1 U
STYRENE	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	1 U
TOLUENE	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	2 U	13	51	2 U	2 U
TRANS-1,2-DICHLOROETHENE	1 U	3	12	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	1 U	19	81	1 U	1 U
VINYL CHLORIDE	1 U	1 U	1 U	1 U	1 U
XYLENES (TOTAL)	3 U	3 U	3 U	3 U	3 U
TOTAL BTEX					
TOTAL CHLORINATED CVOCS		35	146		

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-4
Volatile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	EA113D	EA113R	EA114D	EA114R	EA114R-DUP6	EA116D
Site or Study Area	NIKE	NIKE	NIKE	NIKE	NIKE	NIKE
Date of Sample Collection	10/02/2000	10/02/2000	10/04/2000	10/04/2000	10/04/2000	09/28/2000
Analyte						
1,1,1-TRICHLOROETHANE	1 U	1 UJ	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	1 U	1 UJ	1 U	1 U	1 U	2.49
1,1,2-TRICHLOROETHANE	1 U	1 UJ	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE	1 U	1 UJ	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	1 U	1 UJ	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE	1 U	1 UJ	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE	1 U	1 UJ	1 U	1 U	1 U	1 U
2-BUTANONE	5 R	5 R	5 R	5 R	5 R	5 R
2-HEXANONE	5 U	5 UJ	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 UJ	5 U	5 U	5 U	5 U
ACETONE	5 R	5 R	5 R	5 R	5 R	9.89 J
BENZENE	1 U	1 UJ	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE	1 U	1 UJ	1 U	1 U	1 U	1 U
BROMOFORM	1 U	1 UJ	1 U	1 U	1 U	1 U
BROMOMETHANE	1 U	1 UJ	1 U	1 U	1 U	1 U
CARBON DISULFIDE	1 U	1 UJ	1 U	1 U	1 U	1 U
CARBON TETRACHLORIDE	1 U	1 UJ	1 U	1 U	1 U	1 U
CHLOROBENZENE	1 U	1 UJ	1 U	1 U	1 U	1 U
CHLOROETHANE	1 U	1 UJ	1 U	1 U	1 U	1 U
CHLOROFORM	1 U	1 UJ	1 U	1 U	1 U	1 U
CHLOROMETHANE	1 U	1 UJ	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	2	160 J	1 U	1 U	1 U	18
CIS-1,3-DICHLOROPROPENE	1 U	1 UJ	1 U	1 U	1 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 UJ	1 U	1 U	1 U	1 U
ETHYLBENZENE	1 U	1 UJ	1 U	1 U	1 U	1 U
M,P-XYLENES	2 U	2 UJ	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U
O-XYLENE	1 U	1 UJ	1 U	1 U	1 U	1 U
STYRENE	1 U	1 UJ	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	1 U	1 UJ	1 U	1 U	1 U	1 U
TOLUENE	1 U	1 UJ	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	2	200 J	2 U	2 U	2 U	21
TRANS-1,2-DICHLOROETHENE	1 U	38 J	1 U	1 U	1 U	3.6
TRANS-1,3-DICHLOROPROPENE	1 U	1 UJ	1 U	1 U	1 U	1 U
TRICHLOROETHENE	2	260	1 U	1 U	1 U	22
VINYL CHLORIDE	1 U	7 J	1 U	1 U	1 U	1 U
XYLENES (TOTAL)	3 U	3 UJ	3 U	3 U	3 U	3 U
TOTAL BTEX						
TOTAL CHLORINATED CVOCS	4	467				45.49

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-4
Volatile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	EA116R	EA116R2	EA116R2-DUP7	MW01-08D	MW01-09D
Site or Study Area	NIKE	NIKE	NIKE	Study Area 01	Study Area 01
Date of Sample Collection	09/28/2000	09/28/2000	09/28/2000	09/30/2000	09/30/2000
Analyte					
1,1,1-TRICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	5.27	1 U	1 U	1 U	1 U
1,1,2-TRICHLOROETHANE	2.03	1 U	1 U	1 U	1 U
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U	1 U
2-BUTANONE	5 R	5 R	5 R	11 J	5 R
2-HEXANONE	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U
ACETONE	5 R	5 R	5 R	5 R	5 R
BENZENE	1 U	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
BROMOFORM	1 U	1 U	1 U	1 U	1 U
BROMOMETHANE	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE	1 U	1 U	1 U	1 U	1 U
CARBON TETRACHLORIDE	1 U	1 U	1 U	1 U	1 U
CHLOROBENZENE	1 U	1 U	1 U	1 U	1 U
CHLOROETHANE	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	39	1 U	1 U	1.78	1.42
CIS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	1 U	1 U	1 U	1.13	1 U
M,P-XYLENES	2 U	2 U	2 U	3.03	2 U
METHYLENE CHLORIDE	1 U	1.14 U	1.06 U	1.35 U	1.4 U
O-XYLENE	1 U	1 U	1 U	1 U	1 U
STYRENE	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	1 U
TOLUENE	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	48	2 U	2 U	1.8	1.43
TRANS-1,2-DICHLOROETHENE	9.13	1 U	1 U	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	42	1 U	0.904	2.18	1 U
VINYL CHLORIDE	1 U	1 U	1 U	1 U	1 U
XYLENES (TOTAL)	3 U	3 U	3 U	3.12	3 U
TOTAL BTEX				4.25	
TOTAL CHLORINATED CVOCS	97.3		0.904	3.98	1.43

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-4
Volatile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	MW01-10D	MW01-10R	MW01-11D	MW01-12D
Site or Study Area	Study Area 01	Study Area 01	Study Area 01	Study Area 01
Date of Sample Collection	10/03/2000	10/03/2000	10/01/2000	10/01/2000
Analyte				
1,1,1-TRICHLOROETHANE	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	1 U	1 U	1 U	5.5 J
1,1,2-TRICHLOROETHANE	1 U	1 U	1 U	0.972 J
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U
2-BUTANONE	5 R	5 R	5 R	5 R
2-HEXANONE	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U
ACETONE	5 R	5 R	5 R	5 R
BENZENE	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE	1 U	1 U	1 U	1 U
BROMOFORM	1 U	1 U	1 U	1 U
BROMOMETHANE	1 U	1 U	1 U	1 U
CARBON DISULFIDE	1 U	1 U	1 U	1 U
CARBON TETRACHLORIDE	1 U	1 U	1 U	1 U
CHLOROBENZENE	1 U	1 U	1 U	1 U
CHLOROETHANE	1 U	1 U	1 U	1 U
CHLOROFORM	1 U	1 U	1 U	1 U
CHLOROMETHANE	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	1 U	1 U	1 U	13 J
CIS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 U	1 U	1 U
ETHYLBENZENE	1 U	1 U	1 U	1 U
M,P-XYLENES	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	3.17 U	3.19 U	1.13 U	1.23 U
O-XYLENE	1 U	1 U	1 U	1 U
STYRENE	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	1 U	1 U	1 U	1 U
TOLUENE	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	2 U	2 U	2 U	16 J
TRANS-1,2-DICHLOROETHENE	1 U	1 U	1 U	3.03 J
TRANS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U
TRICHLOROETHENE	1 U	1 U	1 U	27 J
VINYL CHLORIDE	1 U	1 U	1 U	1 U
XYLENES (TOTAL)	3 U	3 U	3 U	3 U
TOTAL BTEX				
TOTAL CHLORINATED CVOCS				49.472

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-4
Volatile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	MW01-12D-DUP2	MW01-13D	MW01-13R	MW01-14D
Site or Study Area	Study Area 01	Study Area 01	Study Area 01	Study Area 01
Date of Sample Collection	10/01/2000	09/27/2000	09/27/2000	09/27/2000
Analyte				
1,1,1-TRICHLOROETHANE	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	5.9	1 U	1 U	1 U
1,1,2-TRICHLOROETHANE	1.08	1 U	1 U	1 U
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U
2-BUTANONE	5 R	5 R	5 R	5 R
2-HEXANONE	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U
ACETONE	5 R	5 R	5 R	5 R
BENZENE	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE	1 U	1 U	1 U	1 U
BROMOFORM	1 U	1 U	1 U	1 U
BROMOMETHANE	1 U	1 U	1 U	1 U
CARBON DISULFIDE	1 U	1 U	1 U	1 U
CARBON TETRACHLORIDE	1 U	1 U	1 U	1 U
CHLOROBENZENE	1 U	1 U	1 U	1 U
CHLOROETHANE	1 U	1 U	1 U	1 U
CHLOROFORM	1 U	1 U	1 U	1 U
CHLOROMETHANE	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	13	1 U	1 U	4.09
CIS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 U	1 U	1 U
ETHYLBENZENE	1 U	1 U	1 U	1 U
M,P-XYLENES	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	1 U	1 U	2.48 U	1.23 U
O-XYLENE	1 U	1 U	1 U	1 U
STYRENE	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	1 U	1 U	1 U	1 U
TOLUENE	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	17	2 U	2 U	4.13
TRANS-1,2-DICHLOROETHENE	3.2	1 U	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U
TRICHLOROETHENE	27	1 U	1 U	1 U
VINYL CHLORIDE	1 U	1 U	1 U	1 U
XYLENES (TOTAL)	3 U	3 U	3 U	3 U
TOTAL BTEX				
TOTAL CHLORINATED CVOCS	50.98			4.13

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-4
Volatile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	MW01-15D	MW01-15R	MW02-03D	MW02-03R	MW02-08D
Site or Study Area	Study Area 01	Study Area 01	Site 02	Site 02	Site 02
Date of Sample Collection	09/30/2000	09/30/2000	09/29/2000	09/29/2000	10/03/2000
Analyte					
1,1,1-TRICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	1 U	1 U	1.87	1 U	3
1,1,2-TRICHLOROETHANE	1 U	1 U	2.51	1 U	1 U
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,1-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U	1 U
2-BUTANONE	5 R	5 R	5 R	5 R	5 R
2-HEXANONE	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U
ACETONE	5 R	5 R	5 R	5 R	5 R
BENZENE	1 U	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
BROMOFORM	1 U	1 U	1 U	1 U	1 U
BROMOMETHANE	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE	1 U	1 U	1 U	1 U	1 U
CARBON TETRACHLORIDE	1 U	1 U	1 U	1 U	1 U
CHLOROBENZENE	1 U	1 U	1 U	1 U	1 U
CHLOROETHANE	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	3.06	0.934	29	1 U	4
CIS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	1 U	1 U	1 U	1 U	1 U
M,P-XYLENES	2 U	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	3.51 U	1 U	1.22 U	1.48 U	1 UJ
O-XYLENE	1 U	1 U	1 U	1 U	1 U
STYRENE	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	1 U
TOLUENE	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	3.09	0.943	33	2 U	4
TRANS-1,2-DICHLOROETHENE	1 U	1 U	3.58	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	5.82	0.923	17	1 U	8
VINYL CHLORIDE	1 U	1 U	1 U	1 U	1 U
XYLENES (TOTAL)	3 U	3 U	3 U	3 U	3 U
TOTAL BTEX					
TOTAL CHLORINATED CVOCS	8.91	1.866	54.38		15

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-4
Volatile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	MW02-10D	MW02-11D	MW03-02D	MW03-03D	MW03-03R
Site or Study Area	Site 02	Site 02	Site 03	Site 03	Site 03
Date of Sample Collection	09/29/2000	09/29/2000	09/30/2000	09/30/2000	09/30/2000
Analyte					
1,1,1-TRICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	4.37	1 U	1 U	45	34
1,1,2-TRICHLOROETHANE	4.06	1.81	1 U	7.29	3.97
1,1-DICHLOROETHANE	0.961	1 U	1 U	1.3	1 U
1,1-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U	1 U
2-BUTANONE	5 R	5 R	5 R	5 R	5 R
2-HEXANONE	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U
ACETONE	5 R	5 R	5 R	5 R	5 R
BENZENE	1 U	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
BROMOFORM	1 U	1 U	1 U	1 U	1 U
BROMOMETHANE	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE	1 U	1 U	1 U	1 U	1 U
CARBON TETRACHLORIDE	1 U	1 U	1 U	1 U	1 U
CHLOROBENZENE	1 U	1 U	1 U	1 U	1 U
CHLOROETHANE	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	42	19	3.71	89	52
CIS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	1 U	1 U	1 U	1 U	1 U
M,P-XYLENES	2 U	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	1.69 U	2.19 U	1.1 U	2.09	1.97 U
O-XYLENE	1 U	1 U	1 U	1 U	1 U
STYRENE	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	1 U	1 U	1 U	1 U	1 U
TOLUENE	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	47	20	4.7	110	70 J
TRANS-1,2-DICHLOROETHENE	4.66	1.09	0.964	32	17
TRANS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	16	1.76	5.93	220	160
VINYL CHLORIDE	1.1	0.914	1 U	1.38	1 U
XYLENES (TOTAL)	3 U	3 U	3 U	3 U	3 U
TOTAL BTEX					
TOTAL CHLORINATED CVOCS	73.491	24.484	10.63	384.97	267.97

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-4
Volatile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	MW03-03R-DUP03	MW03-05D	MW03-06D	MW03-07D	MW03-08D
Site or Study Area	Site 03	Site 03	Site 03	Site 03	Site 03
Date of Sample Collection	09/30/2000	10/02/2000	10/02/2000	10/02/2000	10/02/2000
Analyte					
1,1,1-TRICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	36	1 U	180	71 J	410
1,1,2-TRICHLOROETHANE	4.03	1 U	16	5 J	12
1,1-DICHLOROETHANE	1 U	1 U	2.13	1 U	1 U
1,1-DICHLOROETHENE	1 U	1 U	1.6 U	1 U	1 U
1,2-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U	1 U
2-BUTANONE	5 R	5 R	5 R	5 R	5 R
2-HEXANONE	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U
ACETONE	5 R	5 R	5 R	5 R	5 R
BENZENE	1 U	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
BROMOFORM	1 U	1 U	1 U	1 U	1 U
BROMOMETHANE	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE	1 U	1 U	1 U	1 U	1 U
CARBON TETRACHLORIDE	1 U	1 U	1 U	1 U	1 U
CHLOROBENZENE	1 U	1 U	1 U	1 U	1 U
CHLOROETHANE	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	57	1 U	190	74 J	190
CIS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	1 U	1 U	1 U	1 U	1 U
M,P-XYLENES	2 U	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	2.75 U	1.26 U	1 U	1 UJ	1.39 U
O-XYLENE	1 U	1 U	1 U	1 U	1 U
STYRENE	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	1 U	1 U	0.952	1 U	3.61
TOLUENE	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	80	2 U	250	98 J	280
TRANS-1,2-DICHLOROETHENE	19	1 U	59	22 J	45
TRANS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	170	1 U	670	270	840
VINYL CHLORIDE	0.905	1 U	2.39	1 J	1 U
XYLENES (TOTAL)	3 U	3 U	3 U	3 U	3 U
TOTAL BTEX					
TOTAL CHLORINATED CVOCS	290.935		1121.472	445	1545.61

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-4
Volatile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	MW03-08R	MW03-09D	MW03-09D-DUP4	MW03-10D	MW03-11R
Site or Study Area	Site 03	Site 03	Site 03	Site 03	NIKE
Date of Sample Collection	10/02/2000	10/03/2000	10/03/2000	10/02/2000	10/04/2000
Analyte					
1,1,1-TRICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	390	3	3.26	33	2.93
1,1,2-TRICHLOROETHANE	25	8 J	11 J	2.45	1 U
1,1-DICHLOROETHANE	1.52	2	2.25	1 U	1 U
1,1-DICHLOROETHENE	3.8	1 U	0.914	1 U	1 U
1,2-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U	1 U
2-BUTANONE	5 R	5 R	5 R	5 R	5 R
2-HEXANONE	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U
ACETONE	5800 J	5 R	5 R	5 R	5 R
BENZENE	1 U	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
BROMOFORM	1 U	1 U	1 U	1 U	1 U
BROMOMETHANE	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE	1 U	1 U	1 U	1 U	1 U
CARBON TETRACHLORIDE	1 U	1 U	1 U	1 U	1 U
CHLOROBENZENE	1 U	1 U	1 U	1 U	1 U
CHLOROETHANE	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	1 U	1 U	1 U	1 U	1 U
CHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	280	190	240	31	1.27
CIS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	1 U	1 U	1 U	1 U	1 U
M,P-XYLENES	2 U	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	1 U	1 UJ	2.72 U	1 U	2.85 U
O-XYLENE	1 U	1 U	1 U	1 U	1 U
STYRENE	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	1.94	1 U	1 U	1 U	1 U
TOLUENE	1 U	1 U	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	380	230	280	41	1.28
TRANS-1,2-DICHLOROETHENE	100	33	44	9.87	1 U
TRANS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	1000	130	140	98	5.97
VINYL CHLORIDE	3.53	4	5.13	1 U	1 U
XYLENES (TOTAL)	3 U	3 U	3 U	3 U	3 U
TOTAL BTEX					
TOTAL CHLORINATED CVOCS	1805.79	377	442.554	174.45	10.18

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-4
V latile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	MW03-12D	MW03-12R	MW03-13D	MW03-13R	MW03-14D	MW03-14R
Site or Study Area	NIKE	NIKE	NIKE	NIKE	NIKE	NIKE
Date of Sample Collection	10/02/2000	10/02/2000	10/03/2000	10/03/2000	09/28/2000	09/29/2000
Analyte						
1,1,1-TRICHLOROETHANE	1 U	1 U	1 U	1 U	2500 U	1 U
1,1,2,2-TETRACHLOROETHANE	250	1300	52 J	45 J	240000	7500
1,1,2-TRICHLOROETHANE	45	50	84	23	2800	75 J
1,1-DICHLOROETHANE	4	1	2	1 U	2500 U	3.76 J
1,1-DICHLOROETHENE	6	3	8	2	2500 U	13 J
1,2-DICHLOROETHANE	1 U	1 U	1 U	1 U	2500 U	1 U
1,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U	2500 U	1 U
2-BUTANONE	5 R	5 R	5 R	5 R	13000 R	5 R
2-HEXANONE	5 U	5 U	5 U	5 U	13000 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	13000 U	5 U
ACETONE	5 R	5 R	5 R	5 R	13000 R	11 J
BENZENE	1 U	1 U	1 U	1 U	2500 U	1 U
BROMODICHLOROMETHANE	1 U	1 U	1 U	1 U	2500 U	1 U
BROMOFORM	1 U	1 U	1 U	1 U	2500 U	1 U
BROMOMETHANE	1 U	1 U	1 U	1 U	2500 U	1 U
CARBON DISULFIDE	1 U	1 U	1 U	1 U	2500 U	1 U
CARBON TETRACHLORIDE	1 U	1 U	1 U	1 U	2500 U	1 U
CHLOROBENZENE	1 U	1 U	1 U	1 U	2500 U	1 U
CHLOROETHANE	1 U	1 U	1 U	1 U	2500 U	1 U
CHLOROFORM	1 U	1 U	1 U	1 U	2500 U	1 U
CHLOROMETHANE	1 U	1 U	1 U	1 U	2500 U	1 U
CIS-1,2-DICHLOROETHENE	1000	480	18 J	21 J	11000	2200
CIS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	2500 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 U	1 U	1 U	2500 U	1 U
ETHYLBENZENE	1 U	1 U	1 U	1 U	2500 U	1 U
M,P-XYLENES	2 U	2 U	2 U	2 U	5000 U	2 U
METHYLENE CHLORIDE	1 UJ	1 UJ	1 UJ	1 UJ	5200 U	1.41 J
O-XYLENE	1 U	1 U	1 U	1 U	2500 U	1 U
STYRENE	1 U	1 U	1 U	1 U	2500 U	1 U
TETRACHLOROETHENE	1	35	26	3	3900	8.32 J
TOLUENE	1 U	1 U	1 U	1 U	2500 U	1.7 J
TOTAL 1,2-DICHLOROETHENE	1300	720	27 J	370	17000	3200
TRANS-1,2-DICHLOROETHENE	300	230	9 J	110	6500	1000
TRANS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	2500 U	1 U
TRICHLOROETHENE	2000	2000	91 J	87 J	120000	10000
VINYL CHLORIDE	25	6	11	3	2500 U	11 J
XYLENES (TOTAL)	3 U	3 U	3 U	3 U	7500 U	3 U
TOTAL BTEX						1.7
TOTAL CHLORINATED CVOCS	3631	4115	301	533	383700	20811.08

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-4
Volatile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	MW03-14R2	MW03-14R2-DUP8	MWZ3-01	MWZ3-02	MWZ3-03
Site or Study Area	NIKE	NIKE	BasewideGW	BasewideGW	BasewideGW
Date of Sample Collection	09/28/2000	09/28/2000	10/03/2000	09/29/2000	09/28/2000
Analyte					
1,1,1-TRICHLOROETHANE	1 U	1 U	1 U	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	1 U	1 U	56	1.83	1 U
1,1,2-TRICHLOROETHANE	1.64 J	1 UJ	7	2.45	1.83
1,1-DICHLOROETHANE	3.08	3.09	1 U	1 U	1 U
1,1-DICHLOROETHENE	150 J	160 J	1 U	1 U	1 U
1,2-DICHLOROETHANE	1 U	1.57	1 U	1 U	1 U
1,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U	1 U
2-BUTANONE	5 R	5 R	5 R	5 R	5 R
2-HEXANONE	5 U	5 U	5 U	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U
ACETONE	5 R	5 R	5 R	5 R	5 R
BENZENE	1 U	1 U	1 U	1 U	1 U
BROMODICHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
BROMOFORM	1 U	1 U	1 U	1 U	1 U
BROMOMETHANE	1 U	1 U	1 U	1 U	1 U
CARBON DISULFIDE	1 U	1 U	1 U	1 U	1 U
CARBON TETRACHLORIDE	1 U	1 U	1 U	1 U	1 U
CHLOROBENZENE	1 U	1 U	1 U	1 U	1 U
CHLOROETHANE	1 U	1 U	1 U	1 U	1 U
CHLOROFORM	3.27	3.45	1 U	1 U	1 U
CHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
CIS-1,2-DICHLOROETHENE	2000	1800	130	30	24
CIS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE	1 U	1 U	1 U	1 U	1 U
M,P-XYLENES	2 U	2 U	2 U	2 U	2 U
METHYLENE CHLORIDE	1 U	1.33 U	1 UJ	1.63 U	2.31 U
O-XYLENE	1 U	1 U	1 U	1 U	1 U
STYRENE	1 U	1 U	1 U	1 U	1 U
TETRACHLOROETHENE	9.53	10	1 U	1 U	1 U
TOLUENE	1.54	1.63	1 U	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	2900	2500	190	34	27
TRANS-1,2-DICHLOROETHENE	890	730	51	3.78	2.4
TRANS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U
TRICHLOROETHENE	12000	10000	220	16	11
VINYL CHLORIDE	20	21	3	1 U	1 U
XYLENES (TOTAL)	3 U	3 U	3 U	3 U	3 U
TOTAL BTEX	1.54	1.63			
TOTAL CHLORINATED CVOCS	15087.52	12699.11	476	54.28	39.83

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-4
Volatile Organic Compounds Detected in the September - October 2000 Ground-water Samples (ug/L)

Sample ID	MWZ4-01	MWZ4-02
Site or Study Area	BasewideGW	BasewideGW
Date of Sample Collection	09/28/2000	10/03/2000
Analyte		
1,1,1-TRICHLOROETHANE	1 U	1 U
1,1,2,2-TETRACHLOROETHANE	1 U	1 U
1,1,2-TRICHLOROETHANE	1 U	1 U
1,1-DICHLOROETHANE	1 U	1 U
1,1-DICHLOROETHENE	1 U	1 U
1,2-DICHLOROETHANE	1 U	1 U
1,2-DICHLOROPROPANE	1 U	1 U
2-BUTANONE	5 R	5 R
2-HEXANONE	5 U	5 U
4-METHYL-2-PENTANONE	5 U	5 U
ACETONE	5 R	5 R
BENZENE	1 U	1 U
BROMODICHLOROMETHANE	1 U	1 U
BROMOFORM	1 U	1 U
BROMOMETHANE	1 U	1 U
CARBON DISULFIDE	1 U	1 U
CARBON TETRACHLORIDE	1 U	1 U
CHLOROBENZENE	1 U	1 U
CHLOROETHANE	1 U	1 U
CHLOROFORM	1 U	1 U
CHLOROMETHANE	1 U	1 U
CIS-1,2-DICHLOROETHENE	1 U	1 U
CIS-1,3-DICHLOROPROPENE	1 U	1 U
DIBROMOCHLOROMETHANE	1 U	1 U
ETHYLBENZENE	1 U	1 U
M,P-XYLENES	2 U	2 U
METHYLENE CHLORIDE	4.05 U	1 UJ
O-XYLENE	1 U	1 U
STYRENE	1 U	1 U
TETRACHLOROETHENE	1 U	1 U
TOLUENE	1 U	1 U
TOTAL 1,2-DICHLOROETHENE	2 U	2 U
TRANS-1,2-DICHLOROETHENE	1 U	1 U
TRANS-1,3-DICHLOROPROPENE	1 U	1 U
TRICHLOROETHENE	1 U	1 U
VINYL CHLORIDE	1 U	1 U
XYLENES (TOTAL)	3 U	3 U
TOTAL BTEX		
TOTAL CHLORINATED CVOCS		

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit
R = value rejected through validation

TABLE 4-5

SUMMARY OF 1995, 1996, 1998, AND 2000 TOTAL CVOC DETECTED IN GROUND WATER

Monitoring Well Location	1995 Total CVOC (ug/l)	1996 Total CVOC (ug/l)	1998 Total CVOC (ug/L)	2000 Total CVOC (ug/L)
Detected CVOC Concentration decreasing or remaining approximately the same				
EA-101	NI	3	NM	1
EA-103	NI	ND (ND)	NM	ND
EA-104	NI	899	NM	454
EA-105	NI	ND	ND	ND
EA-106D	NI	1	NM	ND
EA-106R	NI	NI	ND	ND
EA-107	NI	3	NM	ND
EA-108	NI	3	NM	ND
EA-111D	NI	NI	0.6 (0.6)	1
EA-112D	NI	NI	42.8	35
EA-112R	NI	NI	168	146
EA-113D	NI	NI	1.5	4
MW03-13D	15,200	1,719	NM	301
MW03-14D	526,480	423,000	368,500	383,700
EA-110D	NI	NI	ND	ND
EA-110R	NI	NI	2	ND
EA-111R	NI	NI	2	ND (ND)
MW01-08D	25	6	NM	4
MW01-09D	ND	ND	NM	1
MW01-10D	ND	ND	NM	ND
MW01-11D	ND	ND	NM	ND
MW01-13D	1	ND (ND)	NM	ND
MW01-12D	49 (52)	33	18	49 (51)
MW01-14D	ND	2	4	4
MW01-15D	29	16	NM	9
MW02-08D	23	14	NM	15
MW02-10D	96	74	80	73
MW03-03D	778	629	642	385
MW03-05D	6	ND	NM	ND
MW03-06D	1,661	1,336 (1,103)	NM	1,121
MW03-07D	463	536	862	445
MW03-08R	5,360	NM	NM	1,806
MW03-10D	409	189 (203)	NM	174
MW03-12R	3,871	NM	NM	4,115
MW03-13R	8,280	NM	NM	533
MW-Z3-03	—	36	41	40
MW-Z4-01	—	ND	ND (ND)	ND
MW-Z4-02	—	—	ND	ND
Detected CVOC Concentration showing no apparent trend				
MW03-12D	5,456	112	NM	3,631
MW03-08D	8,379	2,200	4,119 (4,349)	1,546
Detected CVOC Concentration showing an apparent increasing trend				
EA-102	NI	64,775	NM	115,148
EA-109	NI	41	NM	96
MW02-11D	18	20	NM	24
MW02-03D	31	40	37	54
MW03-02D	7	8	NM	11
MW03-09D	91	250	NM	377 (442)
MW03-14R	16,300	NM	NM	20,811
MW-Z3-01	—	61	1,181	476
MW-Z3-02	—	ND	NM	54

total CVOC concentration in ug/L (Duplicate sample) ND = Not Detected

NM = Not measured NI = Not Installed -- = Data not available

Table 4-6
Semi-Volatile Organic Compounds Detected in September - October 2000 Ground-water Samples (ug/L)

Sample ID	EA114D NIKE	EA114R NIKE	EA114R-DUP6 NIKE
Date of Sample Collection	10/04/2000	10/04/2000	10/04/2000
Analyte			
1,2,4-TRICHLOROBENZENE	5 U	5 U	5 U
1,2-DICHLOROBENZENE	5 U	5 U	5 U
1,3-DICHLOROBENZENE	5 U	5 U	5 U
1,4-DICHLOROBENZENE	5 U	5 U	5 U
2,2'-OXYBIS(1-CHLOROPROPANE)	5 U	5 U	5 U
2,4,5-TRICHLOROPHENOL	10 U	10 U	10 U
2,4,6-TRICHLOROPHENOL	5 U	5 U	5 U
2,4-DICHLOROPHENOL	5 U	5 U	5 U
2,4-DIMETHYLPHENOL	5 U	5 U	5 U
2,4-DINITROPHENOL	10 U	10 U	10 U
2,4-DINITROTOLUENE	5 U	5 U	5 U
2,6-DINITROTOLUENE	5 U	5 U	5 U
2-CHLORONAPHTHALENE	5 U	5 U	5 U
2-CHLOROPHENOL	5 U	5 U	5 U
2-METHYLNAPHTHALENE	5 U	5 U	5 U
2-METHYLPHENOL	5 U	5 U	5 U
2-NITROANILINE	10 U	10 U	10 U
2-NITROPHENOL	5 U	5 U	5 U
3,3'-DICHLOROBENZIDINE	5 U	5 U	5 U
3-NITROANILINE	10 U	10 U	10 U
4,6-DINITRO-2-METHYLPHENOL	10 U	10 U	10 U
4-BROMOPHENYL PHENYL ETHER	5 U	5 U	5 U
4-CHLORO-3-METHYLPHENOL	5 U	5 U	5 U
4-CHLOROANILINE	5 U	5 U	5 U
4-CHLOROPHENYL PHENYL ETHER	5 U	5 U	5 U
4-METHYLPHENOL	5 U	5 U	5 U
4-NITROANILINE	10 U	10 U	10 U
4-NITROPHENOL	10 U	10 U	10 U
ACENAPHTHENE	5 U	5 U	5 U
ACENAPHTHYLENE	5 U	5 U	5 U
ANTHRACENE	5 U	5 U	5 U
AZOBENZENE	5 U	5 U	5 U
BENZIDINE	5 U	5 U	5 U
BENZO(A)ANTHRACENE	5 U	5 U	5 U
BENZO(A)PYRENE	5 U	5 U	5 U
BENZO(B)FLUORANTHENE	5 U	5 U	5 U
BENZO(K)FLUORANTHENE	5 U	5 U	5 U
BENZO[G,H,I]PERYLENE	5 U	5 U	5 U
BENZOIC ACID	10 U	10 U	10 U
BENZYL ALCOHOL	5 U	5 U	5 U
BIS(2-CHLOROETHOXY) METHANE	5 U	5 U	5 U
BIS(2-CHLOROETHYL) ETHER	5 U	5 U	5 U

Table 4-6
Semi-Volatile Organic Compounds Detected in September - October 2000 Ground-water Samples (ug/L)

Sample ID	EA114D NIKE	EA114R NIKE	EA114R-DUP6 NIKE
Date of Sample Collection	10/04/2000	10/04/2000	10/04/2000
Analyte			
BIS(2-ETHYLHEXYL) PHTHALATE	5 U	5 U	5 U
BUTYL BENZYL PHTHALATE	5 U	5 U	5 U
CARBAZOLE	5 U	5 U	5 U
CHRYSENE	5 U	5 U	5 U
DI-N-BUTYL PHTHALATE	5 U	5 U	5 U
DI-N-OCTYLPHTHALATE	5 U	5 U	5 U
DIBENZO(A,H)ANTHRACENE	5 U	5 U	5 U
DIBENZOFURAN	5 U	5 U	5 U
DIETHYL PHTHALATE	5 U	5 U	5 U
DIMETHYL PHTHALATE	5 U	5 U	5 U
FLUORANTHENE	5 U	5 U	5 U
FLUORENE	5 U	5 U	5 U
HEXACHLOROBENZENE	5 U	5 U	5 U
HEXACHLOROBUTADIENE	5 U	5 U	5 U
HEXACHLOROCYCLOPENTADIENE	5 U	5 U	5 U
HEXACHLOROETHANE	5 U	5 U	5 U
INDENO(1,2,3-CD)PYRENE	5 U	5 U	5 U
ISOPHORONE	5 U	5 U	5 U
N-NITROSO-DI-N-PROPYLAMINE	5 U	5 U	5 U
N-NITROSODIMETHYLAMINE	5 U	5 U	5 U
N-NITROSODIPHENYLAMINE	5 U	5 U	5 U
NAPHTHALENE	5 U	5 U	5 U
NITROBENZENE	5 U	5 U	5 U
PENTACHLOROPHENOL	10 U	10 U	10 U
PHENANTHRENE	5 U	5 U	5 U
PHENOL	5 U	5 U	5 U
PYRENE	5 U	5 U	5 U
PYRIDINE	5 U	5 U	5 U

NOTES:
U = unqualified (below laboratory detection limit)

Table 4-7
Total Metals Detected in September - October 2000 Ground-water Samples (ug/L)

Analytical Method	Analyte	EA104 NIKE 09/30/2000	EA104R NIKE 09/30/2000	EA106D NIKE 09/30/2000	EA106R NIKE 09/30/2000	EA112D NIKE 10/01/2000	EA112R NIKE 10/04/2000	EA112R2 NIKE 10/01/2000
SW6010B	ALUMINUM	230	135	1240	62 U	62 U	62 U	324
SW6010B	ANTIMONY	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
SW6010B	ARSENIC	5 U	5 U	5 U	5 U	5 U	5 U	5 U
SW6010B	BARIUM	6.7 U	8.3 U	13.1 U	14.7 U	14.7 U	8.3 U	16 U
SW6010B	BERYLLIUM	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U
SW6010B	CADMIUM	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
SW6010B	CALCIUM	6440 J	7420 J	7920	22700	8630 J	8020 J	14900
SW6010B	CHROMIUM	6.4 U	6.4 U	6.4 U	6.4 U	6.4 U	6.4 U	6.4 U
SW6010B	COBALT	6.8 U	13.7 U	3.3 U	3.3 U	10.3 U	6.8 U	4.9 U
SW6010B	COPPER	8.7 U	8.7 U	8.7 U	8.7 U	8.7 U	8.7 U	8.7 U
SW6010B	IRON	573	8430	2400 J	922 J	11200	10300	3680 J
SW6010B	LEAD	2.1 U	1.8 U	1.9 J	1.8 U	1.8 U	1.8 U	1.8 U
SW6010B	MAGNESIUM	2130	3340	3230	5510	3440	3220	3660
SW6010B	NICKEL	16.1	60.3	10 U	7.3 U	7.3 U	8.6 J	7.3 U
SW6010B	POTASSIUM	988	1020	2350	2990	1190	1120	15200 J
SW6010B	SELENIUM	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U
SW6010B	SILVER	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U	6.1 U
SW6010B	SODIUM	5790	6470	10500	13400	11400	8820	17700
SW6010B	VANADIUM	4.5 U	4.5 U	4.5 U	4.5 U	4.5 U	4.5 U	4.5 U
SW6010B	ZINC	38.2 U	42.3 U	49.7	27.2	21.6 U	24.3 U	92.1 J
SW6010B	MERCURY	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
SW7470A	THALLIUM	1 UJ		1 U	1 U	1 UJ	1 UJ	1 U
SW7841		*NOTE:*						
		Manganese data is included with General Chemistry Results						

Table 4-7
Total Metals D tected in
September - October 2000
Ground-water Samples
(ug/L)

		EA112R2-DUP5 NIKE	EA113D NIKE	EA113R NIKE	EA114D NIKE	EA114R NIKE	EA114R-DUP6 NIKE
Analytical Method	Analyte	10/01/2000	10/02/2000	10/02/2000	10/04/2000	10/04/2000	10/04/2000
SW6010B	ALUMINUM	329	869	155	141	62 U	62 U
SW6010B	ANTIMONY	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
SW6010B	ARSENIC	5 U	5 U	5 U	5 U	5 U	5 U
SW6010B	BARIUM	23.3 U	8.3 U	8.3 U	5.1 U	6.4 U	5.1 U
SW6010B	BERYLLIUM	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U
SW6010B	CADMIUM	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
SW6010B	CALCIUM	19700 J	10700 J	21400 J	2790 J	8230 J	8870 J
SW6010B	CHROMIUM	6.4 U	6.4 U	6.4 U	6.4 U	6.4 U	6.4 U
SW6010B	COBALT	6.8 U	13.7 U	6.8 U	13.7 U	8.6 U	10.3 U
SW6010B	COPPER	8.7 U	8.7 U	8.7 U	8.7 U	8.7 U	8.7 U
SW6010B	IRON	2510 J	6740	2980	1330	13700	14600
SW6010B	LEAD	2.3 U	1.8 U	1.8 U	1.8 U	2 U	1.9 U
SW6010B	MAGNESIUM	4450	5520	3660	1400	1960	2170
SW6010B	NICKEL	7.3 U	23.7	7.3 U	7.3 U	8.6 J	7.3 U
SW6010B	POTASSIUM	9020 J	1780	1810	4490	1760	1790
SW6010B	SELENIUM	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U
SW6010B	SILVER	6.1 U	6.1 U	6.1 U	6.1 U	6.6 J	6.9 J
SW6010B	SODIUM	15200	9420	6110	6410	6590	7070
SW6010B	VANADIUM	4.5 U	5.2 U	4.5 U	4.5 U	4.5 U	4.5 U
SW6010B	ZINC	25.2 UJ	46.4 U	32.9 U	7.5 U	44.3 U	12.3 U
SW6010B	MERCURY	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
SW7470A	THALLIUM	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
SW7841							

Table 4-8
General Chemistry Parameters
Detected in September - October 2000
Ground-water Samples

Analytical Method	Analyte	Units	EA101 NIKE 10/03/2000	EA102 NIKE 10/03/2000	EA103 NIKE 10/04/2000	EA104 NIKE 09/30/2000	EA104R NIKE 09/30/2000	EA105 NIKE 09/29/2000	EA105R NIKE 09/29/2000
E325.2	CHLORIDE	mg/L	7.09	16.5	7.07	8.59	12.7	12.6	10.8
E353.2	NITRATE	mg/L						0.23	0.1 U
E353.3	NITRATE	mg/L	0.1 U	0.1 U	0.14	0.1 U	0.1 U		
E375.4	SULFATE	mg/L	9.61	10.6	7.26	13.2	13.9	10	14.1
E403	ALKALINITY, TOTAL	mg/L	62.7	31.9	52	14 J	41.8 J	8.4	8.5 J
SW3810	ETHANE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U
SW3810	ETHYLENE	UG/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U
SW3810	METHANE	UG/L	47	5	26	1 U	2.5	1	41
SW9030	Sulfide	mg/L	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
SW6010B	MANGANESE	UG/L	558	129	200	114	378	17.6	214

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit

Table 4-8
Gen ral Chemistry Parameters
Detected in September - October 2000
Ground-water Samples

Analytical Method	Analyte	Units	EA106D NIKE 09/30/2000	EA106R NIKE 09/30/2000	EA107 NIKE 09/27/2000	EA107R NIKE 09/27/2000	EA108 NIKE 09/27/2000	EA108R NIKE 09/27/2000	EA109 NIKE 10/03/2000
E325.2	CHLORIDE	mg/L	19.6	10.9	8.06	22.8	5.86	12	6.11
E353.2	NITRATE	mg/L	1.26	0.1 U	0.16	0.1 U	1.05	0.1 U	
E353.3	NITRATE	mg/L							0.1 U
E375.4	SULFATE	mg/L	15.6	3.79	11	12.5	13.2	23.4	7.26
E403	ALKALINITY, TOTAL	mg/L	16.2 J	85.9 J	18.6	87	14.5	71.5	85.4
SW3810	ETHANE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U	2 U
SW3810	ETHYLENE	UG/L	3 U	3 U	3 U	3 U	3 U	3 U	3 U
SW3810	METHANE	UG/L	3	1400	1	32	7	1	80
SW9030	Sulfide	mg/L	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
SW6010B	MANGANESE	UG/L	104	216	1.8 U	275	124	1120	2440

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit

Table 4-8
Gen ral Chemistry Parameters
Detected in September - October 2000
Ground-water Samples

Analytical Method	Analyte	Units	EA110D Site 03 09/26/2000	EA110R Site 03 09/26/2000	EA111D Site 03 09/27/2000	EA111R Site 03 09/27/2000	EA111R-DUP1 Site 03 09/27/2000	EA112D NIKE 10/01/2000
E325.2	CHLORIDE	mg/L	6.61	6.47	8.76	9.85	9.14	22.1
E353.2	NITRATE	mg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	
E353.3	NITRATE	mg/L						0.1 U
E375.4	SULFATE	mg/L	5.49	1.87	15.6	4.95	4.61	18.2
E403	ALKALINITY, TOTAL	mg/L	68.6 J	92.9 J	59 J	102 J	107 J	36.8 J
SW3810	ETHANE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U
SW3810	ETHYLENE	UG/L	3 U	3 U	3 U	3 U	3 U	3 U
SW3810	METHANE	UG/L	700	30	1 U	760 J	440 J	70
SW9030	Sulfide	mg/L	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
SW6010B	MANGANESE	UG/L	536	94.9	536	2210	2540	622

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit

Tabl 4-8
G n ral Ch mistry Paramet rs
Detected in September - October 2000
Ground-water Samples

Analytical Method	Analyte	Units	EA112R NIKE 10/04/2000	EA112R2 NIKE 10/01/2000	EA112R2-DUP5 NIKE 10/01/2000	EA113D NIKE 10/02/2000	EA113R NIKE 10/02/2000	EA114D NIKE 10/04/2000
E325.2	CHLORIDE	mg/L	21.5	7.76	7.33	24.3	11.9	7.45
E353.2	NITRATE	mg/L		0.16 J				
E353.3	NITRATE	mg/L	0.1 U		0.1 UJ	0.21	0.11	0.1 U
E375.4	SULFATE	mg/L	20.3	10.6	11.2	15.4	14.1	13.6
E403	ALKALINITY, TOTAL	mg/L	35.2	99 J	95.3 J	38.9	71.1	13.4
SW3810	ETHANE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U
SW3810	ETHYLENE	UG/L	3 U	3 U	3 U	3 U	3 U	3 U
SW3810	METHANE	UG/L	5.4 J	2 J	1.3 J	110	2.8	1.3
SW9030	Sulfide	mg/L	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
SW6010B	MANGANESE	UG/L	550	219	237	487	137	1000

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit

Table 4-8
G neral Chemistry Parameters
Detected in September - October 2000
Ground-water Samples

Analytical Method	Analyte	Units	EA114R NIKE 10/04/2000	EA114R-DUP6 NIKE 10/04/2000	EA116D NIKE 09/28/2000	EA116R NIKE 09/28/2000	EA116R2 NIKE 09/28/2000	EA116R2-DUP7 NIKE 09/28/2000
E325.2	CHLORIDE	mg/L	8.02	8.18	22.5	22	7.21	6.9
E353.2	NITRATE	mg/L			0.1 U	0.1 U	0.1 U	0.1 U
E353.3	NITRATE	mg/L	0.1 U	0.1 U				
E375.4	SULFATE	mg/L	9.36	8.49	17.3	18.9	8.57	8.07
E403	ALKALINITY, TOTAL	mg/L	36.8	42.7	36.5	38.5	363	356
SW3810	ETHANE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U
SW3810	ETHYLENE	UG/L	3 U	3 U	3 U	3 U	3 U	3 U
SW3810	METHANE	UG/L	1 U	1 U	3	3	1	1 U
SW9030	Sulfide	mg/L	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
SW6010B	MANGANESE	UG/L	473	511	1170	402	13.6	9.1

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit

Table 4-8
G neral Chemistry Parameters
Detected in September - October 2000
Ground-water Samples

Analytical Method	Analyte	Units	MW01-08D Study Area 01 09/30/2000	MW01-09D Study Area 01 09/30/2000	MW01-10D Study Area 01 10/03/2000	MW01-10R Study Area 01 10/03/2000	MW01-11D Study Area 01 10/01/2000
E325.2	CHLORIDE	mg/L	6.1	6.1	9	7.7	9.1
E353.2	NITRATE	mg/L					
E353.3	NITRATE	mg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
E375.4	SULFATE	mg/L	19.1	14.8	15.8	11.5	15.7
E403	ALKALINITY, TOTAL	mg/L	33.1 J	60 J	39.2 J	72 J	42.6 J
SW3810	ETHANE	UG/L	2 U	2 U	2 U	2 U	2 U
SW3810	ETHYLENE	UG/L	3 U	3 U	3 U	3 U	3 U
SW3810	METHANE	UG/L	1 U	560	1.9	3.6	63
SW9030	Sulfide	mg/L	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
SW6010B	MANGANESE	UG/L	292	680	529	989	474

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit

Table 4-8
Gen ral Chemistry Param ters
Detected in September - October 2000
Ground-water Samples

Analytical Method	Analyte	Units	MW01-12D Study Area 01 10/01/2000	MW01-12D-DUP2 Study Area 01 10/01/2000	MW01-13D Study Area 01 09/27/2000	MW01-13R Study Area 01 09/27/2000	MW01-14D Study Area 01 09/27/2000
E325.2	CHLORIDE	mg/L	6.2	6.5	6.8	6.19	6.9
E353.2	NITRATE	mg/L				0.1 U	
E353.3	NITRATE	mg/L	0.1 U	0.1 U	0.1 U		0.2
E375.4	SULFATE	mg/L	18.1	17.2	7.9	6.87	13
E403	ALKALINITY, TOTAL	mg/L	31.7 J	30.9 J	50 J	63 J	49.5 J
SW3810	ETHANE	UG/L	2 U	2 U	2 U	2 U	2 U
SW3810	ETHYLENE	UG/L	3 U	3 U	3 U	3 U	3 U
SW3810	METHANE	UG/L	88 J	460	74	1	2.5
SW9030	Sulfide	mg/L	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
SW6010B	MANGANESE	UG/L	446	404	689	578	607

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit

Table 4-8
General Ch mistry Paramet rs
Detected in September - October 2000
Ground-water Samples

Analytical Method	Analyte	Units	MW01-15D Study Area 01 09/30/2000	MW01-15R Study Area 01 09/30/2000	MW02-03D Site 02 09/29/2000	MW02-03R Site 02 09/29/2000	MW02-08D Site 02 10/03/2000	MW02-10D Site 02 09/29/2000
E325.2	CHLORIDE	mg/L	7.66	7.22	7.66	9.47	6.8	7.73
E353.2	NITRATE	mg/L	0.1 U	0.1 U	0.1 U	0.1 U		0.1 U
E353.3	NITRATE	mg/L					0.5	
E375.4	SULFATE	mg/L	15.1	11.8	20	13.2	15.6	15
E403	ALKALINITY, TOTAL	mg/L	28.6 J	82.6 J	45.5 J	33.2 J	18.3 J	46.6 J
SW3810	ETHANE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U
SW3810	ETHYLENE	UG/L	3 U	3 U	3 U	3 U	3 U	3 U
SW3810	METHANE	UG/L	4	2	1	3	1 U	4
SW9030	Sulfide	mg/L	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
SW6010B	MANGANESE	UG/L	308	671	470	658	155	815

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit

Table 4-8
General Chemistry Parameters
Detected in September - October 2000
Ground-water Samples

Analytical Method	Analyte	Units	MW02-11D Site 02 09/29/2000	MW03-02D Site 03 09/30/2000	MW03-03D Site 03 09/30/2000	MW03-03R Site 03 09/30/2000	MW03-03R-DUP03 Site 03 09/30/2000	MW03-05D Site 03 10/02/2000
E325.2	CHLORIDE	mg/L	7.61	6.8	7.41	7.06	7.12	5.1
E353.2	NITRATE	mg/L	0.19		0.1 U	0.1 U	0.1 U	
E353.3	NITRATE	mg/L		0.4				0.85
E375.4	SULFATE	mg/L	14.2	17.8	16.1	16.1	16.2	13.7
E403	ALKALINITY, TOTAL	mg/L	52.3 J	47.8 J	49.6 J	51.4 J	55.2 J	9.8 J
SW3810	ETHANE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U
SW3810	ETHYLENE	UG/L	3 U	3 U	3 U	3 U	3 U	3 U
SW3810	METHANE	UG/L	2	1 U	3	3 J	1.5 J	1 U
SW9030	Sulfide	mg/L	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
SW6010B	MANGANESE	UG/L	529	606	508	391	399	166

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit

Table 4-8
General Chemistry Parameters
Detected in September - October 2000
Ground-water Samples

Analytical Method	Analyte	Units	MW03-06D Site 03 10/02/2000	MW03-07D Site 03 10/02/2000	MW03-08D Site 03 10/02/2000	MW03-08R Site 03 10/02/2000	MW03-09D Site 03 10/03/2000	MW03-09D-DUP4 Site 03 10/03/2000
E325.2	CHLORIDE	mg/L	8.4	7.3	8.6	10.5	9.9	9
E353.2	NITRATE	mg/L						
E353.3	NITRATE	mg/L	0.1 U	0.5	0.1 U	0.1 U	0.1 U	0.1 U
E375.4	SULFATE	mg/L	14.9	15.4	11.9	12.1	15.5	15.1
E403	ALKALINITY, TOTAL	mg/L	34.1 J	30.3 J	14.5 J	67.5 J	47 J	42.6 J
SW3810	ETHANE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U
SW3810	ETHYLENE	UG/L	3 U	3 U	3 U	3 U	3 U	3 U
SW3810	METHANE	UG/L	2.4	1.8	1 U	1.6	9.8	8
SW9030	Sulfide	mg/L	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
SW6010B	MANGANESE	UG/L	343	138	34.8	381	474	574

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit

Table 4-8
General Chemistry Paramet rs
Detected in September - Oct ber 2000
Ground-water Samples

Analytical Method	Analyte	Units	MW03-10D Site 03 10/02/2000	MW03-11R NIKE 10/04/2000	MW03-12D NIKE 10/02/2000	MW03-12R NIKE 10/02/2000	MW03-13D NIKE 10/03/2000	MW03-13R NIKE 10/03/2000
E325.2	CHLORIDE	mg/L	6.1	7.8	15.4	8.82	11.4	9.09
E353.2	NITRATE	mg/L						
E353.3	NITRATE	mg/L	0.2	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
E375.4	SULFATE	mg/L	12.8	16.5	23.4	11.6	12.8	13.2
E403	ALKALINITY, TOTAL	mg/L	22.9 J	28.2 J	97.2	33.6	40.3	48.7
SW3810	ETHANE	UG/L	2 U	2 U	2 U	2 U	2 U	2 U
SW3810	ETHYLENE	UG/L	3 U	3 U	3 U	3 U	3 U	3 U
SW3810	METHANE	UG/L	1 U	1	63	8.3	7	3.6
SW9030	Sulfide	mg/L	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
SW6010B	MANGANESE	UG/L	42.3	132	1580	189	583	228

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit

Table 4-8
G neral Chemistry Parameters
Detected in September - October 2000
Ground-water Samples

Analytical Method	Analyte	Units	MW03-14D NIKE 09/28/2000	MW03-14R NIKE 09/29/2000	MW03-14R2 NIKE 09/28/2000	MW03-14R2-DUP8 NIKE 09/28/2000	MWZ3-01 BasewideGW 10/03/2000
E325.2	CHLORIDE	mg/L	57.8	15.2	9.01	9.14	16
E353.2	NITRATE	mg/L	0.1 U	0.1 U	0.1 U	0.1 U	
E353.3	NITRATE	mg/L					0.1 U
E375.4	SULFATE	mg/L	13	14.4	2.81	3.12	17.9
E403	ALKALINITY, TOTAL	mg/L	70.8	93.2 J	437	416	36.8 J
SW3810	ETHANE	UG/L	3		2 U	2 U	2 U
SW3810	ETHYLENE	UG/L	2		3 U	3 U	3 U
SW3810	METHANE	UG/L	3		1.8	2.3	20
SW9030	Sulfide	mg/L	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
SW6010B	MANGANESE	UG/L	1310	530	67.9	66.4	534

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit

Table 4-8
G neral Chemistry Paramet rs
Detected in September - October 2000
Ground-water Samples

Analytical Method	Analyte	Units	MWZ3-02 BasewideGW 09/29/2000	MWZ3-03 BasewideGW 09/28/2000	MWZ4-01 BasewideGW 09/28/2000	MWZ4-02 BasewideGW 10/03/2000
E325.2	CHLORIDE	mg/L	7.59	7.99	5.33	5.7
E353.2	NITRATE	mg/L	0.1 U	0.1 U	0.1 U	
E353.3	NITRATE	mg/L				0.1 U
E375.4	SULFATE	mg/L	16.2	15.2	5.7	3.4
E403	ALKALINITY, TOTAL	mg/L	53.1 J	54.8 J	25 J	70.3 J
SW3810	ETHANE	UG/L	2 U	2 U	2 U	2 U
SW3810	ETHYLENE	UG/L	3 U	3 U	3 U	3 U
SW3810	METHANE	UG/L	2	3	420	1700
SW9030	Sulfide	mg/L	1 UJ	1 UJ	1 UJ	1 UJ
SW6010B	MANGANESE	UG/L	662	618	5940	310

NOTES:
U = unqualified (below laboratory detection limit)
J = estimated value below sample qualification limit

TABLE 5-1
Inference of NAPL Presence:
Comparision of Maximum Detected Concentrations to 1% of Compound Solubility
Former PR-58 Nike Site and NCBC Davisville Study Areas 01 and 04, Sites 02 and 03
North Kingstown, R.I.

Compound	Deep Well Max (ug/L)	Location	Rock Well Max (ug/L)	Location	Deep Rock Well Max (ug/L)	Location	Solubility (ug/L)	One Percent (ug/L)
1,1,2,2-TETRACHLOROETHANE	**240,000**	**MW03-14D**	7500	MW03-14R			2,962,000	29,620
1,1,2-TRICHLOROETHANE	2800	MW03-14D	75	EA104R/MW03-14R	1.64	MW03-14R2	4,420,000	44,200
1,1-DICHLOROETHANE	4	MW03-12D	12	EA107R	3.09	MW03-14R2-DUP8	5,060,000	50,600
1,1-DICHLOROETHENE	8	MW03-13D	13	MW03-14R	160	MW03-14R2-DUP8	2,250,000	22,500
1,2-DICHLOROETHANE	2	EA102			1.57	MW03-14R2-DUP8	8,608,000	86,080
2-BUTANONE	11	MW01-08D					256,000,000	2,560,000
ACETONE	9.89	EA116D	5800	EA110R			miscible	miscible
CARBON DISULFIDE			1.15	MW03-14R			1,185,000	11,850
CARBON TETRACHLORIDE	12	EA102					804,800	8,048
CHLOROFORM	31	EA102			3.45	MW03-14R2-DUP8	7,950,000	79,500
CIS-1,2-DICHLOROETHENE	**11,000**	**MW03-14D**	2200	MW03-14R	2000	MW03-14R2	800,000	8,000
ETHYLBENZENE	1.13	MW01-08D					206,000	2,060
M,P-XYLENES	3.03	MW01-08D						
METHYLENE CHLORIDE	2.09	MW03-03D	2.32	EA106R	2.59	EA112R2	13,200,000	132,000
TETRACHLOROETHENE	**3,900**	**MW03-14D**	35	MW03-12R	10	MW03-14R2-DUP8	150,000	1,500
TOLUENE			1.7	MW03-14R	1.63	MW03-14R2-DUP8	526,000	5,260
TRANS-1,2-DICHLOROETHENE	6500	MW03-14D	1000	MW03-14R	890	MW03-14R2	6,300,000	63,000
TRICHLOROETHENE	**120,000**	**MW03-14D**	10000	MW03-14R	**12000**	**MW03-14R2**	1,100,000	11,000
VINYL CHLORIDE	25	MW03-12D	16	EA104R	21	MW03-14R2-DUP8	1,100,000	11,000

Bold indicates concentrations & locations of detected compunds in excess of 1% of the compund solubility.

TABLE 5-2
Physical and Chemical Properties of VOC
Former PR-58 Nike Site
North Kingstown, RI

Chemical	Molecular Weight	Specific Density @ 20°C	Octanol-Water Partition Coefficient (log Kow)	Absolute Viscosity (cp)	Organic Carbon partition Coefficient Koc ml/gm	Solubility in Water @ 25°C (mg/L)
Methylene Chloride	84.93	1.3266	1.30	0.43	8.8	20,000
Ethylbenzene	106.17	0.8670	3.15	—	1100	152
Vinyl Chloride	62.5	0.9106	1.38	—	57	2,670
Toluene	92	0.8666-0.86697	2.73	—	300	535
Xylene (mixed)	106.17	0.86-0.88	3.26	—	240	198
t-1,2-DCE	96.94	1.2565	0.48	0.40	59	6,300
c-1,2-DCE	96.94	1.27	0.70	—	49	3,500
TCE	131.39	1.464	2.38	0.57	126	1,100
1,1,1-TCA	133.40	1.31-1.3390	2.5	1.20	152	1,500
1,1,2-TCA	133.40	1.434-1.441	2.47	0.12	56	4,500
1,1,2,2-PCA	167.85	1.5953	2.39	1.75	118	2,900
1,1-DCE	96.94	1.213-1.218	1.84	0.36	65	2,250
1,1-DCA	98.96	1.173-1.176	1.79	0.44	30	5,500
PCE	165.83	1.6227	2.6	0.89	364	1500

Source: Ground Water Chemicals Desk Reference (Montgomery and Welkom, 1990)
NIOSH Pocket Guide to Chemical Hazards, 1994

TABLE 5-3
TOC Values in Soil Samples from Adjacent Site 02 and Site 03
NCBC Davisville, RI

Monitoring Well	TOC sample Interval (FBGS)	foc, %	Screened Interval (FBGS)	Geological Unit Screened	Reference
MW02-08D	34-36	0.01	36-46	very fine sand	TRC, Phase II RI, 1994
MW02-09S	19-21	0.02	12-27	fine sand	
MW02-10D	44-46	0.09	42-52	silty sand	
MW02-11S	29-31	0.02	13-28	F-C sand and gravel	
MW03-03D	29-31	0.02	48-58	silty sand	
MW03-04S	16-18	0.03	10-25	F-M sand and silt	

Foc = Fraction of organic carbon, as expressed as %.
FBGS = Feet below ground surface.

TABLE 5-4

Summary Of REDOX Indicator Parameter Results From Well Sampling (September-October 2000)
Former PR-58 Nike Site and NCBC Davisville Study Areas 01 and 04, Sites 02 and 03
North Kingstown, R.I.

Well Number	Date	Eh (mV)	Dissolved Oxygen	NO^{-3} (mg/L)	Mn (µg/L)	Fe^{++} (mg/L)	SO_4^{-2} (mg/L)	CH_4 (µg/L)	Interpreted Dominant Electron Accepted
EA-101	10/3/00	108.0	0.79	0.1	558	2.55	9.61	47	O_2/Fe/Mn
EA-102	10/3/00	118.2	0.60	0.1	129	0.20	10.6	5	O_2
EA-103	10/4/00	261.2	0.93	0.14	200	NA	7.26	26	O_2
EA-104D	9/30/00	*	0.36	0.1	114	0.0	13.2	1	NO_3/Mn
EA-104R	9/30/00	-85.7	0.72	0.1	378	>5.10	13.9	72.5	
EA-105D	9/29/00	*	7.30	0.23	17.6	0.0	10	1	O_2
EA-105R	9/29/00	-31.3	1.03	0.1	214	>5.10	14.1	41	
EA-106D	9/30/00	217.9	1.48	1.26	104	0.16	15.6	3	O_2
EA-106R	9/30/00	*	1.20	0.1	216	0.82	3.79	1400	
EA-107D	9/27/00	815	8.70	0.16	1.8	0.0	11	1	O_2
EA-107R	9/27/00	-405.4	1.64	0.1	275	1.09	12.5	32	
EA-108D	9/27/00	*	5.83	1.05	124	0.04	13.2	7	O_2
EA-108R	9/27/00	-196.0	3.07	0.1	1120	2.14	23.4	1	
EA-109	10/3/00	-63.8	0.67	0.1	2440	10.0	7.26	80	Fe/SO_4
EA-110D	9/26/00	-189.2	1.61	0.1	536	>5.10	5.49	700	SO_4/CH_4
EA-110R	9/26/00	122.6	0.22	0.1	94.9	0.0	1.87	30	
EA-111D	9/27/00	-16.1	1.06	0.1	536	>5.10	15.6	1	Fe^{+2}
EA-111R	9/27/00	-97.6	2.1	0.1	2210(2540)	>5.10	4.95(4.61)	760(440)	
EA-112D	10/1/00	30.3	0.38	0.1	622	11.72	18.2	70	Fe^{+2}

Well Number	Date	Eh (mV)	Dissolved Oxygen	NO^{-3} (mg/L)	Mn (µg/L)	Fe^{++} (mg/L)	SO_4^{-2} (mg/L)	CH_4 (µg/L)	Interpreted Dominant Electron Accepted
EA-112R	10/4/00	-81.4	0.38	0.1	550	10.92	20.3	5.4	
EA-112R2	10/1/00	-297.0	0.36	0.16(0.1)	219(237)	0.04	10.6(11.2)0	2(1.3)	
EA-113D	10/2/00	226.1	0.04	0.21	487	0.42	15.4	110	O_2/ NO_3^-
EA-113R	10/2/00	-311	0.28	0.11	137	0.82	14.1	2.8	
EA-114D	10/4/00	119.4	0.98	0.1	1000	1.92	13.6	1.3	O_2
EA-114R	10/4/00	-211.8	0.35	0.1	473(511)	NA	9.36(8.49)	1(1)	
EA-116D	9/28/00	-36.3	0.99	0.1	1170	0.33	17.3	3	Mn
EA-116R	9/28/00	-434	10.75	0.1	402	2.54	18.9	3	
EA-116R2	9/28/00	-81.5	0.87	0.1	13.6(9.1)	0.66 (Dup 0.66)	8.57(8.07)	1(1)	
MW01-08D	9/30/00	-39.2	0	0.1	292	>5.10	19.1	1	Fe
MW01-09D	9/30/00	-2	2.41	0.1	680	2.76	14.8	560	O_2/Mn
MW01-10D	10/3/00	-20.5	0.19	0.1	529	10.28	15.8	1.9	Fe
MW01-10R	10/3/00	-316.0	0.99	0.1	989	2.74	11.5	3.6	
MW01-11D	10/1/00	-40.0	0.24	0.1	474	6.12	15.7	63	Fe
MW01-12D	10/1/00	-16.8	0	0.1	446(404)	2.89 (Dup 2.64)	18.1(17.2)	88(460)	Mn
MW01-13D	9/27/00	-33.0	12.40	0.1	689	1.75	7.9	74	Mn
MW01-13R	9/27/00	-67.0	0.14	0.1	578	1.0	6.87	1	
MW01-14D	9/27/00	-32.8	0.65	0.2	607	2.43	13	2.5	NO_3^-/Mn
MW01-15D	9/30/00	149.0	0.23	0.1	308	1.17	15.1	4	O_2
MW01-15R	9/30/00	-488	1.73	0.1	671	0.26	11.8	2	
MW02-03D	9/29/00	7.9	0.35	0.1	470	2.88	20	1	Mn
MW02-03R	9/29/00	-86.2	0.70	0.1	658	1.91	13.2	3	

Well Number	Date	Eh (mV)	Dissolved Oxygen	NO^{-3} (mg/L)	Mn (µg/L)	Fe^{++} (mg/L)	SO_4^{-2} (mg/L)	CH_4 (µg/L)	Interpreted Dominant Electron Accepted
MW02-08D	10/3/00	299	0.49	0.5	155	0.06	15.6	1	O_2
MW02-10D	9/29/00	-16.4	0	0.1	815	>5.10	15	4	Fe^{+2}
MW02-11D	9/29/00	-13.1	0	0.19	529	>5.10	14.2	2	Fe^{+2}
MW03-02D	9/30/00	-9.3	0.59	0.4	606	>5.10	17.8	1	Fe^{+2}
MW03-03D	9/30/00	-13.6	0.25	0.1	508	>5.10	16.1	3(1.5)	Fe^{+2}
MW03-03R	9/30/00	-36.3	0.16	0.1	391(399)	>5.10	16.1(16.2)	1	
MW03-05D	10/2/00	303.1	3.61	0.85	166	0.0	13.7	2.4	O_2
MW03-06D	10/2/00	-32	0.34	0.1	343	3.92	14.9	1.8	Mn/Fe^{+2}
MW03-07D	10/2/00	231	5.13	0.5	138	1.14	15.4	1	O_2
MW03-08D	10/2/00	101.9	1.10	0.1	34.8	0.02	11.9	1.6	O_2
MW03-08R	10/2/00	-43.3	0.91	0.1	381	1.15	12.1	9.8(8)	
MW03-09D	10/3/00	57	0.58	0.1	474(574)	3.16 (Dup 6.46)	15.5(15.1)	1	Mn/Fe^{+2}
MW03-10D	10/2/00	137.4	0.94	0.2	42.3	0.03	12.8	1	O_2/NO_3^-
MW03-11R	10/4/00	-41.9	0.12	0.1	132	1.92	16.5	63	
MW03-12D	10/2/00	249.0	2.28	0.1	1580	3.93	23.4	8.3	O_2
MW03-12R	10/2/00	90	0.62	0.1	189	0.34	11.6	7	
MW03-13D	10/3/00	-24.9	0.57	0.1	583	2.42	12.8	3.6	Mn
MW03-13R	10/3/00	21.8	1.14	0.1	228	1.49	13.2	3	
MW03-14D	9/28/00	-170.9	1.04	0.1	1310	>5.10	13		Fe^{+2}
MW03-14R	9/29/00	-140.2	10.10	0.1	530	2.25	14.4		
MW03-14R2	9/28/00	-167.5	1.07	0.1	67.9(66.4)	0.56 (Dup 0.50)	2.81(8.12)	1.8(2.3)	
MW-Z3-01	10/3/00	-136.5	0.20	0.1	534	10.68	17.9	20	Fe^{+2}

Well Number	Date	Eh (mV)	Dissolved Oxygen	NO^{-3} (mg/L)	Mn (µg/L)	Fe^{++} (mg/L)	SO_4^{-2} (mg/L)	CH_4 (µg/L)	Interpreted Dominant Electron Accepted
MW-Z3-02	9/29/00	-24.6	0.74	0.1	662	2.38	16.2	2	Mn
MW-Z3-03D	9/28/00	-34.9	0.60	0.1	618	>5.10	15.2	3	Fe^{+2}
MW-Z4-01	9/28/00	-75.4	0.27	0.1	5940	0.73	5.7	420	SO_4/CH_4
MW-Z4-02	10/3/00	-258.0	0.24	0.1	310	2.97	3.4	1700	CH_4

NOTES: This table shows the last set of Eh and DO parameters measured before removal of flow through cell prior to sample collection.

NA = Data not available
BC = degrees Celsius
mg/L = milligrams per litre
mS/cm = millisiemens/centimeter
NTU = Nephlometric Turbidity Units
mV = millivolt
* = Instrument Malfunction
NA = data not available

Fe^{++} was measured with DR2000 Direct Reading Spectrophotometer by Hach (1,10 Phenanthroline method)
Eh and DO were measured with YSI Water Quality Meter with flow through cell.
Nitrate(NO^{-3}), manganese (Mn), sulfate (SO_4^{-2}), and methane (CH_4) were laboratory analyzed.

TABLE 5-5. ANALYTICAL PARAMETERS AND WEIGHTING FOR PRELIMINARY SCREENING[a]

Analysis	Concentration in Most Contaminated Zone	Interpretation	Value
Oxygen*	<0.5 mg/L	Tolerated, suppresses the reductive pathway at higher concentrations	3
Oxygen*	>1 mg/L	VC may be oxidized aerobically	-3
Nitrate*	<1 mg/L	At higher concentrations may compete with reductive pathway	2
Iron II*	>1 mg/L	Reductive pathway possible	3
Sulfate*	<20 mg/L	At higher concentrations may compete with reductive pathway	2
Sulfide*	>1 mg/L	Reductive pathway possible	3
Methane*	<0.5 mg/L >0.5 mg/L	VC oxidizes Ultimate reductive daughter product, VC accumulates	0 3
Oxidation Reduction Potential (ORP)	<50 millivolts (mV) <-100 mV	Reductive pathway possible Reductive pathway likely	1 2
pH*	5<pH<9 5>pH>9	Optimal range for reductive pathway Outside optimal range for reductive pathway	0 -2
TOC	>20 mg/L	Carbon and energy source; drives dechlorination; can be natural or anthropogenic	2
Temperature*	>20°C	At T >20°C biochemical process is accelerated	1
Carbon Dioxide	>2X background	Ultimate oxidative daughter product	1
Alkalinity	>2X background	Results from interaction of carbon dioxide with aquifer minerals	1
Chloride*	>2X background	Daughter product of organic chlorine	2
Hydrogen	>1 nM	Reductive pathway possible, VC may accumulate	3
Hydrogen	<1 nM	VC oxidized	0
Volatile Fatty Acids	>0.1 mg/L	Intermediates resulting from biodegradation of aromatic compounds; carbon and energy source	2
BTEX*	>0.1 mg/L	Carbon and energy source; drives dechlorination	2
PCE*		Material released	0
TCE*		Material released Daughter product of PCE	0 2[a]
DCE*		Material released Daughter product of TCE If cis is greater than 80% of total DCE, it is likely a daughter product of TCE	0 2[a]
VC*		Material released Daughter product of DCE	0 2[a]
Ethene/Ethane	>0.01 mg/L >0.1 mg/L	Daughter product of VC/ethene	2 3
Chloroethane*		Daughter product of VC under reducing conditions	2
1,1,1-trichloroethane*		Material released	0
1,2-dichlorobenzene*		Material released	0
1,3-dichlorobenzene*		Material released	0
1,4-dichlorobenzene*		Material released	0
chlorobenzene*		Material released or daughter product of dichlorobenzene	2[a]
1,1-DCE*		Daughter product of TCE or chemical reaction of 1,1,1-TCA	2[a]

* Required analysis.

(a) Points awarded only if it can be shown that the compound is a daughter product (i.e., not a constituent of the source NAPL).

Source: Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater, November 1996.

TABLE 5-6. Preliminary Biodegradation Screening Results Based On The 1998 Ground-Water Sample Results Former PR-58 Nike Site and Adjacent NCBC Davisville Study Area 01, Sites 02 and 03 North Kingstown, RI

Indicator Parameters	EA-105 (Background)	Weight	MW03-14D (NAPL Source Area)	Weight	MW03-07D (Downgradient)	Weight	Interpretation
Dissolved Oxygen (mg/L)	3.11	-3	2.1	-3	0.88	0	Tolerated at concentrations <0.5 mg/l, suppresses reductive pathway at concentrations >0.5 mg/l.
Nitrate (mg/L)	ND	2	0.52	2	ND	2	May compete with reductive pathway at concentrations >1 mg/L.
Iron II (µg/L)	168	0	10,800	3	4,380	3	Reductive pathway possible at concentrations >1 mg/L.
Sulfate (mg/L)	9.47	2	9.41	2	15.1	2	May compete with reductive pathway at concentrations > 20 mg/L.
Methane (mg/L)	<0.01	0	<0.01	0	<0.01	0	<0.5 mg/L VC oxidizes, >0.5 mg/l VC accumulates.
ORP (mV)	135	0	-130	0(2)	55	1	<50 mV reductive pathway possible, <-100 mV reductive pathway likely.
pH	5.36	0	6.8	0	5.9	0	Optimal range for reductive pathway is 5< pH <9.
Temperature EC	9	0	6.5	0	8	0	Biochemical processes are accelerated at temperatures >20EC.
Hydrogen (nM)	2.51	3	NA(1)	-	1.11	3	>1 nM reductive pathway possible, <1 nM VC oxidized.

Indicator Parameters	EA-105 (Background)	Weight	MW03-14D (NAPL Source Area)	Weight	MW03-07D (Downgradient)	Weight	Interpretation
PCE (µg/L)	ND	0	2,900 J	0	ND	0	
TCE (µg/L)	ND	0	130,000	0	480	0	Likely release material.
trans 1,2-DCE (µg/L)	ND	-	7,800	-	46	-	
cis 1,2-DCE (µg/L)	ND	0	13,000	2	140	2	Concentration of cis DCE greater than 80% of total DCE is indicative of reductive dechlorination.
Vinyl Chloride (µg/L)	ND	0	ND	0	ND	0	Likely daughter product of reductive dechlorination.
Ethene/ethane (µg/L)	<0.01	0	0.1	3	<0.01	0	Daughter product of vinyl chloride.
Screening Value		4		9		13	*

Source: AFCEE, Draft Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. November 1996.
(1) Hydrogen was not sampled because Well MW03-14D is steel cased.
(2) ORP does not correlate with Dissolved Oxygen, weight assigned only to DO reading.
ND - Not Detected
J - Estimated Value

Indicator Parameters	MW02-10D (Downgradient)	Weight	MW01-14D (Downgradient)	Weight	EA-112D (Crossgradient)	Weight	Interpretation
Dissolved Oxygen (mg/L)	0.45	3	0.58	3	0.34	3	Tolerated at concentrations <0.5 mg/l, suppresses reductive pathway at concentrations >0.5 mg/l.
Nitrate (mg/L)	ND	2	ND	2	ND	2	May compete with reductive pathway at concentrations >1 mg/L.
Iron II (µg/L)	14,100	3	11,300	3	11,400	3	Reductive pathway possible at concentrations >1 mg/L.
Sulfate (mg/L)	15.4	2	12.2	2	20.1	2	May compete with reductive pathway at concentrations > 20 mg/L.
Methane (mg/L)	<0.01	0	0.06	3	<0.01	0	<0.5 mg/L VC oxidizes, >0.5 mg/l VC accumulates.
ORP (mV)	-35	1	-77	1	-15.6	1	<50 mV reductive pathway possible, <-100 mV reductive pathway likely.
pH	6.31	0	6.54	0	6.2	0	Optimal range for reductive pathway is 5< pH <9.
Temperature EC	11	0	12.5	0	9.2	0	Biochemical processes are accelerated at temperatures >20EC.
Hydrogen (nM)	10.22	3	1.98	3	2.74	3	>1 nM reductive pathway possible, <1 nM VC oxidized.
PCE (µg/L)	ND	0	ND	0	ND	0	
TCE (µg/L)	19	0	ND	0	24	0	Likely release material.
trans 1,2-DCE (µg/L)	5	-	ND	-	4	-	

Indicator Parameters	MW02-10D (Downgradient)	Weight	MW01-14D (Downgradient)	Weight	EA-112D (Crossgradient)	Weight	Interpretation
cis 1,2-DCE (µg/L)	40	2	3	2	10	2	Concentration of cis DCE greater than 80% of total DCE is indicative of reductive dechlorination.
Vinyl Chloride (µg/L)	1 J	2	ND	0	ND	0	Likely daughter product of reductive dechlorination.
Ethene/ethane (µg/L)	<0.01	0	<0.01	0	<0.01	0	Daughter product of vinyl chloride.
Screening Value		**18**		**19**		**16**	*

Source: AFCEE, Draft Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. November 1996.

ND - Not Detected
J - Estimated Value

* - As a preliminary assessment of biodegradation, data from 6 representative wells was evaluated and scored in accordance with the Draft AFCEE Protocol. The average score for the 6 wells is 13.2. Per the Draft AFCEE Protocol a score of 6 to 14 indicates limited evidence for biodegradation of chlorinated organics.

TABLE 5-7. Preliminary Biodegradation Screening Results Based On The 2000 Ground-Water Sample Results
Former PR-58 Nike Site and Adjacent NCBC Davisville Study Area 01, Sites 02 and 03
North Kingstown, RI

Indicator Parameters	EA-105 (Background)	Weight	MW03-14D (NAPL Source Area)	Weight	MW03-07D (Down gradient)	Weight	Interpretation
Dissolved Oxygen (mg/L)	7.30	-3	1.04	-3	.13	-3	Tolerated at concentrations <0.05 mg/L, suppresses reductive pathway at concentrations >0.5 mg/L.
Nitrate (mg/L)	.23	2	0.1	2	0.5	2	May compete with reductive pathway at concentrations >1 mg/L.
Iron II (mg/L)	0.0	-	>5.10	3	1.14	3	Reductive pathway possible at concentrations >1 mg/L.
Sulfate (mg/L)	10	2	13	2	15.4	2	May compete with reductive pathway at concentrations >20 mg/L.
Methane (mg/L)	0.001	0	0.003	0	0.0018	0	<0.5 mg/L VC oxidizes, >0.5 mg/L VC accumulates.
ORP (mV)	*		-170.9	2	231	0	<50mV reductive pathway possible, <-100mV reductive pathway likely.
pH	5.36	0	6.64	0	5.17	0	Optimal range for reductive pathway is 5< pH <9.
Temperature °c	13.40	0	12.14	0	19.25	0	Biochemical processes are accelerated at temperatures >20EC.

PCE (µg/L)	ND	0	3900	0	ND	0	
TCE (µg/L)	ND	0	120000	0	270	0	Likely release material.
trans 1,2-DCE (µg/L)	ND	-	6500	-	22J	-	
cis 1,2-DCE (µg/L)	ND	0	11000	0	74J	0	Concentration of cis DCE greater than 80% of total DCE is indicative of reductive dechlorination.
Vinyl Chloride (µg/L)	ND	0	ND	0	1J	2	Likely daughter product of reductive dechlorination.
Screening Value		4		9		9	*

Source: AFCEE, Draft Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. November 1996.

(1) Hydrogen was not sampled because Well MW03-14D is steel cased.

(2) ORP does not correlate with Dissolved Oxygen, weight assigned only to DO reading.
ND - Not Detected
J - Estimated Value

Indicator Parameters	MW02-10D (Downgradient)	Weight	MW01-14D (Down gradient)	Weight	EA-112D (Cross gradient)	Weight	Interpretation
Dissolved Oxygen (mg/L)	0	3	0.65	0	0.38	3	Tolerated at concentrations <0.5 mg/l, suppresses reductive pathway at concentrations >0.5 mg/l.
Nitrate (mg/L)	0.1	2	0.2	2	0.1	2	May compete with reductive pathway at concentrations >1 mg/L.
Iron II (mg/L)	0.06	-	2.43	3	11.72	3	Reductive pathway possible at concentrations >1 mg/L.
Sulfate (mg/L)	15	2	13	2	18.2	2	May compete with reductive pathway at concentrations >20 mg/L.
Methane (mg/L)	0.004	0	0.0025	0	0.07	0	<0.5 mg/L VC oxidizes, >0.5 mg/L VC accumulates.
ORP (mV)	-16.4	1	-32.8	1	30.3	1	<50 mV reductive pathway possible, <-100 mV reductive pathway likely.
pH	7.15	0	6.37	0	6.53	0	Optimal range for reductive pathway is 5< pH <9.
Temperature EC	15.73	0	14.34	0	12.05	0	Biochemical processes are accelerated at temperatures

							>20EC.
PCE (µg/L)	ND	0	ND	0	ND	0	
TCE (µg/L)	16	0	ND	0	19	0	Likely release material.
Trans 1,2-DCE (µg/L)	4.66	-	ND	-	3	-	
cis 1,2-DCE (µg/L).	42	2	4.09	2	10	0	Concentration of cis DCE greater than 80% of total DCE is indicative of reductive dechlorination.
Vinyl Chloride (µg/L)	1.1	2	ND	0	ND	0	Likely daughter product of reductive dechlorination.
Screening Value		**12**		**10**		**11**	*

Source: AFCEE, Draft Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater. November 1996.

ND - Not Detected
J - Estimated Value

* - As a preliminary assessment of biodegradation, data from 6 representative wells was evaluated and scored in accordance with the Draft AFCEE Protocol. The average score for the 6 wells is 13.2. Per the Draft AFCEE Protocol a score of 6 to 14 indicates limited evidence for biodegradation of chlorinated organics.

TABLE 5-8 Comparison Of TCE To DCE Ratios From 1996 and 2000 Ground-Water Sample Data Former PR-58 Nike Site and Adjacent NCBC Davisville Study Area 01, Sites 02 and 03 North Kingstown, RI

Well Number	2000 R Value	1996 R Value	Increase/Decrease/ Same
EA112D	1.46	NA	-
EA116D	1.05	NA	-
MW03-02D	1.26	1	I
MWZ3-02	0.47	ND	I
W01-15D	1.88	1.8	S
MW01-12D	1.59	1.5	S
MW01-08D	1.21	0.5	I
MW02-03D	0.52	0.3	I
MW02-08D	2	1.75	S
MW02-10D	0.34	0.3	S
MW02-11D	0.09	ND	S
MW03-03D	2	2.4	S
MWZ3-03	0.41	0.24	I
MW03-06D	2.68	3	S
MW03-09D	0.5	0.2	I
MW03-10D	2.39	2.1	S
MW03-07D	2.76	2.9	S
MW03-08D	3	4	S
MW03-13D	3.37	5.3	D
MW0-12D	1.54	3.1	D
EA109	2.33	2.4	S
EA102	22	9.4	I
MW03-14D	7.06	4.3	I
EA104	2	2.3	S
EA113D	1	NA	-
MWZ3-01	1.16	1.7	D

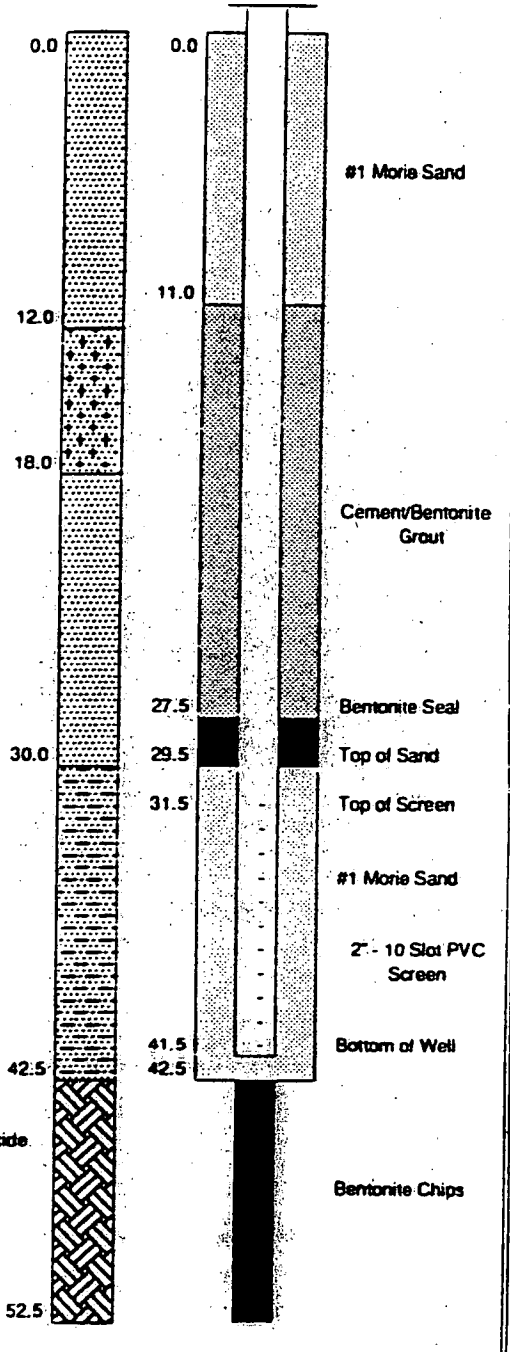
- Changes of 25% or greater were considered significant . Less than 25% changes was considered the same.

Monitoring Well: MW-3D
Site 02 - CED Battery Acid Disposal Area
NCBC - Davisville
Depth: 41.5 FEET

Drilling Company: EDI
Drillers: S. Lamarche
TRC Inspector: D. Boucher
Monitoring Well Coordinates:
N 194,389.69
E 521,033.70

Date Started: MAY 24, 1993
Date Completed: MAY 26, 1993
Depth to Water: 18.5 Feet
Monitoring Well Elevations:
Top of PVC = 41.22
Ground Elevation = 39.54

Depth (feet)	Blow Counts		Field Measurements OVA (ppm)	HNu (ppm)	Soil Description
0-2	3	3	0	0	Brown F SAND, some silt, tr gravel, moist, no odor.
	4	5			18" recovery.
2-4	4	4	0	0	Same as above. 18" recovery.
	10	12			
4-6	14	16	0	0	0-8" Same as above.
	37	39			8-18" Grey/Brown F SAND, little silt & gravel, moist, no odor.
6-8	61	47	0	0	Brown/Grey F-M SAND, little silt & gravel, tr C sand, damp,
	52	71			no odor. 10" recovery.
8-10	15	40	0	0	0-14" Brown/Grey F SAND, some gravel & silt.
	39	35			14-18" White powdery substance.
10-12	22	30	-	-	No Recovery.
	35	27			
12-14	22	27	0	0	Brown F-M SAND, some gravel, little C sand, dry, no odor.
	20	15			14" recovery.
14-16	11	12	0	0	Same as above.
	19	15			
16-18	12	14	0	0	Lt Brown F SAND, tr gravel, dry, no odor.
	15	17			
18-20	9	10	0	0	0-6" Brown F-M SAND, tr gravel.
	9	10			6-7" Grey SILT, wet.
					7-14" Grey F SAND, tr silt, wet, no odor.
27	3	6	0	0	Brown/Grey F SAND, some M sand, tr C sand, wet, no odor.
	7	8			20" recovery.
30-32	3	4	0	0	0-12" Same as above.
	6	14			12-20" Grey VF SAND & SILT, no odor.
					20-22" Dk Brown/red F SAND.
35-37	6	6	0	0	Grey VF SAND & SILT, wet, no odor.
	17	24			8" recovery.
40-42	2	4	0	0	0-6" Grey SILT & VF SAND, tr F sand.
	6	4			6-10" Grey SILT & GRAVEL, no odor, wet.
42.5-51.5					Medium-dk gray, medium-coarse grained META SANDSTONE GNEISS. Massive and competent. Minerology: primarily quartz, plagioclase, hornblende, and biotite. Few open iron oxide stained fratures dipping 0-45 degrees.
	5' Core Run #1				
	4.9' recovery				
	5' Core Run #2				
	4.6' recovery				

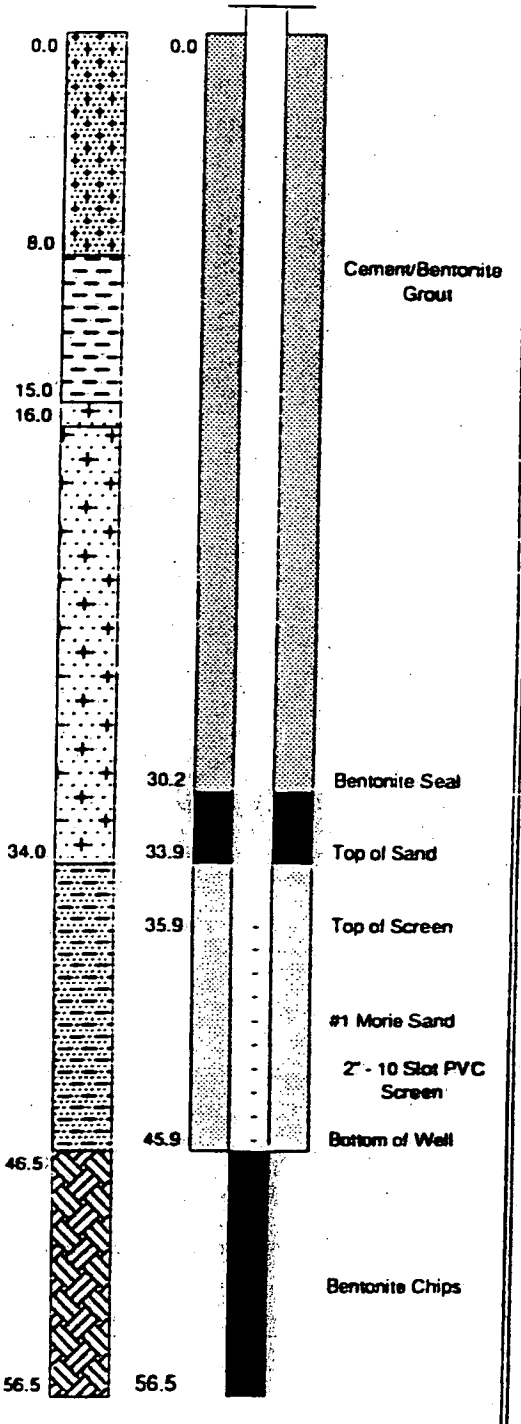


Monitoring Well: MW-8D
Site 02 - CED Battery Acid Disposal Area
NCBC - Davisville
Well Depth: 45.9 FEET

Drilling Company: EDI
Drillers: J. Francis
TRC Inspector: M. Susca
Monitoring W ll Coordinates:
N 194,363.98
E 520,636.48

Date Started: MAY 20, 1993
Date Completed: May 21, 1993
Depth to Water: 17 Feet
Monitoring Well Elevations:
Top of PVC = 38.63
Ground Elevation = 39.00

Depth (feet)	Blow Counts		Field Measurements OVA (ppm)	HNu (ppm)	Soil Description
0-2	-	16	1.7	-	F SAND, some silt, little m-c gravel, asphalt fragments (0-6"), dry, no odor, 16" recovery.
	12	16			
2-4	24	21	1.7	-	0-4" Tan F-M SAND, little cobbles; 10-18" Dk. brown SAND, little silt, cobbles in tip, dry, 18" recovery.
	24	24			
4-6	28	28	1.8	-	Green/Tan F-VF SAND, tr gravel, dry, 14" recovery.
	50	70			
6-8	67	27	1.8	-	Green/Gray F-C SAND, some cobbles to 2 1/2", little F-C gravel, dry, damp, 14" recovery.
	20	20			
8-10	22	22	1.8-1.9	-	0-6" Green/brown VF SAND and SILT; 6-16" SILT, little f-c gravel, damp, 16" recovery.
	32	85			
10-12	90	105	1.4	-	Green/brown SILT, little f sand, tr gravel, 3" cobbles in tip, damp, 6" recovery.
	110	120/3			
12-14	67	80	1.4-1.6	-	0-6" Dk gray SILT, tr f gravel, damp; 6-16" Dk gray SILT, some F-C sand, damp
	50	50			
14-16	18	24	1.4-1.6	-	0-4" SILT, little cobbles and gravel, tr sand; 4-10" F-M SAND; 10-20" Tan/gray F-C SAND, little gravel.
	24	36			
16-18	40	22	1.2-1.8	-	0-16" Tan F-C SAND, some f-c gravel.
	22	30			16-20 Green/tan VF SAND, little silt; wet at 17'.
19-21	9	6	1.2	-	Green/brown F-C SAND, tr f-m gravel, saturated.
	9	9			12" recovery.
24-26	22	30	1.2	-	0-12" Green/tan F-C SAND.
	40	60			12-24" VF SAND, tr silt, red and orange bands.
29-31	15	15	1.2	-	0-8" Green/brown F-C SAND.
	15	15			8-24" Gray VF SAND.
34-36	3	4	1.2	-	Grey w/bands of orange and tan, F-VF SAND, tr silt, 2" band of grey VF sand and silt at base. 24" recovery.
	5	10			
39-41	WOR		1.2	-	0-6" Grey VF-F SAND; 6-8" Grey SILT, trace clay.
44-46	18	20	1.1	-	Grey F SAND, some silt, little gravel, bottom 2" rock peices.
	56	120/3"			
46.5-56.5					Medium-dk gray, medium-coarse grained META SANDSTONE GNEISS. Massive and competent. Mineralogy: primarily quartz, plagioclase, hornblende, biotite. Several quartz vein-healed fratures dipping 30-80 degrees.
	5' Core Run #1				
	4.6' recovery				
	5' Core Run #2				
	3.35' recovery				

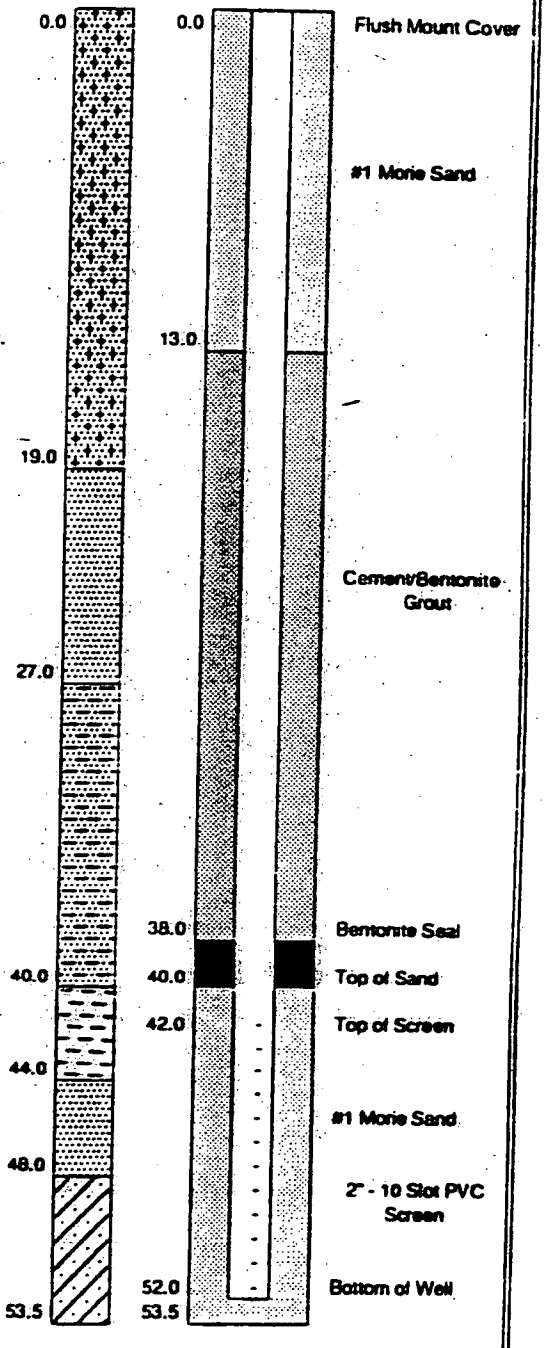


Monitoring Well: MW-10D
Site 02 - CED Battery Acid Disposal Area
[illegible]BC - Davisville
[illegible] Depth: 52 FEET

Drilling Company: EDI
Drillers: S. Lamarche & D. Dolan
TRC Inspector: D. Boucher
Monitoring Well Coordinates:
N 194,236.43
E 520,677.17

Date Started: MAY 21, 1993
Date Completed: MAY 21, 1993
Depth to Water: 16 Feet
Monitoring Well Elevations:
Top of PVC = 37.36
Ground Elevation = 37.80

Depth (feet)	Blow Counts		Field Measurements OVA (ppm)	Field Measurements HNu (ppm)	Soil Description
0-2	14	17	0	0	Lt brown F SAND, some silt, dry, no odor, 12" recovery.
	18	12			
2-4	10	10	0	0	Dk brown F-M SAND, some gravel, tr silt, dry, no odor, 10" recovery.
	11	12			
4-6	21	11	0	0	Dk brown F-M SAND, little silt and gravel, dry, no odor, 6" recovery.
	9	9			
6-8	4	5	0	8	Dk brown F-M SAND, some gravel, little silt, dry, no odor, 10" recovery.
	5	5			
8-10	4	4	0	0	Dk brown F-M SAND, some gravel, little silt, dry, no odor, 10" recovery.
	4	6			
10-12	6	12	0	0	0-2" Peice of asphalt 2-20" Brown/lt gray F-M SAND, some gravel, dry, no odor.
	13	22			
12-14	28	21	0	0	0-4" Dk brown/black F-M SAND, some gravel, dry, no odor; 4-18" Lt brown/yellow F SAND, little gravel, no odor, dry.
	23	20			
14-16	6	12	0	-	Brown/Dk Brown F-M SAND, tr c sand & gravel, dry.
	20	18			
16-18	40	40	0	0	Dk brown/black F-M SAND, little gravel, tr silt, wet, no odor.
	36	39			
19-21	6	6	280	250	Dk Gray F SAND, wet, gas smell, slight sheen on water in split spoon, 17" recovery.
	9	7			
21-23	7	10	250	95	0-12" Gray F SAND, damp, gas odor; 12-13" Orange, rust F SAND, damp, gas odor; 13-23" Dk gray SILT, damp, gas odor; 22-24" Orange/rust F SAND, moist, gas odor.
	11	9			
23-25	7	9	200	55	0-10" Lt brown/gray, F SAND, moist, gas odor; 10-24" Dk gray SILT, moist, gas odor.
	9	9			
	9	6	20	55	0-12" Dk brown/gray F SAND, moist, gas odor; 12-24" Gray VF SAND and SILT, moist, gas odor.
	7	11			
28-30	7	11	160	140	0-10" Grey F SAND, some silt, wet, petroleum odor. 10-22" Grey VF SAND & SILT, wet, petroleum odor.
	18	20			
30-32	9	11	20	0	Dk Grey VF SAND & SILT, wet, slight petro. odor. 11" recovery.
	17	17			
32-34	11	11	50	60	Dk Grey F SAND & SILT, wet, petroleum odor. 24" recovery.
	14	19			
34-36	7	11	100	30	Same as above. 22" recovery.
	18	20			
36-38	11	7	30	15	Same as above. 24" recovery.
	13	14			
38-40	5	6	25	2	0-12" Brown F SAND, tr silt, wet, petroleum odor. 12-22" Dk Grey SILT & VF SAND, wet.
	8	7			
40-42	4	8	0	0	Dk Grey SILT. Lense of F-M sand at 6", no odor. 14" recovery.
	8	8			
42-44	3	4	0	0	Dk Grey SILT, tr F sand, wet, no odor. 10" recovery.
	4	5			
44-46	4	4	0	0	Dk Grey/Black F SAND, tr silt, wet, no odor.
	13	20			
46-48			0	0	Dk Grey/Black VF SAND, some silt, wet, no odor. 12" recovery.
48-50	28	27	0	0	Dk Grey/Black F-M SAND, some gravel & silt, (weathered bedrock), no odor. 12" recovery.
	30	33			
50-52	20	8	-	-	Same as above.
	8	8			
52-54	15	43	-	-	Grey F-C GRAVEL, tr sand.
	120/3"				



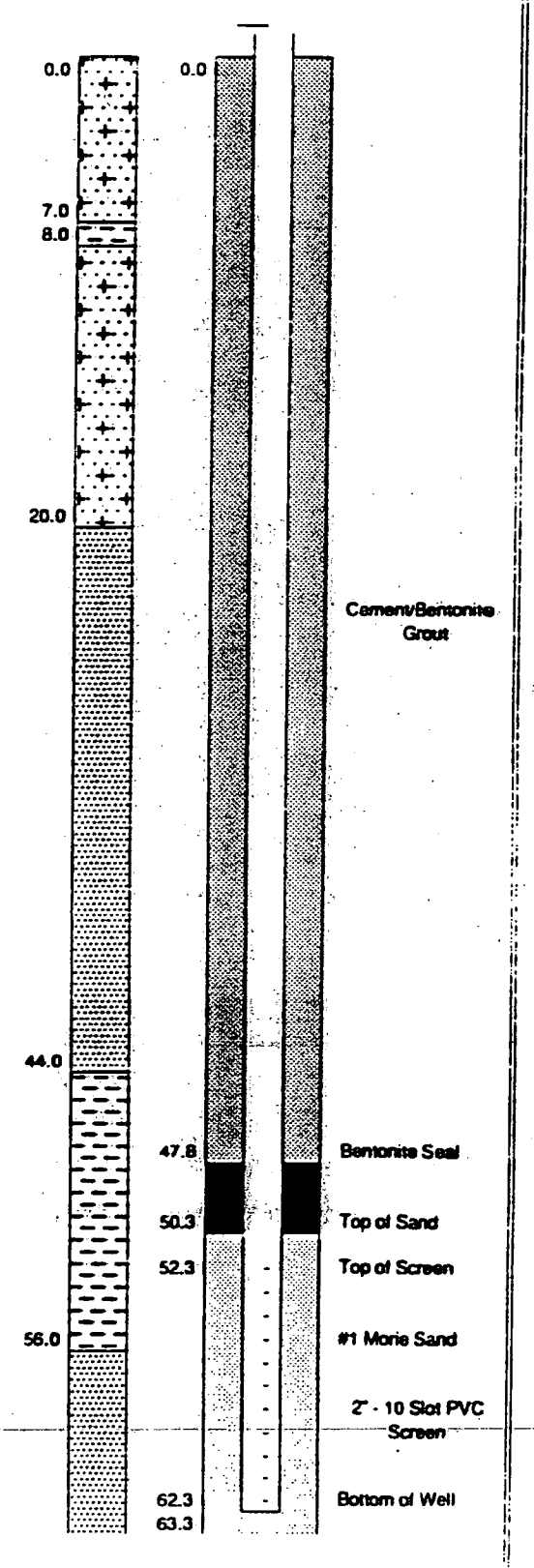
Sample 02-MW10-08 collected from 14-16'

Monitoring Well: MW-11D
Site 02 - CED Battery Acid Disposal Area
NCBC - Davisville
Depth: 62.3 FEET

Drilling Company: EDI
Drillers: J. Francis, M. DeAmicis
TRC Inspector: M. Susca
Monitoring Well Coordinates:
N 194,097.67
E 520,798.26

Date Started: MAY 24, 1993
Date Completed: MAY 25, 1993
Depth to Water: 18 Feet
Monitoring Well Elevations:
Top of PVC = 40.04
Ground Elevation = 38.0

Depth (feet)	Blow Counts		Field Measurements OVA (ppm)	HNu (ppm)	Soil Description
0-2	11	25	0	-	0-4" Dk Brown F SAND, some silt, little gravel.
	24	21			4-18" Brown F-C SAND, little gravel, dry.
2-4	31	35	0.2	-	Brown F-C SAND, little gravel, dry.
	55	71			18" recovery.
4-6	120/4"		0.3	-	0-8" Wash
					8-12" Brown/Grey F-C SAND, little gravel, tr silt.
6-8	42	50	1	0	0-4" Grey F-C SAND, some gravel & cobbles.
	55	120/2"			4-14" Brown/Grey SILT, some M-C sand & gravel, damp.
8-10	75	95	-	-	0-10" Wash
	120/2"				10-16" Dk Brown/Grey F-C SAND, some cobbles, tr silt, dry.
10-12	120/5"		0.5	0.7	0-4" Dk Brown/Grey F-C SAND, some gravel & cobbles.
					4-6" Grey SILT, tr sand, tr clay, damp.
12-14	25	25	0.9	0	0-6" Grey/Brown COBBLES & F SAND, little gravel.
	25	25			6-16" Tan/Grey F-C SAND, tr silt, damp.
14-16	12	20	0.2	-	Tan/Grey M-C SAND, little cobbles & gravel, tr F sand.
	34	30			16" recovery.
16-18	22	30	0	-	Tan/Grey F-C SAND, little gravel & cobbles, damp.
	40	30			14" recovery.
18-20	6	6	0	-	Brown F-M SAND, tr C sand, wet.
	7	12			12" recovery.
24-26	6	7	0	-	0-12" Wash
	13	20			12-24" Grey/Brown F SAND.
29-31	15	14	0	-	0-12" Wash
	14	18			12-24" Grey F-VF SAND.
34-36	5	7	0	-	Grey/Brown F SAND, tr M sand.
	7	8			
39-41	5	8	0	-	Grey F SAND.
	6	11			
44-46	WOR	WOR	0	-	0-16" Wash
	5	57			16-24" Grey SILT, little fine sand, rock fragments in tip of split-spoon.
49-51	32	39	0.1	-	Grey SILT, some F-VF sand, some gravel & cobbles.
	29	29			(Weathered Bedrock). 10" recovery.
54-56	23	25	0	-	0-14" Wash
	23	33			14-24" Grey Rock Fragments, some F-C sand & silt.
59-61	25-120/6"		0	-	0-16" Wash
					16-24" Grey F SAND, tr silt, damp, no odor.



Monitoring Well: MW-11D (continued)
Site 02 - CED Battery Acid Disposal Area
NCBC - Davisville
Well Depth: 62.3 FEET

Drilling Company: EDI
Drillers: J. Francis, M. DeAmicis
TRC Inspector: M. Susca
Monitoring Well Coordinates:
N 194,097.67
E 520,798.26

Date Started: MAY 24, 1993
Date Completed: MAY 25, 1993
Depth to Water: 18 Feet
Monitoring Well Elevations:
Top of PVC = 40.04
Ground Elevation = 38.0

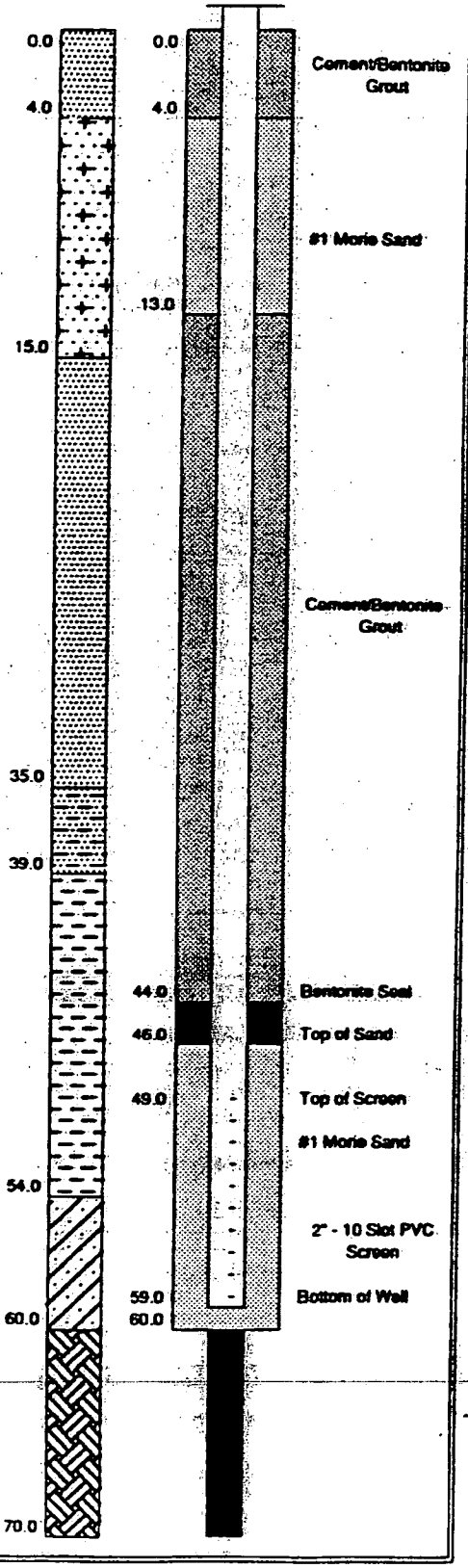
Depth (feet)	Blow Counts	Field Measurements OVA (ppm)	Field Measurements HNu (ppm)	Soil Description	Lithology	Monitoring Well Construction
64-66	120/2"	0	-	Grey WEATHERED BEDROCK. 8" recovery.	66.0	
68-70	120/3"	0	-	Grey WEATHERED BEDROCK. 5" recovery.	68.5	68.5 Bentonite Chips
68.5-78.5	5' Core Run #1 4.8' recovery 5' Core Run #1 4.8' recovery			Dk gray argillaceous SHALE, brittle and shattered over most of core length. Mineralogy: primarily quartz, muscovite, biotite, with minor pyrite and clay minerals. Abundant shale partings and natural fractures.	78.5	78.5

Monitoring Well: MW-2D
Site 03 - CED Solvent Disposal Area
SC - Davisville
Depth: 59 FEET

Drilling Company: EDI
Drillers: J. Frances, M. DeAmicis
TRC Inspector: M. Susca
Monitoring Well Coordinates:
N 194,492.95
E 520,261.00

Date Started: MAY 26, 1993
Date Completed: MAY 27, 1993
Depth to Water: 13 Feet
Monitoring Well Elevations:
Top of PVC = 38.57
Ground Elevation = 36.22

Depth (feet)	Blow Counts	OVA (ppm)	HNu (ppm)	Soil Description
0-2	18 20 25 25	0	-	0-4" Topsoil. 4-15" Brown F SAND, some silt, little gravel. 15-20" Brown/Gray F SAND, tr silt & gravel.
2-4	18 14 14 20	0	-	Brown F SAND, tr gravel, damp. 16" Recovery.
4-6	18 16 14 16	0	-	0-4" Dk Brown F SAND, some gravel, tr silt, dry. 4-20" Dk Brown F-C SAND, some silt, little gravel, dry.
6-8	14 24 90 96	0	-	0-8" Brown F SAND. 8-20" Dk Brown/Gray SILT, little C sand, tr F sand, damp.
8-10	60 60 120/3"	0.8	-	0-8" Dk Brown F-M SAND, some gravel, tr silt. 8-14" Gray SILT, some gravel & cobbles.
10-12	40 120/2"	0	-	Dk Brown F-C SAND, some silt & gravel, dry. 10" Recovery.
12-14	20 61 51 41	0.4	-	Dk Brown F-C SAND & GRAVEL, tr silt, wet at 13'. 18" Recovery.
14-16	12 24 20 24	0.2	-	0-8" Tan M-C SAND, little gravel, tr F sand, wet. 8-14" Olive F SAND, tr M-C sand, wet.
16-18	18 20 21 24	0.5	0	Olive/Tan F SAND, wet. 20" Recovery.
22-24	3 3 5 10	0	-	Grey F SAND, tr M-C sand & gravel, wet. 21" Recovery.
24-26	4 5 8 10	2	0	Grey F SAND, tr M sand, wet, no odor. 24" Recovery.
29-31	4 5 6 8	0	0	0-18" Grey F SAND, tr M-C sand, wet, no odor. 18-24" Grey F-C SAND, wet, no odor.
35-37	8 11 15 22	0	0	Dk Grey F SAND & SILT, wet, no odor. 12" Recovery.
39-41	6 11 11 12	0	0	Dk Grey SILT, wet, no odor. 16" Recovery.
44-46	WOR WOR 7 6	–	0	Same as Above. 24" Recovery.
49-51	WOR WOR 7 10	0	0	Dk Grey SILT, tr F sand, wet, no odor. 18" Recovery.
54-56	120/3"	–	–	Dk Grey SILT & ROCK FRAGMENTS, wet, no odor. 3" Recovery.
59-61	120/5"	0	–	Dk Grey ROCK FRAGMENTS, little silt, tr gravel. 4" recovery
60-70	5' Core Run #1 4.3' recovery			Light gray, fine-medium grained META SANDSTONE GNEISS, with scattered thin dk gray shaly zones. Mineralogy: primarily quartz, plagioclase, biotite, and hornblende. Minor amounts of pyrite and clay minerals. Few fractures dipping 10-30 degrees.
	5' Core Run #2 4.9' recovery			

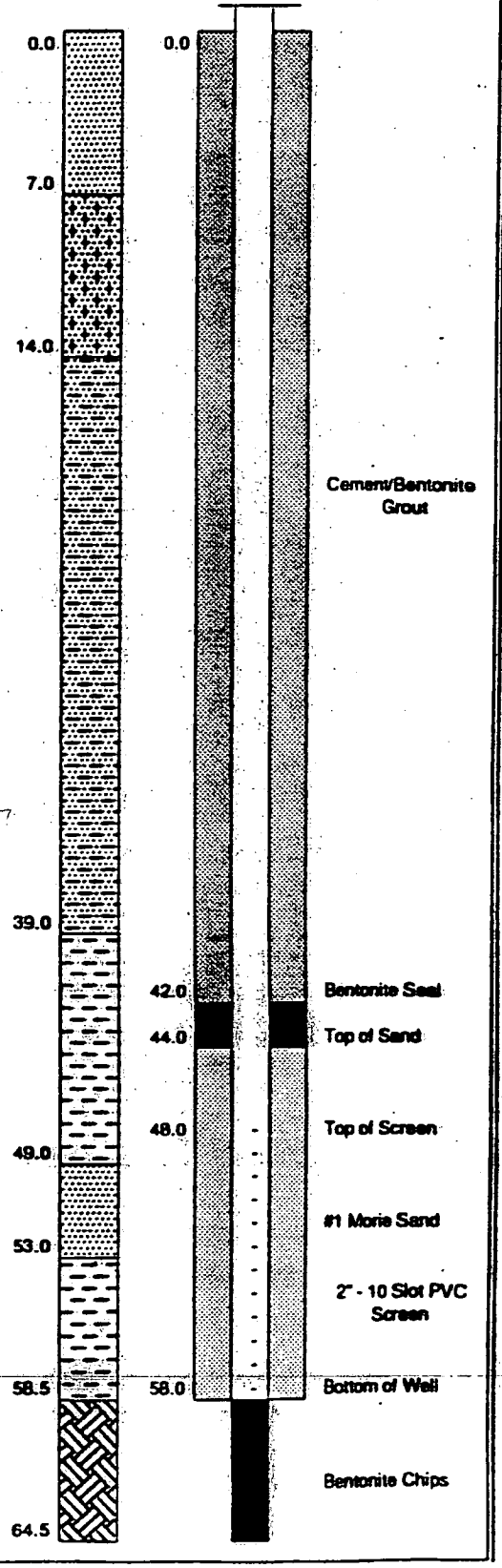


Monitoring Well: MW-3D
Site 03 - CED Solvent Disposal Area
NCBC - Davisville
[redacted]epth: 58 FEET

Drilling Company: EDI
Drillers: J. Frances, M. DeAmicis
TRC Inspector: L. Butler
Monitoring Well Coordinates:
N 194,347.61
E 520,178.90

Date Started: June 1, 1993
Date Completed: June 2, 1993
Depth to Water: 14 Feet
Monitoring Well Elevations:
Top of PVC = 38.43
Ground Elevation = 36.39

Depth (feet)	Field Measurements: Blow Counts		OVA (ppm)	HNu (ppm)	Soil Description
0-2	5	8	0	–	Dk. Brown F SAND, some silt, tr gravel, moist.
	10	12			21" Recovery.
2-4	31	76	0	–	Dk Brown F-C SAND, little silt, little gravel, tr asphalt.
	60	60			22" Recovery.
4-6	21	31	0	–	0-7" Dk Brown SILT & F SAND. 7-16" Dk Grey/Brown F-C
	55	70			SAND, some silt. 16-22" Grey/Brown F SAND, little silt.
6-8	110	120/3"	0	–	0-2" Dk Grey SILT, little F-C sand.
					2-8" Brown F-M SAND, some silt, tr gravel, moist.
8-10	31	64	0	–	Dk Grey/brown F-M SAND, some silt, little gravel, moist.
	100	90			23" Recovery.
10-12	12	18	0	–	Brown/Dk Grey F-M SAND, some silt, little C sand, tr gravel,
	30	30			moist. 23" Recovery.
12-14	55	30	0	–	Same as Above, moist. 24" Recovery.
	40	50			
14-16	7	9	0	–	Dk Grey F SAND & SILT, wet.
	10	12			13" Recovery.
19-21	4	6	0	–	Same as Above. 20" Recovery.
	6	6			
24-26	6	8	0	–	Same as Above. 24" Recovery.
	8	6			
29-31	5	5	0	–	0-13" Dk Grey F SAND, some silt, little M sand.
	10	15			13-14" Dk Grey SILT, little F sand.
					14-24" Dk Grey F SAND, some M sand, little silt.
34-36	4	4	0	–	0-12" Wash. 12-20" Dk Grey SILT, tr F sand.
	7	8			20-24" Dk Grey F SAND, some silt, little M sand.
39-41	15	17	0	–	0-12" Wash.
	20	25			12-24" Dk Grey SILT, little clay, tr F sand, tight.
44-46	WOR	WOR	0	–	Same as above, loose. 8" Recovery.
	WOR	7			
49-51	WOR	4	0	–	Dk Grey F SAND, some silt, tr M sand, loose.
	6	7			24" Recovery.
54-56	WOR	WOR	0	–	0-18" Wash.
	4	17			18-24" Dk Grey SILT, little F sand, tr gravel, tight.
[redacted]5					Light gray, fine-medium grained META SANDSTONE GNEISS, with scattered thin dk gray shaly zones. Mineralogy: primarily quartz, plagioclase, biotite, and hornblende. Minor amounts of pyrite and clay minerals. Few fractures dipping 10 degrees.
5' Core Run #1					
2.1' recovery					
3' Core Run #2					
no recovery (few broken rocks)					

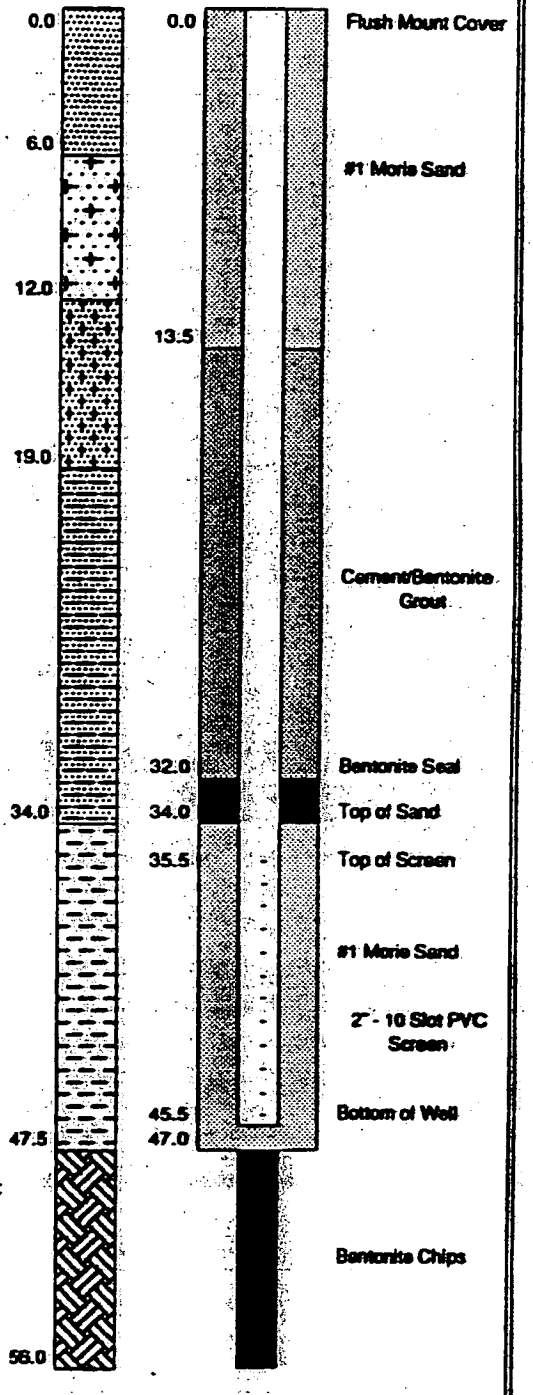


Monitoring Well: MW-5D
Site 03 - CED Solvent Disposal Area
- Davisville
Depth: 45.5 FEET

Drilling Company: EDI
Drillers: S. Lamarche, D. Dolan
TRC Inspector: D. Boucher
Monitoring Well Coordinates:
N 194,355.40
E 520,414.41

Date Started: MAY 26, 1993
Date Completed: MAY 27, 1993
Depth to Water: 16 Feet
Monitoring Well Elevations:
Top of PVC = 37.87
Ground Elevation = 38.31

Depth (feet)	Blow Counts		Field Measurements OVA (ppm)	HNu (ppm)	Soil Description
0-2	11	13	0	0	0-3" Brown F-M SAND, moist, no odor.
	17	15			3-22" Dk Brown F SAND, little silt, tr gravel, no odor, moist.
2-4	7	9	0	0	0-10" Dk Brown F SAND, moist, no odor.
	7	7			10-22" Brown F SAND, tr silt, moist, no odor.
4-6	20	18	0	0	Brown F SAND, tr silt, f sand, & gravel, moist, no odor.
	28	40			18" Recovery.
6-8	36	36	0	0	0-14" Brown F-C SAND & GRAVEL, moist, no odor.
	50	59			14-18" Brown/Grey F SAND, tr M sand; moist, no odor.
8-10	36	120/0"	0	0	Dk Grey F SAND & a large piece of gravel.
					3" Recovery.
10-12	32	32	3.5	0	Brown/Dk Grey F SAND, tr gravel, moist, no odor.
	34	40			16" Recovery.
12-14	30	27	0	0	Dk Grey SILT, some gravel & C sand, no odor.
	28	32			12" Recovery.
14-16	18	34	2.5	0	0-12" Brown/Grey F SAND, some M sand, tr C sand, moist.
	52	46			12-16" Brown F-C SAND & GRAVEL, moist, no odor.
16-18			0	0	Brown F-C SAND, little gravel, wet, no odor.
					16" Recovery.
19-21	7	6	0	0	Brown F SAND, wet, no odor.
	6	5			16" Recovery.
26	7	8	0	0	Grey/Brown F-M SAND, wet, no odor.
	8	11			14" Recovery.
29-31	1	1	0	0	Grey F SAND, little silt, wet, soft, no odor.
	3	3			24" Recovery.
34-36	8	8	0	0	Grey F SAND & SILT, wet, no odor.
	12	12			24" Recovery.
40-42	3	3	0	0	Dk Grey SILT, some F sand, wet, no odor.
	7	6			20" Recovery.
45-47	28	60	0	0	0-10" Dk Grey F SAND, tr gravel, wet, no odor.
	43	28			10-16" Dk Grey SILT, tr gravel, wet, no odor.
47.5-56.0					Light grey, fine-medium grained META SANDSTONE GNEISS, with scattered thin dk gray shaly zones. Mineralogy: primarily quartz, plagioclase, biotite, and hornblende. Minor amounts of pyrite and clay minerals. Few fractures dipping 60 degrees.
	5' Core Run #1				
	rock shattered and broken				
	recovery difficult to determine				
	5' Core Run #2				
	rock shattered and broken				
	recovery difficult to determine				

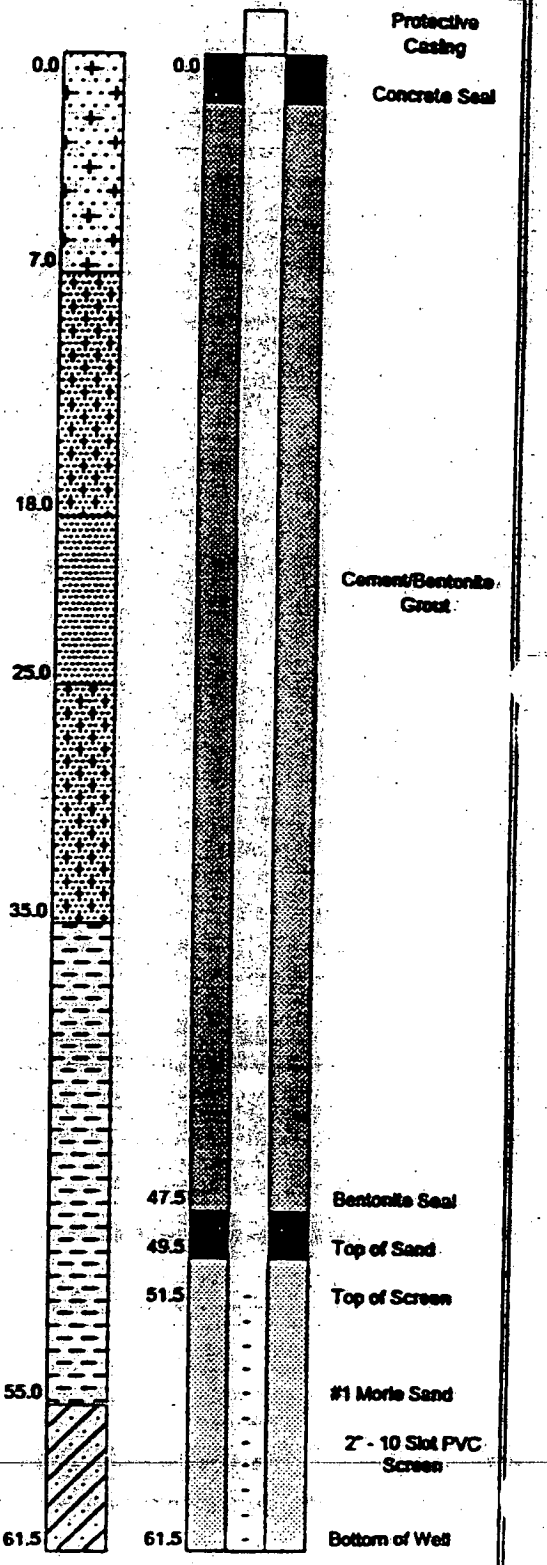


Monitoring Well: MW-6D
Site 03 - CED Solvent Disposal Area
NCBC - Davisville
Well Depth: 61.5 FEET

Drilling Company: All Terrain Drilling, Inc.
Drillers: R. Bourassa
TRC Inspector: J. Peterson & K. Prochorena
Monitoring Well Coordinates:
N 194,264.63
E 519,886.21

Date Started: MARCH 22, 1994
Date Completed: MARCH 24, 1994
Depth to Water: 14.93 feet (4/25/94)
Monitoring Well Elevations:
Top of PVC = 38.19
Ground Elevation = 35.99

Depth (feet)	Blow Counts		Field Measurements OVA (ppm)	Field Measurements HNu (ppm)	Soil Description
0-2	3	4	-	0	Dk Brown M-C SAND, ASPHALT & GRAVEL fragments, dry, no odor.
	18	24			
2-4	48	69	-	0	0-6" Dk Brown M-C SAND, some gravel, moist, no odor.
	70	81			6-12" Dk Brown/Grey M-C SAND, trace gravel & rock , dry,
4-4.5	150		-	0	Rock in tip of spoon, 0" Recovery
5-7	100	118	-	0	Rock in tip of spoon
	98	95			0" Recovery.
7-9	28	36	-	0	Brown/Grey M SAND, some F-M gravel, trace C
	21	24			gravel, dry, no odor, 12" Recovery.
9-11	10	20	-	0	Same as above, 16" Recovery.
	22	25			
11-13	22	20	-	0	0-4" Same as above.
	24	33			4-20" Tan/Brown M SAND, trace F SAND, dry, no odor.
13-15	10	15	-	0	Tan/Brown M SAND, trace F sand, dry, no odor.
	18	24			12" Recovery.
15-17	3	8	-	0	Same as above.
	18	24			
17-19	8	16	-	0	0-17" Same as above.
	24	40			17-21" Brown/Tan F SAND, trace M sand, wet, no odor.
19-21	8	26	-	0	0-6" Same as above.
	27	25			18-19" Tan/Gray F SAND, wet, no odor.
					19-24" Gray F SAND, little M sand, dry, no odor.
25-27	12	28	-	0	Tan/Brown F-M SAND, wet, no odor.
	41	83			24" Recovery.
35-37	4	3	-	0	0" Recovery.
	3	5			
40-42	15	20	0	0	Dk Grey SILT, trace F sand, wet, no odor.
	22	30			12" Recovery.
45-47	8	4	0	0	Dk Grey SILT, trace F sand & clay, wet, no odor.
	4	6			18" Recovery.
50-52	10	15	0	0	Dk Grey SILT, trace F sand & clay, wet, no odor.
	19	12			18" Recovery.
55-57	22	35	0	0	Dk Grey SILT, little rock frags, trace F sand & clay, wet,
	20	18			no odor, 6" Recovery.
60-61.5	22	28			Dk Gray SILT, some rock frags, trace clay & M sand.
	41	50			6" Recovery.
					Auger refusal at 61.5' below grade

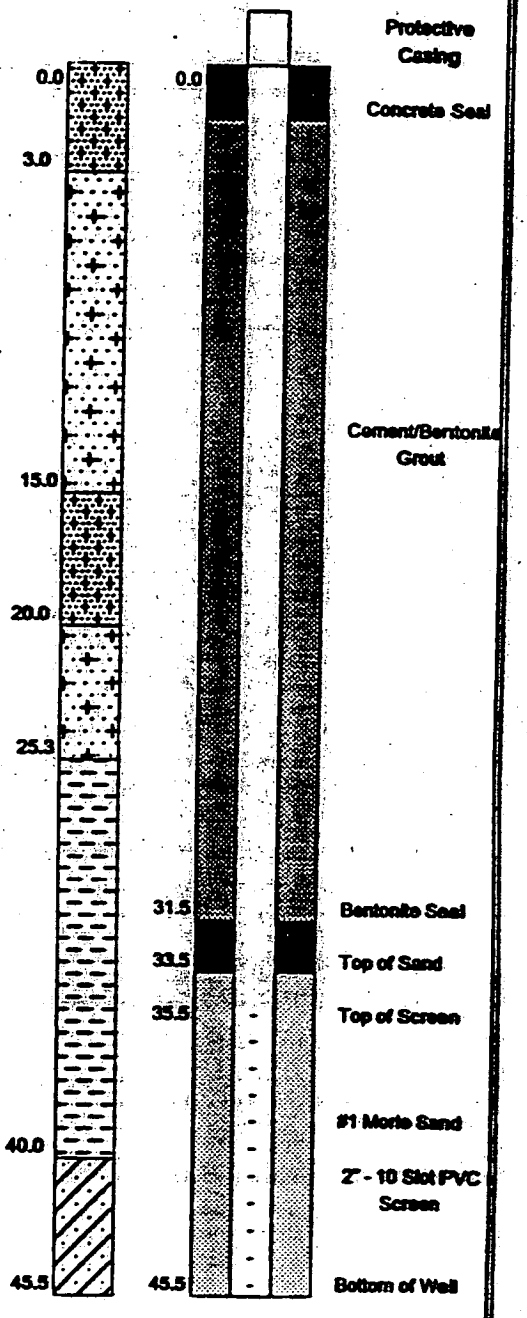


Monitoring Well: MW-7D
Site 03 - CED Solvent Disposal Area
C - Davisville
ell Depth: 45.5 FEET

Drilling Company: All Terrain Drilling, Inc.
Drillers: R. Bourassa
TRC Inspector: J. Peterson & K. Prochorena
Monitoring Well Coordinates:
N 194,200.67
E 519,607.54

Date Started: MARCH 24, 1994
Date Completed: MARCH 25, 1994
Depth to Water: 11.67 feet (4/25/94)
Monitoring Well Elevations:
Top of PVC = 35.41
Ground Elevation = 33.06

Depth (feet)	Blow Counts		Field Measurements OVA (ppm)	HNu (ppm)	Soil Description
0-2	4	10	0	0	0-4" Top soil, some brown sand & asphalt frags, dry no odor.
	18	22			4-16" Dk brown F-M SAND, trace gravel & rock fragments.
2-4	17	19	0	0	0-12" Brown F SAND, trace M sand, dry, no odor.
	13	13			12-24" Brown M-C SAND, dry, no odor.
4-6	18	22	0	0	0-4" Brown M-C SAND, dry, no odor.
	27	40			4-18" Tan/Grey F SAND, dry, no odor.
6-8	90	45	0	0	0-14" Tan/Grey F SAND, dry, no odor.
	69	73			14-20" Brown M-C SAND, trace F sand, dry, no odor.
8-10	10	13	0	0	0-4" Brown M-C SAND, trace F sand, dry, no odor.
	17	16			4-24" Dk Brown M-C SAND & SILT, trace rock frags.
10-12	10	11	0	0	0-4" Dk Brown M-C SAND & SILT, trace rock frags, dry, no odor.
	13	17			4-24" Dk brown/grey F SAND & SILT, trace rock frags.
12-13.5			0	0	Dk Brown M-C SAND, little F gravel, trace rock frags, wet, no odor, 12" Recovery.
14-16	8	8	0	0	0-12" Same as above.
	13	22			14-18" Brown F-M SAND, wet, no odor.
[illegible]2	10	11	0	0	Brown M-C SAND, wet, no odor.
	18	27			24" Recovery.
25-27	61	45	0	0	0-4" Same as above.
	41	33			4-15" Dk Brown SILT, little F sand, wet, no odor.
30-32	45	100	0	0	0-18" Lt Brown M SAND, wet, no odor.
	100				18-24" Dk Grey SILT, trace F sand, wet, no odor.
35-37			0	0	Dk Grey SILT, trace F sand & clay, wet, no odor.
					24" Recovery.
40-42	32	27	0	0	Dk Grey SILT & GRAVEL, little clay, wet, no odor.
	25	30			24" Recovery.
45-47	100/0"		0	0	Grey SHALE, wet, no odor.
					1" Recovery.
					Auger Refusal at 45.5'

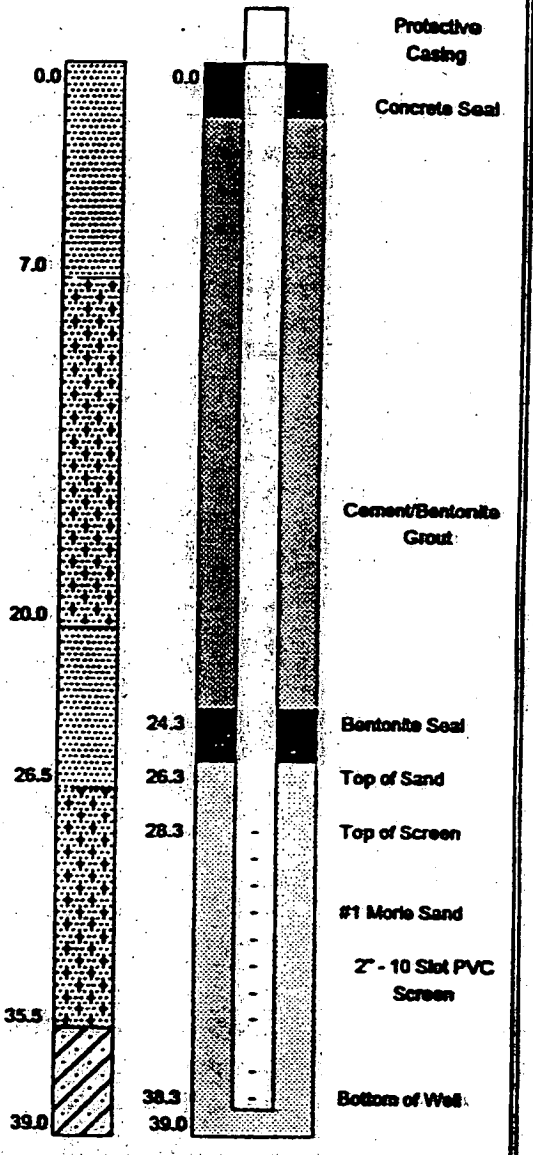


Monitoring Well: MW-8D
Site 03 - CED Solvent Disposal Area
NCBC - Davisville
Depth: 38.3 FEET

Drilling Company: All Terrain Drilling, Inc.
Drillers: R. Bourassa
TRC Inspector: J. Peterson & K. Prochorena
Monitoring Well Coordinates:
N 194,108.30
E 519,132.28

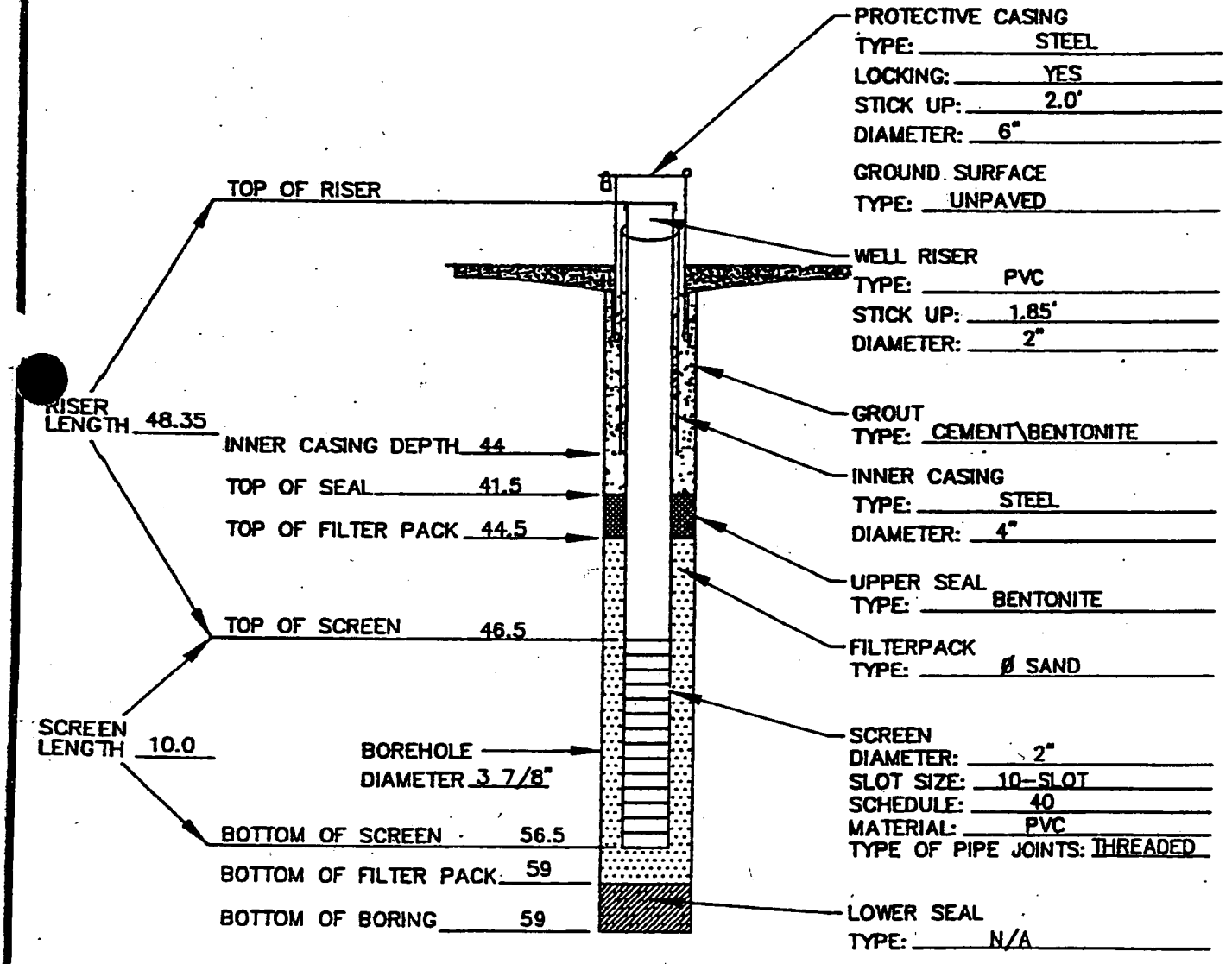
Date Started: MARCH 28, 1994
Date Completed: MARCH 29, 1994
Depth to Water: 8.20 feet (4/25/94)
Monitoring Well Elevations:
Top of PVC = 32.74
Ground Elevation = 30.58

Depth (feet)	Blow Counts		Field Measurements OVA (ppm)	HNu (ppm)	Soil Description
0-2	4	10	0	0	0-3" Top Soil, 3-11" Dk Brown F-M SAND, trace M gravel.
	18	22			11-18" Brown F SAND, some silt, dry, no odor.
2-4	17	19	0	0	Tan/Brown F SAND, trace silt, dry, no odor.
	13	13			24" Recovery
4-6	18	22	0	0	0-6" Same as above.
	27	40			6-24" Tan F SAND, dry, no odor.
6-8	90	45	0	0	0-7" Tan F SAND, dry, no odor.
	69	73			7-24" Tan M SAND, some F sand, dry, no odor.
8-10	10	13	0	0	Tan M SAND, some F sand, wet, no odor.
	17	16			24" Recovery
10-12	10	11	0	0	Tan M SAND, little F & C sand, wet, no odor.
	13	17			24" Recovery
15-17	8	8	0	0	0-24" Tan M SAND, some C sand, trace F sand, wet, no odor.
	13	22			24" Recovery
20-22	10	11	0	0	0-12" Brown F SAND, little M sand, wet, no odor.
	18	27			12-17" Brown C SAND, some M sand, wet, no odor.
					17-24" Brown F SAND, some silt, wet, no odor.
25-27	61	45	0	0	0-18" Brown F SAND, some silt, wet, no odor.
	41	33			18-24" Grey fragmented SHALE, some silt, wet, no odor.
					24" Recovery
30-31.5	45	100	0	0	0-12" Grey C SAND, little F gravel, trace F sand, wet, no odor.
	100/2"				12-18" Tan F-M SAND, little C gravel, wet, no odor.
					18" Recovery.
35-37	39	26	0	0	0-8" Tan C SAND, some F-M gravel, wet, no odor.
	29	33			8-16" Gray fragmented SHALE & SILT, wet, no odor.
39					Auger refusal



MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NCBC DAVISVILLE/ IR PROGRAM SITE 03 / CED SOLVENT DISPOSAL AREA	
DATE INSTALLED: 5-23-95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 30.3'	COORDINATES: N: 194108.15 E: 519140.54
ELEVATION TOP OF WELL RISER: 32.15'	EA INSPECTOR: D. METALLO
DEPTH TO WATER: DATE/TIME 8.77' 05-23-95	WELL No. MW03-08R
DRILLING METHOD/DEPTH: 4 1/4" HSA, (0-30'), 6" FLUSH JOINT CASING, (30-40.5'), 5 7/8" ROLLER BIT, (40.5-44'), HX CORE, (44-59')	



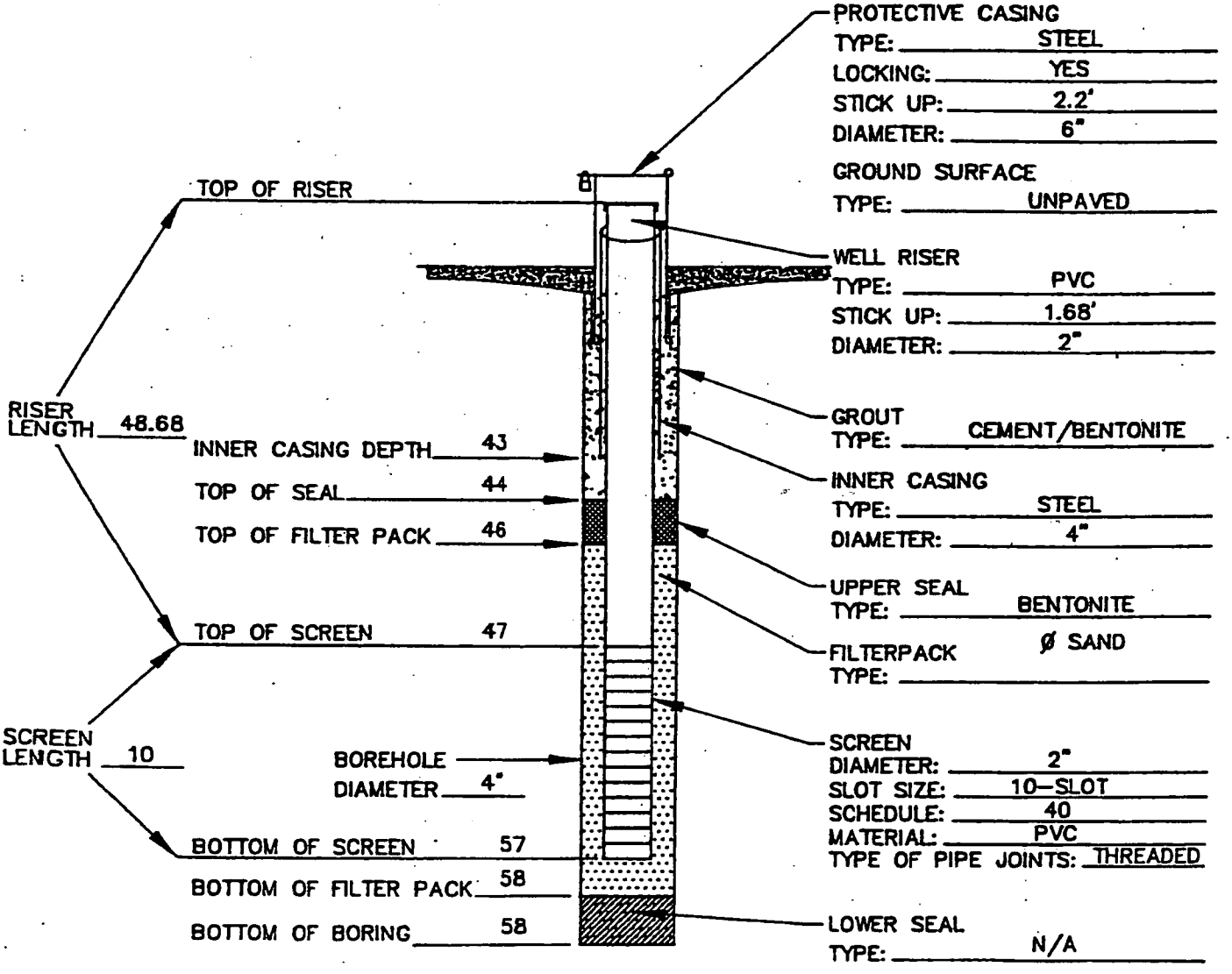
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. c:\DRAWINGS\29600.32\3243\MW03-08R.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NCBC DAVISVILLE / IR PROGRAM SITE 03 / CED SOLVENT DISPOSAL AREA	
DATE INSTALLED: 5-23-95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 32.3'	COORDINATES: N: 194256.75 E: 518495.96
ELEVATION TOP OF WELL RISER: 33.98'	EA INSPECTOR: J. SHAPIRO
DEPTH TO WATER: DATE/TIME	WELL No. MW03-14R
DRILLING METHOD/DEPTH: 4 1/4" HSA,(0-33'), 5" FLUSH JOINT CASING (33-38'), 3" FLUSH JOINT CASING (38-44.5'), NX CORE (44.5-58')	



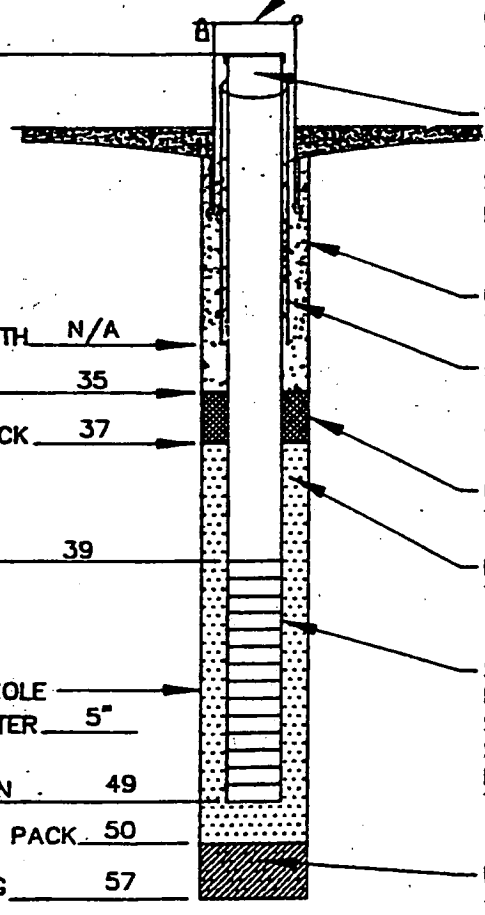
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. Q:\DRAWINGS\29600.32\3243\MW03-14R.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NCBC DAVISVILLE/ IR PROGRAM SITE 03 / CED SOLVENT DISPOSAL AREA	
DATE INSTALLED: 05-12-95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 34.0'	COORDINATES: N: 193987.68 E: 519678.50
ELEVATION TOP OF WELL RISER: 35.94'	EA INSPECTOR: E. BARRETT
DEPTH TO WATER: DATE/TIME	WELL No. MW03-10D
DRILLING METHOD/DEPTH: 4 1/4" HSA, (0-14'), 5" CASING W/4 7/8" ROLLER BIT, (14-52'), HX ROCK CORE, (52-57')	



TOP OF RISER

RISER LENGTH 40.94

INNER CASING DEPTH N/A

TOP OF SEAL 35

TOP OF FILTER PACK 37

TOP OF SCREEN 39

SCREEN LENGTH 10

BOREHOLE DIAMETER 5"

BOTTOM OF SCREEN 49

BOTTOM OF FILTER PACK 50

BOTTOM OF BORING 57

PROTECTIVE CASING
TYPE: STEEL
LOCKING: YES
STICK UP: 2.3'
DIAMETER: 6"

GROUND SURFACE
TYPE: UNPAVED

WELL RISER
TYPE: PVC
STICK UP: 1.94'
DIAMETER: 2"

GROUT
TYPE: CEMENT/BENTONITE

INNER CASING
TYPE: N/A
DIAMETER: N/A

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: ØØ SAND

SCREEN
DIAMETER: 2"
SLOT SIZE: 6-SLOT
SCHEDULE: 40
MATERIAL: PVC
TYPE OF PIPE JOINTS: THREADED

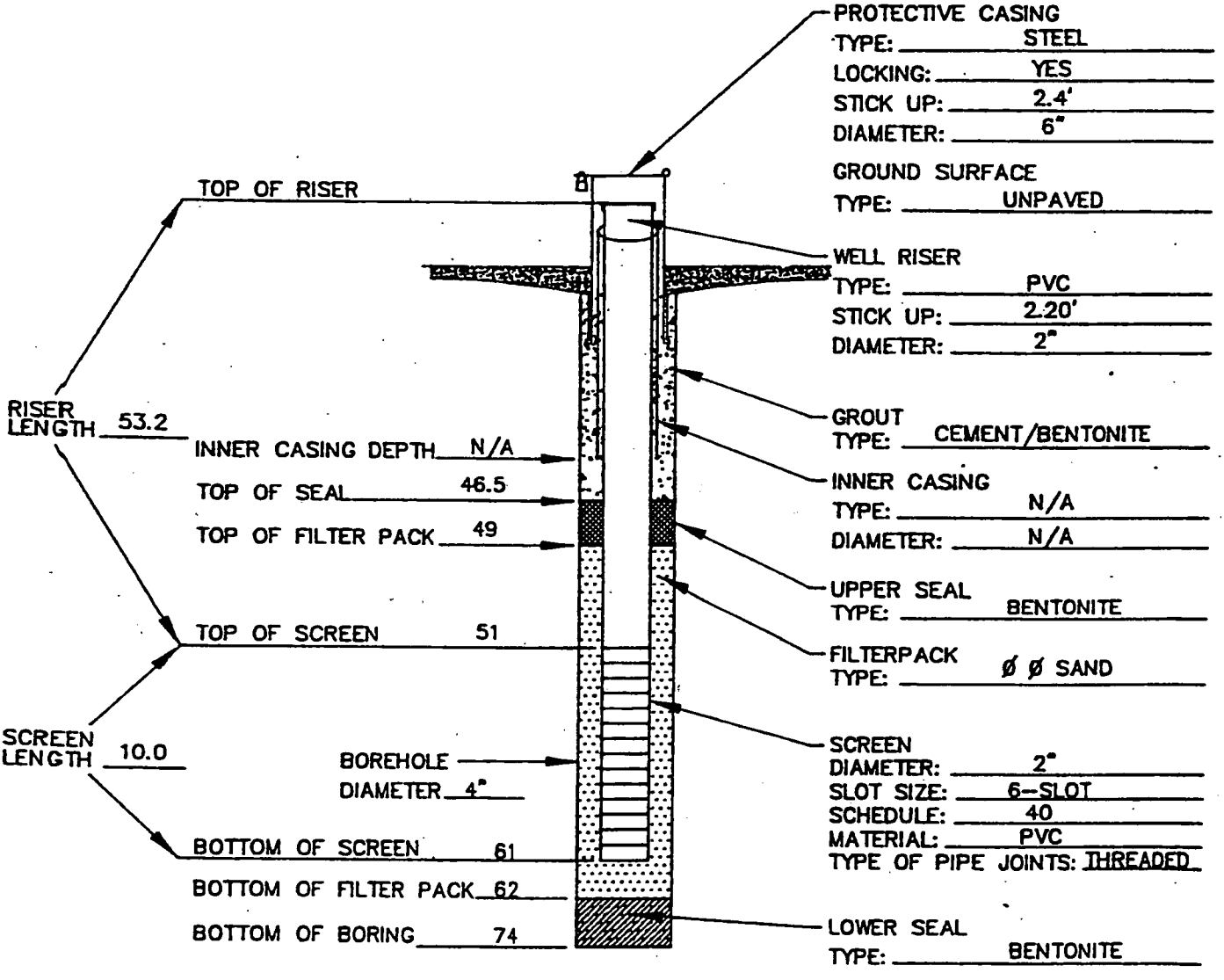
LOWER SEAL
TYPE: BENTONITE

MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NCBC DAVISVILLE/ IR PROGRAM SITE 03 / CED SOLVENT DISPOSAL AREA	
DATE INSTALLED: 05-11-95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 41.2'	COORDINATES: N: 194590.17 E: 519533.77
ELEVATION TOP OF WELL RISER: 43.40'	EA INSPECTOR: D. METALLO
DEPTH TO WATER: 18.0' DATE/TIME 05-11-95 (1200)	WELL No. MW03-09D
DRILLING METHOD/DEPTH: 4 1/4" HSA, (0-20'), 5" FLUSH JOINT CASING, (20-35'), 4" FLUSH JOINT CASING, (35-69'), HX CORE, (69-74')	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

CAD FILE No. G:\DRAWINGS\29600.32\3243\MW03-09D.DWG

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	30.33 ft
Riser Elevation:	32.15 ft
Reference Elevation:	mean sea level
Coordinates	N: 194108 E: 519140

Job No. 29600.32	Client: NCBC Davisville				IR Program Site 03
Drilling Method: Mobile B-61 rig w/ 4 1/4" HSA and 6" FJ casing with 5 7/8" RB					Boring No. MW03-08R
Sampling Method: 2 in. ID split-barrel sampler (S.S.) 3" S.S. where noted					Sheet 1 of 3
					Drilling Start: 05/15/95 0800 Finish: 05/17/95 1000
Water Level:	7.0' bgs				
Time:	1400				
Date:	05/15/95				
Reference:	grade				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft		USCS Log	Surface Conditions: Flat grassy area, adjacent to MW-03-8D & Hydroprobe location HP-02.
S.S.	24 19	0	1 0-2	0	3 12	0		SP-ML	Dark gray silt poorly graded very fine sand little small to medium, round to subroun dry-slightly moist.
					15 12	1			
S.S.	24 22	0	2 2-4	0	8 8	2		SM	Yellowish-brown, fine silty sand, slightly moist.
					8 12	3			
S.S.	24 24	4	3 4-6	0	18 24	4		SP-SM	Olive gray, very fine sand, little silt, moist.
					17 20	5			
3 in. S.S.	24 24	6	4 6-8	0	8 12	6		SP	Dark yellow brown fine to medium sand, little very fine sand, trace silt, trace coars
					8 10	7			
S.S.	24 24	8	5 8-10	0	9 9	8		SP	Same as above.
					8 10	9			
						10			Switch to sampling every 5' interval
						11			
						12			
						13			
						14			
S.S.	24 24	15	6 15-17	0	WOR 1	15		SP	Same as above.
					2 3	16			
						17			
						18			heaving sands - wash out augers
						19			
						20			

Logged by: D. Metallo

Date: 15 May 1995

Drilling Contractor: A&W Environmental Drilling

Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	46.5 - 56.5 ft	Sandpack:	44.5 - 59 ft	Grout:	0 - 41.5 ft
Bottom of Hole:	59 ft	Riser Interval:	0 - 46.5 ft	Bentonite:	41.5 - 44.5 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	30.33 ft
Riser Elevation:	32.15 ft
Reference Elevation:	mean sea level
Coordinates	N: 194108 E: 519140

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville			Location: IR Program Site 03
Drilling Method: Mobile B-61 rig w/ 4 1/4" HSA and 6" FJ casing with 5 7/8" RB				Boring No. MW03-08R
Sampling Method: 2 in. ID split-barrel sampler (S.S.) 3" S.S. where noted				Sheet 2 of 3
				Drilling
Water Level:	7.0' bgs			Start 05/15/95 0800 / Finish 05/17/95 1000
Time:	1400			
Date:	05/15/95			
Reference:	grade			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	
								Surface Conditions: Flat grassy area, adjacent to MW-03-8D & Hydroprobe location HP-02.
S.S.	24 / 24	20	7 / 20-22	0	1, 13, 15, 60	20, 21	SP-SM	Grayish black, very fine to fine sand, tightly packed low plasicity, some silt and me little subangular gravel 1/2", trace clay, wet.
						22, 23, 24		
S.S.	24 / 8	25	8 / 25-27	0	8, 18, 13, 18	25, 26	SP-SM	Same as above.
						27, 28, 29		advance augers to 30', approx. 7' of sand in augers, will switch to 6" casing (push and wash)-stop for 5/15/95. 5/16/95 Start drilling activities (0800)
S.S.	24 / 12	31	9 / 30-32	3	28, 25, 17, 38	30, 31	SM-GM	Black subangular to subrounded gravel up to 1", some coarse sand and sill. T Wet.
						32, 33		
S.S.	24 / 12	34	10 / 34-36	0	10, 20, 11, 13	34, 35	SM-GM	Same as above, color change to dark brown/black.
						36, 37, 38		
S.S.	24 / 14	39	11 / 39-41	1	8, 39, 81, 100/4	39, 40	SM-WTHR ROCK	Black angular to subrounded gravel up to 1"., very platy, fine sand and silt matrix, trace clay, dense

Logged by: D. Metallo Date: 15 May 1995

Drilling Contractor: A&W Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	46.5 - 56.5 ft	Sandpack:	44.5 - 59 ft	Grout:	0 - 41.5 ft
Bottom of Hole:	59 ft	Riser Interval:	0 - 46.5 ft	Bentonite:	41.5 - 44.5 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	30.33 ft
Riser Elevation:	32.15 ft
Reference Elevation:	mean sea level
Coordinates	N: 194108 E: 519140

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville				Location: IR Program Site 03
Drilling Method: Mobile B-61 rig w/ 4 1/4" HSA and 6" FJ casing with 5 7/8" RB					Boring No. MW03-08R
Sampling Method: 2 in. ID split-barrel sampler (S.S.) 3" S.S. where noted					Sheet 3 of 3
					Drilling
Water Level:	7.0' bgs				Start: 05/15/95 0800 / Finish: 05/17/95 1000
Time:	1400				
Date:	05/15/95				
Reference:	grade				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	
						40		Surface Conditions: Flat grassy area, adjacent to MW-03-8D & Hydroprobe location HP-02.
						41		39-41' See description on previous page
S.S.	3 / 3	40.5	12 / 42	n/a	100/3	42	Bed Rock	Various Colored. Sub-round to mostly augular rock fragements. Wet
						43		
						44		Stopped boring activities w/ 6" casing (drive and wash and roller bit advancement). Drilled a 5 7/8" socket from 40 to 44' and installed 4" ID permanent steel casing. This casing was grouted in place w/ type I/II portland cement. The 6" casing was extracted.
						45		
						46		
						47		
						48		
						49		
						50		
						51		
						52		
						53		
						54		
						55		
						56		
						57		
						58		
						59		
						60		

Logged by: D. Metallo Date: 15 May 1995

Drilling Contractor: A&W Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	46.5 - 56.5 ft	Sandpack:	44.5 - 59 ft	Grout:	0 - 41.5 ft
Bottom of Hole:	59 ft	Riser Interval:	0 - 46.5 ft	Bentonite:	41.5 - 44.5 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194108 E: 519140
Surface Elevation:	30.33 ft
Casing Above Surface:	32.15 ft
Reference Elevation:	mean sea level

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville	Location: IR Program Site 03
Drilling Method: Mobile B-61 rig w/ 4 1/4" HSA and 6" FJ casing with 5 7/8" RB		Boring No. MW03-08R
		Sheet 1 of 1

		Drilling Start	Drilling Finish
Core Bit Size:	HX core bit (2.4")		
Water Level:	7.0' bgs	05/15/95 0800	05/17/95 1000
Time:	1400		
Date:	05/15/95		
Reference:	grade		

Core Run RQD % / Run #	REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core Footage	Time Footage	Core Depth
					40					
					41					
					42					
					43					
Run #1 RQD = 72% 3.6' / 5.0' Rec. = 100% 5.0' / 5.0'				Quartz	44		(44 - 49'):Gray (N5) schist-quartz-muscovite w/ minor secondary minerals, high quartz content, scaly lineated schistose fabric, schist / quartzite. Medium to moderate hard, fractures throughout. Fine grained, bedding 90-75 degrees from core axis. Low to moderate permeability. Very slight weathering.	0-1	4:30	44-45
					45			1-2	5:00	45-46
					46			2-3	3:00	46-47
				Quartz	47			3-4	6:00	47-48
					48			4-5	6:00	48-49
Run #2 RQD = 65% 3.2' / 5.0'				Quartz	49		(49 - 51'): same as above	5-6	4:00	49-50
					50			6-7	5:30	50-51
Rec. = 100% 5.0' / 5.0'				Clay Minerals and Pyrite	51		(51 - 59'): Dark gray and very dark gray (N4-N3). phyllite w/ pyrite, quartz, and chlorite. Aphanitic-massive matrix. Bedding 90 degrees to core axis, medium to soft hardness. Slight to moderate weathering. 2-1 mm thick fractures scattered throughout. Voids filled with pyrite and clay minerals. Low to medium permeability	7-8	3:30	51-52
					52			8-9	4:00	52-53
					53			9-10	5:00	53-54
Run #3 RQD = 68% 3.46' / 5.0' Rec. = 100% 5.0' / 5.0'				Clay Minerals and Pyrite	54			10-11	5:00	54-55
					55			11-12	3:30	55-56
					56			12-13	3:30	56-57
					57			13-14	4:00	57-58
					58			14-15	5:30	58-59
					59			Finish coring to 59' at (1155)		
					60		Bottom of boring at 59.0' BGS			

Logged by: D. Metallo

Date: 22 May 1995

Drilling Contractor: A&W Environmental Drilling

Driller: Phil Thornsbury

☐ Core Run Interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	41.19 ft
Riser Elevation:	43.4 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194590 E: 519533

Job: No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville		Location: IR Program Site 03
Drilling Method: Mobil B-61 rig - using 4 1/4" I.D. HSA, 4- or 5" FJ casing with RB			Boring No. MW03-09D
Sampling Method: 2" ID split-barrel sampler driven by 140-lb hammer falling 30" (S.S.)			Sheet 1 of 4
		Drilling Start	Drilling Finish
Water Level: 20.22' bgs		05/09/95 1000	05/09/95 1730
Time: 0805			
Date: 05/12/95			
Reference: T.O.R.			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Grass
S.S.	24 / 24		1 / 0-2	0	5 / 12 / 14 / 15	0 / 1	SM	Dark yellowish brown to medium olive gray fine to medium sand, some silt, trace clay and small subangular gravel
S.S.	24 / 24		2 / 2-4	0	12 / 23 / 28 / 38	2 / 3	SM	As above, gravel content increases
S.S.	24 / 18		3 / 4-6	0	23 / 35 / 29 / 40	4 / 5	SP	Dark gray fine to medium sand, some small to medium gravel, little coarse sand, trace silt, dry to slightly moist.
S.S.	24 / 2		4 / 6-7	0	62 / 100/2	6 / 7	WTHR ROCK	Rock fragments / rock dust.
S.S.	24 / 20		5 / 8-10	0	10 / 14 / 19 / 21	8 / 9	SW	Dark gray fine to coarse sand and small to medium subangular to subrounded gravel, up to 1/2", little coarse sand, trace silt, well graded, some iron staining, dry to slightly moist.
S.S.	24 / 20		6 / 10-12	0	19 / 14 / 18 / 17	10 / 11	SW	Dark yellowish brown fine to medium sand, some coarse sand, and subangular to subrounded gravel up to 1/2", slightly moist to moist.
S.S.	24 / 20		7 / 12-14	1	11 / 8 / 9 / 8	12 / 13	SW	As above
S.S.	24 / 18		8 / 14-16	2	5 / 9 / 9 / 11	14 / 15	SW	Brownish black fine to coarse sand, trace subrounded gravel up to 1/2".
S.S.	24 / 18		9 / 16-18	1	4 / 9 / 12 / 14	16 / 17	SM	Dusky yellowish brown fine to medium sand, some silt, trace rounded gravel up to 1/4" poorly graded, slightly moist to moist.
S.S.	24 / 20		10 / 18-20	3	11 / 10 / 12 / 13	18 / 19	SM	Dusky yellowish brown medium to coarse sand, some fine sand and silt, little subangular to subrounded gravel up to 1/4". Well graded, wet.
						20		

Logged by: O. Metallo

Date: 09 May 1995

Drilling Contractor: A&W Environmental Drilling

Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	51 - 61 ft	Sandpack:	49 - 62 ft	Grout:	0 - 46.5 ft
Bottom of Hole:	74 ft	Riser Interval:	0 - 51 ft	Bentonite:	46.5 - 49 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	41.19 ft
Riser Elevation:	43.4 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194590 E: 519533

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville			Location: IR Program Site 03
Drilling Method: Mobil B-61 rig - using 4 1/4" I.D. HSA, 4- or 5" FJ casing with RB				Boring No. MW03-09D
Sampling Method: 2" ID split-barrel sampler driven by 140-lb hammer falling 30" (S.S.)				Sheet 2 of 4
				Drilling
Water Level:	20.22' bgs			Start 05/09/95 1000 / Finish 05/09/95 1730
Time:	0805			
Date:	05/12/95			
Reference:	T.O.R.			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft		USCS Log	Surface Conditions: Grass
						20			
						21			
						22			
						23			
S.S.	24 / 16		11 / 24-26	4	10 / 15	24		SM	Dark grayish brown very fine to fine sand, some silt, little medium sand, trace subrounded gravel and trace clay. Poorly graded, low competence, lightly packed, wet.
					27 / 30	25			
						26			
						27			
						28			
S.S.	24 / 20		12 / 29-31	4	23 / 31	29		SM	Dusky yellowish brown very fine sand and silt, trace subrounded gravel up to 1/4", trace clay, some iron staining, wet.
					25 / 23	30			
						31			
						32			
						33			
S.S.	24 / 8		13 / 34-36	11	19 / 23	34		MH	Dark gray silt, some very fine sand, medium dense
					19 / 16	35			
						36			
						37			
						38			
S.S.	24 / 18		14 / 39-41	8	5 / 10	39		SM	Dark gray very fine sand, some silt, medium dense.
					14 / 16	40			

Logged by: D. Metallo

Date: 09 May 1995

Drilling Contractor: A&W Environmental Drilling

Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	51 - 61 ft	Sandpack:	49 - 62 ft	Grout:	0 - 46.5 ft
Bottom of Hole:	74 ft	Riser Interval:	0 - 51 ft	Bentonite:	46.5 - 49 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	41.19 ft
Riser Elevation:	43.4 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194590 E: 519533

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville			Location: IR Program Site 03
Drilling Method: Mobil B-61 rig - using 4 1/4" I.D. HSA, 4- or 5" FJ casing with RB				Boring No. MW03-09D
Sampling Method: 2" ID split-barrel sampler driven by 140-lb hammer falling 30" (S.S.)				Sheet 3 of 4
				Drilling
Water Level:	20.22' bgs			Start: 05/09/95 1000 / Finish: 05/09/95 1730
Time:	0805			
Date:	05/12/95			
Reference:	T.O.R.			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Grass
						40		See description on pg. 2
						41		
						42		
						43		
S.S.	24 / 12		15 / 44-46	8	5, 3, 3, 4	44, 45	SM	As above
						46		
						47		
						48		
S.S.	24 / 12		16 / 49-51	11	2, 3, 3, 3	49, 50	SM	As above
						51		
						52		
						53		
S.S.	24 / 16		17 / 54-56	12	2, 4, 3, 3	54, 55	SM	Dark gray very fine to fine sand, some silt, poorly graded, loose, very moist.
						56		
						57		
						58		
S.S.	24 / 10		18 / 59-61	8	-, 1, 2, 2	59, 60	ML	Very dark gray silt, massive, very moist to wet.

Logged by: D. Metallo Date: 09 May 1995

Drilling Contractor: A&W Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	51 - 61 ft	Sandpack:	49 - 62 ft	Grout:	0 - 46.5 ft
Bottom of Hole:	74 ft	Riser Interval:	0 - 51 ft	Bentonite:	46.5 - 49 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	41.19 ft
Riser Elevation:	43.4 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194590 E: 519533

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville		Location: IR Program Site 03
Drilling Method: Mobil B-61 rig - using 4 1/4" I.D. HSA, 4- or 5" FJ casing with RB			Boring No. MW03-09D
Sampling Method:	2" ID split-barrel sampler driven by 140-lb hammer falling 30" (S.S.)		Sheet 4 of 4

					Drilling	
					Start	Finish
Water Level:	20.22' bgs					
Time:	0805				05/09/95 1000	05/09/95 1730
Date:	05/12/95					
Reference:	T.O.R.					

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Grass
						60		See description pg. 3.
						61		
						62		NOTE: driller reported a change in lithology at 62 ft from silt unit to gravel unit.
						63		
S.S.	24 / 24		19 / 64-66	8	29 / 24	64	SP SM	Very dark gray very fine to fine sand and silty sand with 10-15% gravel up to 1/2". Poorly graded, low competence, very moist to wet
					22 / 26	65		
						66		
						67		
						68		
S.S.	2 / 1		n/a / 69-69/1	n/a	100/2	69	WTHR ROCK	Black angular rock fragments (slate, phyllite), some fine sand, trace silt, possible weathered rock.
						70		Sample T.D. = 69 ft
						71		Drilling T.D. = 69 ft
						72		Rock Core Interval = 69 - 74 ft
						73		
						74		
						75		
						76		
						77		
						78		
						79		
						80		

Logged by: D. Metallo Date: 09 May 1995

Drilling Contractor: A&W Environmental Drilling Driller: Phil Thomsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	51 - 61 ft	Sandpack:	49 - 62 ft	Grout:	0 - 46.5 ft
Bottom of Hole:	74 ft	Riser Interval:	0 - 51 ft	Bentonite:	46.5 - 49 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194108 E: 519140
Surface Elevation:	30.33 ft
Casing Above Surface:	32.15 ft
Reference Elevation:	mean sea level

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville				Location: IR Program Site 03	
Drilling Method: Mobil B-61 rig - using 4 1/4" I.D. HSA, 4- or 5" FJ casing with RB					Boring No. MW03-09D	
					Sheet 1 of 1	
					Drilling	
Core Bit Size:	HX Core bit (2.4")				Start	Finish
Water Level:	20.22' bgs				05/11/95	05/11/95
Time:	0805				0900	1030
Date:	05/12/95					
Reference:	T.O.R.					

Core Run RQD % / Run #	Core Run REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG Core Footage	Time Footage	Core Depth
					60					
					61					
					62					
					63					
					64					
					65					
					66					
					67					
					68					
Run #1 RQD = 60% 3.0' / 5.0' Rec. = 100% 5.0' / 5.0'				Clay Minerals Clay Minerals	69		(69 - 74 ft): Schistosic (quartzitic) gneiss, v. low, dull luster ultra fine grain matrix with veins of sugary quartz and fine grained muscovite and chlorite mica and unknown dark minerals with approx. 5-10% porphyrclasts in quartz matrix (angular) some recrystalization. Matrix: dark gray (n3) tightly folded lepidoblastic texture showing several generations of folding, remnant and apparent schistosity, some color banding in quartz regions, hard, v. slight to slightly weathered, fractures <1/8" through-out, some clay minerals as fracture fillings.	0-1	7:00	69-70
					70			1-2	7:00	70-71
					71			2-3	7:00	71-72
					72			3-4	7:00	72-73
					73			4-5	7:00	73-74
					74					
					75					
					76					
					77					
					78					
					79					
					80					

Logged by: D. Metallo Date: 11 May 1995

Drilling Contractor: A&W Environmental Drilling Driller: Phil Thornsbury

☐ Core Run Interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	34.02 ft
Riser Elevation:	35.94 ft
Reference Elevation:	mean sea level
Coordinates:	N: 193987 E: 519678

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville				Location: IR Program Site 03
Drilling Method: Mobil B-61 Rig - using 4 1/4" I.D. HSA and 5-in. FJ casing and 4 7/8" RB.					Boring No. MW03-10D
Sampling Method: 2" diameter split-barrel sampler driven by 140-lb hammer falling 30" (S.S.)					Sheet 1 of 3
					Drilling
Water Level:	13.96' bgs				Start: 05/11/95 0800 / Finish: 05/12/95 1700
Time:	n/a				
Date:	05/31/95				
Reference:	T.O.R.				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Grass
S.S.	24 / 16		1 / 0-2	n/a	3, 11, 10, 10	0-1	SM	Olive black, very fine sand and silt. Some gravel, dry.
S.S.	24 / 14		2 / 2-4	n/a	6, 4, 3, 3	2-3	SM	Olive gray, well graded, very fine sand and silt. Occasional pieces of large gravel, loose, dry.
S.S.	24 / 14		3 / 4-6	0	3, 4, 5, 11	4-5	SM	Olive gray, well graded, very fine sand and silt. Occasional pieces of large gravel loose, moist.
S.S.	24 / 20		4 / 6-8	4	35, 25, 35, 75	6-7	SM / GM	Olive gray, poorly graded fine to medium sand with little coarse sand and fine gravel, trace silt, moist. / Mottled yellow orange and yellow brown, coarse sand and gravel, moderately graded, moist.
S.S.	24 / 20		5 / 8-10	3	20, 32, 34, 35	8-9	GM	Mottled yellow orange and yellow brown, well graded, silt and gravel, loose, moist.
S.S.	24 / 14		6 / 10-12	3	48, 48, 90, 35	10-11	SM	Dark gray silt little clay and gravel, loose, crumbles easily, moist.
S.S.	24 / 14		7 / 12-14	0	10, 11, 10, 12	12-13	SM / SP/SM	Olive black and grayish black silt interbedded with well graded sand and gravel. wet.
						14-18		
S.S.	24 / 10		8 / 19-21	0.5	12, 10, 11, 8	19-20	ML/SP	Grayish black sandy silt with mottled yellow orange and yellow brown, Fine to medium sand, little medium sand and medium gravel, saturated.

Logged by: E. Barrett

Date: 11-12 May 1995

Drilling Contractor: A&W Environmental Drilling

Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	39 - 49 ft	Sandpack:	37 - 50 ft	Grout:	0 - 35 ft
Bottom of Hole:	57 ft	Riser Interval:	0 - 39 ft	Bentonite:	35 - 37 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	34.02 ft
Riser Elevation:	35.94 ft
Reference Elevation:	mean sea level
Coordinates:	N: 193987 E: 519678

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville			Location: IR Program Site 03
Drilling Method: Mobil B-61 Rig - using 4 1/4" I.D. HSA and 5-in. FJ casing and 4 7/8" RB.				Boring No. MW03-10D
Sampling Method: 2" diameter split-barrel sampler driven by 140-lb hammer falling 30" (S.S.)				Sheet 2 of 3
Water Level:	13.96' bgs			Drilling Start: 05/11/95 0800 / Finish: 05/12/95 1700
Time:	n/a			
Date:	05/31/95			
Reference:	T.O.R.			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Grass
						20		See description pg. 1.
						21		
						22		
						23		
S.S.	24 / 12		9 / 24-26	1	10 / 10 / 11 / 18	24	SM	Greenish black and dark gray sandy silt interbedded with yellow brown and yellow orange fine sand. Saturated.
						25		
						26		
						27		
						28		
S.S.	24 / 8		10 / 29-31	1	6 / 6 / 9 / 12	29	SM	Olive gray ~~well-graded~~ fine to very fine sand, little silt, saturated
						30		
						31		
						32		
						33		
S.S.	24 / 10		11 / 34-36	0	5 / 8 / 6 / 7	34	SM	Olive gray fine to very fine sand, little silt, saturated.
						35		
						36		
						37		
						38		
S.S.	24 / 14		12 / 39-41		4 / 4 / 4 / 8	39	SM	Olive gray fine sand with intermittent lenses of coarse sand, saturated.
						40		

Logged by: E. Barrett — Date: 11-12 May 1995

Drilling Contractor: A&W Environmental Drilling — Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	39 - 49 ft	Sandpack:	37 - 50 ft	Grout:	0 - 35 ft
Bottom of Hole:	57 ft	Riser Interval:	0 - 39 ft	Bentonite:	35 - 37 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	34.02 ft
Riser Elevation:	35.94 ft
Reference Elevation:	mean sea level
Coordinates:	N: 193987 E: 519678

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville		Location: IR Program Site 03
Drilling Method: Mobil B-61 Rig - using 4 1/4" I.D. HSA and 5-in. FJ casing and 4 7/8" RB.			Boring No. MW03-10D
Sampling Method: 2" diameter split-barrel sampler driven by 140-lb hammer falling 30" (S.S.)			Sheet 3 of 3
			Drilling

		Start	Finish
Water Level:	13.96' bgs		
Time:	n/a	05/11/95 0800	05/12/95 1700
Date:	05/31/95		
Reference:	T.O.R.		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Grass
						40		See description pg. 2.
						41		
						42		
						43		
S.S.	24 / 8		13 / 44-46	1	20 18 15 9	44 45	ML GM	Olive gray stiff clay, some angular fine gravel, little coarse to fine sand (glacial till).
						46		
						47		
						48		
S.S.	24 / 10		14 / 49-51	0.5	33 35 119 44	49 50	GM WTHR ROCK	Olive gray silt,sand and gravel. (till) Dark gray phyllite fragments, weathered bedrock, platey, wet.
						51		Sample T.D. = 51 ft
						52		Drilling T.D. = 52 ft Rock Core Interval = 52 - 57 ft
						53		
						54		
						55		
						56		
						57		
						58		
						59		
						60		

Logged by: E. Barrett Date: 11-12 May 1995

Drilling Contractor: A&W Environmental Drilling Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	39 - 49 ft	Sandpack:	37 - 50 ft	Grout:	0 - 35 ft
Bottom of Hole:	57 ft	Riser Interval:	0 - 39 ft	Bentonite:	35 - 37 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 193987 E: 519678
Surface Elevation:	34.02 ft
Casing Above Surface:	35.94 ft
Reference Elevation:	mean sea level

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville	Location: IR Program Site 03
Drilling Method: Mobil B-61 Rig - using 4 1/4" I.D. HSA and 5-in. FJ casing and 4 7/8" RB.		Boring No. MW03-10D
		Sheet 1 of 1

		Drilling Start	Drilling Finish
Core Bit Size:	HX Core bit (2.4")		
Water Level:	13.96' bgs	05/12/95	05/12/95
Time:	n/a	0800	0830
Date:	05/31/95		
Reference:	T.O.R.		

Core Run RQD % / Run #	Core Run REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	Surface Conditions: LITHOLOGIC LOG	DRILLING LOG: Core Footage	Time (mins)	Core Depth
					50					
					51					
								Core Footage	Time (mins)	Core Depth
Run #1 RQD = 0% 0' / 5.0' Rec. = 100% 5.0' / 5.0'					52		(52 - 52.5 ft): Medium dark gray, schist. Highly fractured with pieces ranging from 0.5 in to 4 in.	0-1	2:48	52-53
					53		Significant layers and veins of quartz. Often	1-2	3:49	53-54
					54		sheers along quartz veins. Occassional sparse lenses of oxidized weathered rock.	2-3	5:15	54-55
					55		(52.5 - 56 ft): Yellowish gray slightly banded	3-4	4:21	55-56
					56		quartzite. Significant vertical and horizontal quartz layers and veins.	4-5	5:50	56-57
					57		(56 - 57 ft): Medium dark gray, schist. Highly fractured with pieces ranging from 0.5 in to 4 in.			
					58		Significant veins and small crystals of quartz. Often sheers along quartz veins.			
					59					
					60					
					61					
					62					
					63					
					64					
					65					
					66					
					67					
					68					
					69					
					70					

Logged by: E. Barrett Date: 12 May 1995

Drilling Contractor: A&W Environmental Drilling Driller: Brad Haase

☐ Core Run Interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	34.50 ft
Riser Elevation:	36.11 ft
Reference Elevation:	mean sea level
Coordinates	N: 194395 E: 518914

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville				Location: IR Program Site 03
Drilling Method: Mobil B-61 Rig - using 4 1/4" I.D. HSA, 5 or 3 in. FJ casing with RB.					Boring No. MW03-12D
Sampling Method: 2 in. I.D. split-barrel sampler driven by 140-lb hammer falling 30 in. (S.S.)					Sheet 1 of 1
					Drilling
Water Level:	10' bgs				Start 05/16/95 0830 / Finish 05/19/95 1700
Time:	1030				
Date:	05/16/95				
Reference:	S.S.				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	
						0		Surface Conditions: Grass
								Sample not available
						1		
S.S.	24 / 10		1 / 2-4	3	8 / 8	2	SP / SM	Moderate olive brown fine grained sand and dusky yellowish brown sand and silt. Poorly graded, loose, moist.
					8 / 23	3		
S.S.	24 / 16		2 / 4-6	1	5 / 11	4	GM / SM	Dark yellowish brown silt, sand and gravel. Loose, moist. Grades to poorly graded coarse sand and silt with little to no gravel.
					25 / 28	5		
S.S.	24 / 14		3 / 6-8	3	13 / 17	6	GM / ML	Dark gray and olive gray silt interbedded with sand and gravel. Silt layers are tight, sand and gravel lenses are loose.
					15 / 14	7		
S.S.	24 / 24		4 / 8-10	3	5 / 10	8	GM	Mottled yellowish brown, olive black, and med-light gray silt, sand and gravel. Coarse sand, and poorly graded gravel. Loose, moist, sparse sections of tight packed silt.
					11 / 12	9		
S.S.	24 / 14		5 / 10-12	2.5	12 / 15	10	GM	Mottled yellowish brown, olive black, and med-light gray silt, sand and gravel. Coarse sand, and poorly graded gravel. Loose, wet.
					15 / 17	11		
						12		
						13		
						14		
S.S.	24 / 22		6 / 15-17	3	30 / 35	15	GM	Mottled yellowish brown, olive black, and med-light gray silt, sand and gravel. Coarse sand, and poorly graded gravel. Loose, wet.
					85 / 113	16	ML	Dark gray silt and weathered bedrock. Alternating layers of tight packed silt and platey phyllite.
						17		
						18		Sample T.D. = 17 ft Drilling T.D. = 21 ft
						19		Rock Core Interval = 21 - 41.5 ft
						20		

Logged by: E. Barrett Date: 16-19 May 1995

Drilling Contractor: A&W Environmental Drilling Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Casing:	2 in.	Screen Interval:	25 - 35 ft	Sandpack:	23 - 36 ft	Grout:	0 - 21 ft
Bottom of Hole:	41 ft	Riser Interval:	0 - 25 ft	Bentonite:	21 - 23 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194395 E: 518914
Surface Elevation:	33.50 ft
Casing Above Surface:	36.11 ft
Reference Elevation:	mean sea level

Job No.	Client: NORDIV, NAVFAC	Location:
29600.32	NCBC-Davisville	IR Program Site 03
Drilling Method: Mobil B-61 Rig - using 4 1/4" I.D.		Boring No.
HSA, 5 or 3 in. FJ casing with RB.		MW03-12D
		Sheet 1 of 1

					Drilling	
Core Bit Size:	HX Core bit (2.4"), NX Core bit (2.2")				Start	Finish
Water Level:	10' bgs				05/18/95	05/19/95
Time:	1030				0800	1400
Date:	05/16/95					
Reference:	Surface					

Core Run RQD % / Run #	Core Run REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	Surface Conditions: LITHOLOGIC LOG	DRILLING LOG Core Footage	Time (mins)	Core Depth
—					20					
Run #1					21		(21 - 26 ft): Medium and medium dark gray schist/	0-1	4:15	21-22
RQD = 0%							gneiss. Three feet recovery of highly fractured and			
0' / 2.0'					22		broken up rock. Fragments range from 0.5 in to 3 in.	1-2	3:16	22-23
							Visible mica crystals, little quartz and quartzite veins			
Rec. = 50%					23		and crystals, little visible banding. Oxidized staining	2-3	6:15	23-24
2.0' / 4.0'							and weathered clay-like material along fracture zones.			
—					24			3-4	5:17	24-25
—										
					25			4-5	29:50	25-26
—					26					
—										
—					27					
—										
—					28					
Run #2					29		(29 - 34 ft): Medium and medium dark gray schist/	0-1	2:00	29-30
RQD = 0%							gneiss. One foot recovery of highly fractured and			
0' / 0.8'					30		broken up rock. Fragments range from 0.5 in to 2 in.	1-2	4:00	30-31
							Visible mica crystals, little quartz and quartzite veins			
Rec. = 16%					31		and crystals, little visible banding. Oxidized staining	2-3	5:00	31-32
0.8' / 5.0'							and weathered clay-like material along fracture zones.			
—					32			3-4	3:15	32-33
—										
					33			4-5	6:00	33-34
Run #3					34					
RQD = 0%							(34.5 - 37 ft): Dark gray schist. 1.5 feet of recovery	0-1	3:15	34.5-35.5
0' / 1.5'					35		of highly fractured rock with pieces ranging from 0.25			
Rec. = 50%							in to 3 in. Platey fractures with some iron staining	1-2	6:00	35.5-36.5
1.5' / 3.0'					36		along fracture zones. Some quartzite gravels.			
								2-2.5	15:00	36.5-37
Run #4					37		(37 - 42 ft): Medium dark gray schist. 4.1 feet of	0-1	3:05	37-38
RQD = 76%							recovery of solid competent bedrock. Few fractures			
3.1' / 4.1'					38		with sections ranging from 6 in to 12 in. Platey with	1-2	4:19	38-39
							visible mica crystals and quartz and quartzite veins			
Rec. = 91%					39		and crystals. Silt and mud present along fracture	2-3	3:17	39-40
4.1' / 4.5'							zones.			
					40			3-4	3:05	40-41

Logged by: E. Barrett Date: 18-19 May 1995

Drilling Contractor: A&W Environmental Drilling Driller: Brad Haase

☐ Core Run Interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	34.20 ft
Riser Elevation:	36.21 ft
Reference Elevation:	mean sea level
Coordinates	N: 194384 E: 518911

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville				Location: IR Program Site 03
Drilling Method: Mobil B-61 Rig - using 4 1/4" I.D. HSA, 5 or 3 in. FJ casing with RB.					Boring No. MW03-12R
Sampling Method: 2 in. I.D. split-barrel sampler driven by 140-lb hammer falling 30 in. (S.S.)					Sheet 1 of 1
					Drilling
Water Level:	10' bgs				Start: 05/23/95 0800
Time:	0900				Finish: 05/26/95 1700
Date:	05/23/95				
Reference:	S.S.				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Grass
						20		NOTE: Samples were not collected between 0 and 20 feet in this boring. For a description of the 0-20 ft interval, see MW03-12SR. The 20-22 ft interval of this boring was not available due to sample refusal.
						21		
						22		
						23		
S.S.	24 / 20		1 / 24-26	1.2	23 / 33 / 27 / 25	24	WTHR ROCK	Dark gray schist fragments with interbedded clay,silt and sand. Weathered and highly fractured. Fractures in platey and angular pieces ranging from 0.1-2 in. thickness.
						25		lenses range from thin laminae to 1 in. thick.
						26		
						27		
						28		
S.S.	24 / 12		2 / 29-31	10	17 / 30 / 33 / 27	29	WTHR ROCK	Same as above
						30		
						31		
						32		
						33		
S.S.	23 / 14		3 / 34-36	6	70 / 73 / 57 / 100	34	WTHR ROCK	Same as above
						35		
						36		Sample T.D. = 36 ft Drilling T.D. = 41 ft
						37		Rock Core Interval = 41-56 ft
						38		
						39		
						40		

Logged by: E. Barrett Date: 23-26 May 1995

Drilling Contractor: A&W Environmental Drilling Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Casing:	2 in.	Screen Interval:	45 - 55 ft	Sandpack:	43 - 56 ft	Grout:	0 - 41 ft
Bottom of Hole:	56 ft	Riser Interval:	0 - 45 ft	Bentonite:	41 - 43 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194384 E: 518911
Surface Elevation:	34.20 ft
Casing Above Surface:	36.11 ft
Reference Elevation:	mean sea level

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville	Location: IR Program Site 03
Drilling Method: Mobil B-61 Rig - using 4 1/4" I.D. HSA, 5 or 3 in. FJ casing with RB.		Boring No. MW03-12R
		Sheet 1 of 1

		Drilling	
		Start	Finish
Core Bit Size:	HX Core bit (2.4")		
Water Level:	10' bgs	05/25/95	05/25/95
Time:	1030	1100	1300
Date:	05/16/95		
Reference:	Surface		

Core Run RQD % / Run #	Core Run REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG Core Footage	Time (mins)	Core Depth
—					40					
Run #1 RQD = 80% 4.0' / 5.0' Rec. = 100% 5.0' / 5.0'					41 42 43 44 45		(41 - 46 ft): Medium and medium light gray schist/gneiss. Full recovery of solid competent bedrock with sections ranging from 12 to 24 in with very few small broken fragments. Platey with little banding. Mica crystals and scattered vertical and horizontal quartzite veins and crystals. Glossy texture when wet. Little silt along fracture zones with some oxidized staining.	0-1 1-2 2-3 3-4 4-5	2:36 2:49 4:24 6:08 5:25	41-42 42-43 43-44 44-45 45-46
Run #2 RQD = 92% 4.5' / 5.0' Rec. = 98% 4.9' / 5.0'					46 47 48 49 50		(46-50 ft): Light and medium light gray schist/gneiss. Full recovery of competent bedrock with most sections 12 in with a few 2-4 in. sections. Noticeable banding with vertical and horizontal veins of quartz and quartzite. Significant quartz and mica crystals. Some sections appear platey and schist-like, others are more massive and gneiss-like (alternating). Silt and clay in the fracture zones.	5-6 6-7 7-8 8-9 9-10	3:42 4:10 5:03 4:55 4:11	46-47 47-48 48-49 49-50 50-51
Run #3 RQD = 38% 1.9' / 5.0' Rec. = 100% 5.0' / 5.0' —					51 52 53 54 55		(50-56 ft): Medium light gray with medium gray schist/ gneiss. Full recovery of competant bedrock. Sections range from 2 to 6 in. with significant vertical and horizontal fractures. Silt, clay, and oxidized staining in the fracture zones. Platey and blocky along fracture zones. Vertical and horizontal quartz and quartzite veins. Visible mica and quartz crystals.	10-11 11-12 12-13 13-14 14-15	4:42 4:39 4:06 4:21 4:08	51-52 52-53 53-54 54-55 55-56
— — — — — — — — —					56 57 58 59 60					

Logged by: E. Barrett Date: 25 May 1995

Drilling Contractor: A&W Environmental Drilling Driller: Brad Haase

☐ Core Run Interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	30.21 ft
Riser Elevation:	32.45 ft
Reference Elevation:	mean sea level
Coordinates	N: 194146 E: 519003

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville				Location: IR Program Site 03
Drilling Method: Mobile B-61 rig w/ 4 1/4" I.D. HSA and 6" FJ casing with 5 7/8" RB					Boring No. MW03-13D
Sampling Method: 2 in. ID split-barrel sampler (S.S.) 3" S.S. where noted					Sheet 1 of 3
Water Level:	5' bgs				Drilling: Start 05/23/95 1500; Finish 05/25/95 1000
Time:	1520				
Date:	05/23/95				
Reference:	surface				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Flat grassy area, adjacent to MW-03-8D & Hydroprobe location HP-02.
S.S.	24 / 18		1 / 0-2	0	2, 3, 4, 4	0	SM	Dusky yellow brown , very fine to fine sand and silt, loose, slighly moist.
S.S.	24 / 20		2 / 2-4	0	3, 4, 6, 7	2	SM	Moderate yellow brown with pale yellow brown very fine to fine silty sand, very poo graded, moist.
S.S.	24 / 20		3 / 4-6	0	4, 6, 6, 6	4	SM	Same as above, color pale yellow brown. encountered water at 5 ft.
S.S.	24 / 18		4 / 6-8	n/a	6, 7, 7, 7	6	SP	Same as above
S.S.	24 / 24		5 / 8-10	0	6, 6, 9, 8	8	SM	Dark yellow brown, very fine to fine sand, some silt, wet.
						10		
						11		
						12		
						13		
						14		
S.S.	24 / 22		6 / 15-17	1	1, 3, 4, 5	15	SW	Dark yellow brown fine to medium sand, trace silt, organics, loose.
						16		
						17		
						18		
						19		
						20		

Logged by: D. Metallo Date: May 23 -25 1995

Drilling Contractor: A&W Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	29 - 39 ft	Sandpack:	26 - 40.5 ft	Grout:	0 - 24 ft
Bottom of Hole:	47.5 ft	Riser Interval:	0 - 29 ft	Bentonite:	24 - 26 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	30.21 ft
Riser Elevation:	32.45 ft
Reference Elevation:	mean sea level
Coordinates	N: 194146 E: 519003

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville			Location: IR Program Site 03
Drilling Method: Mobile B-61 rig w/ 4 1/4" I.D. HSA and 6" FJ casing with 5 7/8" RB				Boring No. MW03-13D
Sampling Method: 2 in. ID split-barrel sampler (S.S.) 3" S.S. where noted				Sheet 2 of 3
				Drilling
Water Level:	5' bgs			Start: 05/23/95 1500 / Finish: 05/25/95 1000
Time:	1520			
Date:	05/23/95			
Reference:	surface			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Flat grassy area, adjacent to MW-03-8D & Hydroprobe location HP-02.
S.S.	24 / 7		7 / 20-22		17 26	20	SP	Dark olive black very fine to fine sand, trace medium sand and silt, trace subangul gravel up to 1 1/2 in.
					12 20	21		
						22		
						23		
						24		
S.S.	24 / 18		8 / 25-27	0	3 4	25	SM GM	Black well graded mix of clay - subangular to subrounded gravel up to 1 in.
					5 5	26	ML	
						27		
						28		
						29		
S.S.	24 / 20		9 / 30-32	0	3 12	30	SP	Brownish black fine to medium snad, little subangular to rounded gravel up to 3/ trace very fine sand.
					19 21	31	SW GM	
						32		
						33		
S.S.	24 / 10		10 / 34-36	0	10 8	34	GM SM	Dark brown - black subangular to subrounded gravel up to 1 in., some medium - coarse sand, little silt.
					9 9	35		
						36		
						37		
						38		
S.S.	24 / 8		11 / 39-40	0	25 34	39	GM WTHR	Subangular to angular gravel up to 3/4 in. and very fine sand and silt, trace clay, possible till, saturated.
					100/3	40	ROCK	

Logged by: D. Metallo Date: May 23 -25 1995

Drilling Contractor: A&W Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	29 - 39 ft	Sandpack:	26 - 40.5 ft	Grout:	0 - 24 ft
Bottom of Hole:	47.5 ft	Riser Interval:	0 - 29 ft	Bentonite:	24 - 26 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	30.21 ft
Riser Elevation:	32.45 ft
Reference Elevation:	mean sea level
Coordinates	N: 194146 E: 519003

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville				Location: IR Program Site 03
Drilling Method: Mobile B-61 rig w/ 4 1/4" I.D. HSA and 6" FJ casing with 5 7/8" RB					Boring No. MW03-13D
Sampling Method: 2 in. ID split-barrel sampler (S.S.) 3" S.S. where noted					Sheet 3 of 3
					Drilling
Water Level:	5' bgs				Start: 05/23/95 1500
Time:	1520				Finish: 05/25/95 1000
Date:	05/23/95				
Reference:	surface				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Flat grassy area, adjacent to MW-03-8D & Hydroprobe location HP-02.
						40		
						41	WTHR ROCK	Black weathered rock and schist rock fragments, saturated
						42		
						43		42.5 ft refusal (competant rock)
						44		Sample T.D. = 40 ft
						45		Drilling T.D. = 42.5 ft
						46		Rock Core Interval = 42.5 - 47.5 ft
						47		
						48		
						49		
						50		
						51		
						52		
						53		
						54		
						55		
						56		
						57		
						58		
						59		
						60		

Logged by: D. Metallo

Date: May 23 -25 1995

Drilling Contractor: A&W Environmental Drilling

Driller: Phil Thomsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	29 - 39 ft	Sandpack:	26 - 40.5 ft	Grout:	0 - 24 ft
Bottom of Hole:	47.5 ft	Riser Interval:	0 - 29 ft	Bentonite:	24 - 26 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194146 E: 519003
Surface Elevation:	30.21 ft
Casing Above Surface:	32.15 ft
Reference Elevation:	mean sea level

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville	Location: IR Program Site 03
Drilling Method: Mobile B-61 rig w/ 4 1/4" I.D. HSA and 6" FJ casing with 5 7/8" RB		Boring No. MW03-13D
		Sheet 1 of 1

					Drilling	
Core Bit Size:	NX Core bit (2.2")				Start	Finish
Water Level:	5' bgs				05/24/95	05/24/95
Time:	1520				1130	1400
Date:	05/23/95					
Reference:	surface					

Core Run RQD % / Run #	Core Run REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG Core Footage	Time Footage	Core Depth
					40					
					41					
					42					
Run #1 RQD = 90% 4.5' / 5.0' Rec. = 100% 5.0' / 5.0'				Quartz and Chlorite Pyrite	43 44 45 46 47		(42.5 - 47.5 ft): Gray (n6) Schist - quartz, muscovite, biotite, pyrite in an ultra fine grain matrix (massive) lineated scaly nematoblastic texture medium hardness, very slightly weathered fresh, very thin <2-4 mm fractures, joints parallel with remnant bedding plane, fractures scattered throughout filled with pyrite, quartz and clay minerals, primary and secondary porosity exist but k-value is likely very low.	0-1 1-2 2-3 3-4 4-5	3:00 2:50 2:00 2:00 2:50	42.5-43.5 43.5-44.5 44.5-45.5 45.5-46.5 46.5-47.5
					48					
					49					
					50					
					51					
					52					
					53					
					54		Bottom of boring at 47.5 ft bgs			
					55					
					56					
					57					
					58					
					59					
					60					

Logged by: D. Metallo Date: 24 May 1995

Drilling Contractor: A&W Environmental Drilling Driller: Phil Thornsbury

Core Run Interval

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194146 E: 519003
Surface Elevation:	30.21 ft
Riser Elevation:	32.45 ft
Reference Elevation:	mean sea level

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville	Location: IR Program Site 03
Drilling Method: Mobile B-61 rig w/ 4 1/4" I.D. HSA and 6" FJ casing with 5 7/8" RB		Boring No. MW03-13R
		Sheet 1 of 1

		Drilling Start	Drilling Finish
Core Bit Size:	HX Core bit (2.4")		
Water Level:	5' bgs	05/30/95	05/30/95
Time:	1520	0900	1100
Date:	05/23/95		
Reference:	surface		

Core Run RQD % / Run #	REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core Footage	Time (mins)	Core Depth
—					40					
—										
—					41					
—										
—					42					
—										
					43					
Run #1				Quartz			(43.5 - 45.8 ft): Medium gray quartzite healed fractures	0-1	6:00	43.5-44.5
RQD = 98%					44		quartz filled			
4.9' / 5.0'								1-2	4:30	44.5-45.5
					45					
Rec. = 96%							(45.8 - 48.2 ft): Dark gray, finer grained quartzite	2-3	2:48	45.5-46.5
4.8' / 5.0'					46					
								3-4	2:48	46.5-47.5
					47					
								4-5	1:42	47.5-48.5
				Qtz/Fe	48		(48.2 - 48.5 ft): Dark gray phyllite, large healed fracture			
Run #2							(1/2" thick) filled with quartz and pyrite; slickensides on	5-6	4:30	48.5-49.5
					49		fracture at 4"			
RQD = 95%							(48.5 - 50.9 ft): Dark gray quartzite	6-7	3:00	49.5-50.5
4.8' / 5.0'					50					
								7-8	3:00	50.5-51.5
Rec. = 100%					51		(50.9 - 51.2 ft): Dark gray phyllite			
5.0' / 5.0'				Quartz			(51.2 - 53.2 ft): Medium grained quartzite, minor healed	8-9	4:18	51.5-52.5
				and	52		fractures filled with quartz and pyrite.			
				Fe				9-10	4:48	52.5-53.5
					53					
Run #3							(53.2 - 56.2 ft): Massive, light gray, medium to coarse	10-11	3:30	53.5-54.5
					54		grained quartzite (quartz, mica)			
RQD = 100%								11-12	4:00	54.5-55.5
5.0' / 5.0'					55					
								12-13	3:30	55.5-56.5
Rec. = 100%					56		(56.2 - 58.2 ft): Minor quartz healed fractures, fractures			
5.0' / 5.0'				Quartz			at 55.7 ft and 57 ft	13-14	3:30	56.5-57.5
					57					
								14-15	3:00	57.5-58.5
					58		(58.1 - 58.2 ft): Dark gray, finer grained quartzite, iron			
—							staining on bottom			
—					59					
—										
—					60					

Logged by: J. Shapiro

Date: 30 May 1995

Drilling Contractor: A&W Environmental Drilling

Driller: Phil Thornsbury

Core Run Interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	32.44 ft
Riser Elevation:	34.00 ft
Reference Elevation:	mean sea level
Coordinates	N: 194265 E: 518494

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville				Location: IR Program Site 03
Drilling Method: CME 75 Drill Rig - using 4 1/4" I.D. HSA, 3" and 5" FJ casing with RB					Boring No. MW03-14D
Sampling Method: 2" diameter split-barrel sampler driven by 140-lb hammer falling 30 in. (S.S.)					Sheet 1 of 1
					Drilling
Water Level:	8.7' bgs				Start: 05/17/95 1450
Time:	0845				Finish: 05/19/95 1530
Date:	05/24/95				
Reference:	T.O.C.				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Grass
						20		NOTE: Samples were not collected between 0 and 30 ft in this boring. For a description of the 0-30 ft interval, see MW03-14R.
						21		
						22		
						23		
						24		
						25		
						26		
						27		
						28		
						29		
S.S.	4 / 4		1 / 30-30/4	1.4	101/4	30	GM	Dark gray blocky gravel and fractured rock with silty matrix. Some coarse sand and fine gravel. Blocky gravel, loose, saturated.
						31		
S.S.	9 / 9		2 / 32-32/9	5	42 / 101/3	32	CL	Dark gray silty clay with coarse sand and gravel up to 2". Loose, saturated.
						33		
S.S.	5 / 5		3 / 34-34/5	8	106/5	34	SM	Olive gray coarse sand and gravel with silt/clay matrix. Blocky gravel and fractured rock up to 2", saturated.
						35		
						36		
S.S.	2 / 2		4 / 37-37/2	9	103/2	37	SM	Olive gray coarse sand and gravel with silt/clay matrix. Blocky gravel and fractured rock up to 2 in., saturated.
						38		
						39		Sample T.D. = 37 ft Drilling T.D. = 37 ft
						40		Rock Core Interval = 37-41

Logged by: J. Shapiro Date: 17-19 May 1995

Drilling Contractor: Envirotech Driller: John Richardson

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	30 - 40 ft	Sandpack:	29 - 41 ft	Grout:	0 - 27 ft
Bottom of Hole:	42 ft	Riser Interval:	0 - 30 ft	Bentonite:	27 - 29 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194265 E: 518494
Surface Elevation:	32.44 ft
Casing Above Surface:	34.00 ft
Reference Elevation:	mean sea level

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville				Location: IR Program Site 03
Drilling Method: CME 75 Rig - using 4 1/4" I.D. HSA, 3" and 5" FJ casing with RB					Boring No. MW03-14D
					Sheet 1 of 1
					Drilling
Core Bit Size:	NX Core bit (2.2")				Start: 05/18/95 1300 / Finish: 05/18/95 1530
Water Level:	8.95' bgs				
Time:	n/a				
Date:	05/31/95				
Reference:	T.O.R.				

Core Run RQD % / Run #	Core Run REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core Footage	Time (mins)	Core Depth
					30					
					31					
					32					
					33					
					34					
					35					
					36					
								Core Footage	Time (mins)	Core Depth
Run #1					37		(37 - 40.3 ft): Medium gray quartzite with minor	0-1	7:30	37-38
RQD = 15%							fractures. One large 6 in. section and many small			
0.6' / 3.9'					38		fractured pieces.	1-2	7:00	38-39
Rec. = 100%					39			2-3	6:00	39-40
3.9' / 3.9'				Qrtztite	40		(40.3 - 40.9 ft): Dark gray phyllite with pyrite crystals	3-4	8:00	40-41
							and quartzite laminae.			
Run #2				Clay	41		(41 - 41.3 ft): Silty clay seam	0-1	7:00	41-41.9
RQD = 0%							(41.3 - 41.9 ft): Dark gray phyllite with pyrite crystals			
0' / 0.9'					42		on the surface. Highly fractured.			
Rec. = 100%					43					
0.9' / 0.9'					44					
					45					
					46					
					47					
					48					
					49					
					50					

Logged by: J. Shapiro Date: 18 May 1995

Drilling Contractor: Enviro-Tech Drilling Driller: John Richardson

Core Run Interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	32.34 ft
Riser Elevation:	33.98 ft
Reference Elevation:	mean sea level
Coordinates	N: 194256 E: 518495

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville				Location: IR Program Site 03
Drilling Method: CME 75 Rig - using 4 1/4" I.D. HSA, 3" and 5" FJ casing with RB					Boring No. MW03-14R
Sampling Method: 2" diameter split-barrel sampler driven by 140-lb hammer falling 30 in. (S.S.)					Sheet 1 of 2
					Drilling
Water Level:	8.95' bgs				Start: 05/16/95 1100 / Finish: 05/23/95 1700
Time:	n/a				
Date:	05/31/95				
Reference:	T.O.R.				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Grass
	24		1		6	0	SP	Dark brown fine sand with trace of medium sand, dry.
S.S.	15		0-2	2.2	8			Orange brown fine sand, dry.
					9	1		
					9			
	24		2		14	2	GP	Gray to olive black cobbles in upper section of spoon. Angular to subangular gravel
S.S.	4		2-4	3	17			up to 2". Brown to black fine sand with some medium gravel.
					44	3		
					52			
	24		3		32	4	SP	Dark brown to black fine sand, trace coarse sand. Dry.
S.S.	19		4-6	2	38			Brown medium sand, trace gravel up to 1/2", moist.
					32	5		
					30			
	24		4		32	6	SP	Brown and dark brown, medium to coarse sand, trace gravel up to 1/4", saturated.
S.S.	15		6-8	2.8	28			
					26	7		
					23			
						8		
						9		
	24		5		11	10	SP	Brown/black fine sand, moderately tight, saturated.
S.S.	12		10-12	5.4	10			Brown/orange, medium to coarse sand, saturated.
					14	11		
					101			
						12		
						13		
						14		
	24		6		12	15	SW	Brown, fine to coarse sand, well graded, saturated.
S.S.	9		15-17	3	11			Gray, fine to medium sand, moderately tight, saturated.
					15	16		
					13			
						17		
						18		
						19		
						20		

Logged by: J. Shapiro Date: 16-23 May 1995

Drilling Contractor: Envirotech Driller: John Richardson

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	47 - 57 ft	Sandpack:	46 - 58 ft	Grout:	0 - 44 ft
Bottom of Hole:	58 ft	Riser Interval:	0 - 47 ft	Bentonite:	44 - 46 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	32.34 ft
Riser Elevation:	33.98 ft
Reference Elevation:	mean sea level
Coordinates	N: 194256 E: 518495

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville			Location: IR Program Site 03
Drilling Method: CME 75 Rig - using 4 1/4" I.D. HSA, 3" and 5" FJ casing with RB				Boring No. MW03-14R
Sampling Method: 2" diameter split-barrel sampler driven by 140-lb hammer falling 30 in. (S.S.)				Sheet 2 of 2
			Drilling Start	Drilling Finish
Water Level:	8.95' bgs		05/16/95 1100	05/23/95 1700
Time:	n/a			
Date:	05/31/95			
Reference:	T.O.R.			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm)	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Grass
	24		7		6	20	SP	Gray, medium sand with some fine grained sand, saturated.
S.S.	7		20-22	5.4	17			Gray, fine sand with angular gravel.
					18	21		
					30			
						22		
						23		
						24		
	24		8		18	25	SW	Brown, medium to coarse sand grading to brown fine sand.
S.S.	15		25-27	20	26			
					42	26		Brown/gray fine to medium sand with some clay and gravel. Fractured angular and
					27			platey weathered rock up to 1".
						27		
						28		
						29		
	3		9		100/5	30	SW	Olive gray, very fine sand with gravel and fractured rock fragments up
S.S.	5		30-30/5	n/a				to 2".
						31		
						32		
								Sample T.D. = 30.5 ft
						33		Drilling T.D. = 44.5 ft
								Rock Core Interval = 44.5-58 ft
						34		
						35		
						36		
						37		
						38		
						39		
						40		

Logged by: J. Shapiro Date: 23-26 May 1995

Drilling Contractor: Envirotech Driller: John Richardson

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	47 - 57 ft	Sandpack:	46 - 58 ft	Grout:	0 - 44 ft
Bottom of Hole:	58 ft	Riser Interval:	0 - 47 ft	Bentonite:	44 - 46 ft	Cover:	n/a

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194256 E: 518495
Surface Elevation:	32.34 ft
Casing Above Surface:	33.98 ft
Reference Elevation:	mean sea level

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville			Location: IR Program Site 03
Drilling Method: CME 75 Rig - using 4 1/4" I.D.				Boring No. MW03-14R
HSA, 3" and 5" FJ casing with RB				Sheet 1 of 1
				Drilling: Start / Finish
Core Bit Size:	NX Core bit (2.2")			05/22/95 / 05/22/95
Water Level:	8.95' bgs			1120 / 1411
Time:	n/a			
Date:	05/31/95			
Reference:	T.O.R.			

Core Run RQD % / Run #	Core Run REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core Footage	Time (mins)	Core Depth
—					40					
—										
—					41					
—										
—					42					
—										
					43			Core Footage	Time (mins)	Core Depth
Run #1							(43.5 - 47.5): Gray metapelite (phyllite) minor fractures	0-1	4:00	43.5-44.5
				Fe	44		filled with quartz or pyrite(?) at 3'3" and 3'4", thin layers			
RQD = 60%							(<1/4) of metaquartz.	1-2	5:00	44.5-45.5
2.4' / 4.0'					45					
				Fe				2-3	5:30	45.5-46.5
Rec. = 100%					46					
4.0' / 4.0'								3-4	8:00	46.5-47.5
					47					
Run #2							(47.5 - 52 ft): Dark gray, phyllite, change to graywacke at	4-5	4:30	47.5-48.5
				Fe	48		approx. 1.3'. Seams of phyllite at approx. 3.5' and 4'			
RQD = 66%				and			and 4.5'. Seams are 1", 3" and 6" respectively.	5-6	3:30	48.5-49.5
3.3' / 5.0'				Quartz	49					
								6-7	2:30	49.5-50.5
Rec. = 100%					50					
5.0' / 5.0'				Fe				7-8	2:30	50.5-51.5
				and	51					
				Quartz				8-9	3:30	51.5-52.5
					52					
Run #3							(52.5 - 57.5 ft): Dark gray quartzite (fine	9-10	3:00	52.5-53.5
				Fe	53		grained) with bands of darker gray, phyllite.			
RQD = 80%								10-11	2:30	53.5-54.5
3.9' / 4.9'					54					
				Fe				11-12	3:00	54.5-55.5
Rec. = 99%					55					
4.9' / 5.0'								12-13	2:30	55.5-56.5
				Fe	56					
								13-14	3:00	56.5-57.5
					57					
—										
—					58					
—										
—					59					
—										
—					60					

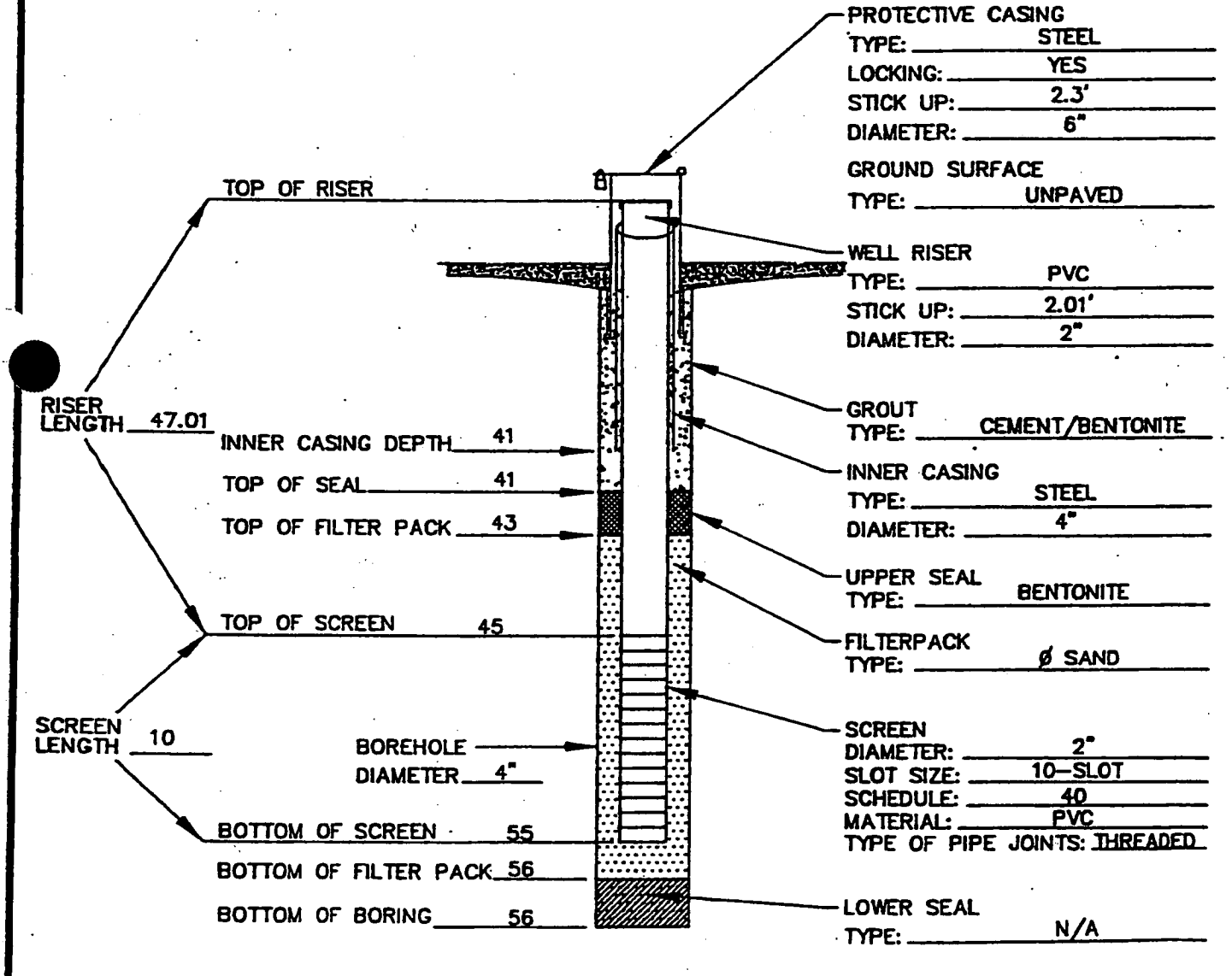
Logged by: J. Shapiro Date: 22 May 1995

Drilling Contractor: Enviro-Tech Drilling Driller: John Richardson

☐ Core Run Interval

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NCBC DAVISVILLE/ IR PROGRAM SITE 03 / CED SOLVENT DISPOSAL AREA	
DATE INSTALLED: 05-26-95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 34.2'	COORDINATES: N: 194384.12 E: 518911.97
ELEVATION TOP OF WELL RISER: 36.21'	EA INSPECTOR: E. BARRETT
DEPTH TO WATER: DATE/TIME	WELL No. MW03-12R
DRILLING METHOD/DEPTH: 6" CASING W/5 7/8" ROLLER BIT, (0-41'), HX ROCK CORE, (41-56')	



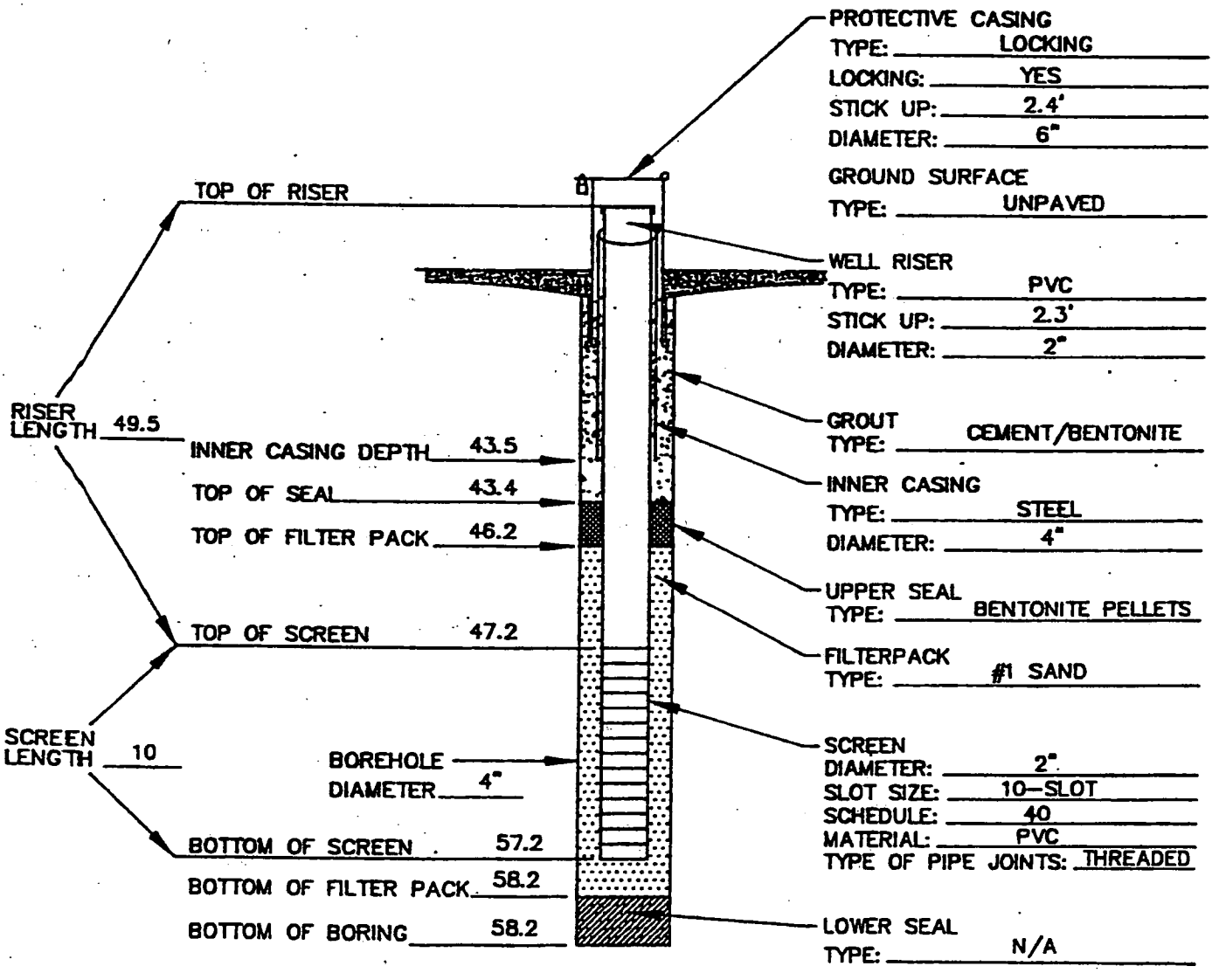
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. = \DRAWINGS\29600.32\3243\W03-12R.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NCBC DAVISVILLE / IR PROGRAM SITE 03 / CED SOLVENT DISPOSAL AREA	
DATE INSTALLED: 5-31-95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 30.1'	COORDINATES: N: 194150.84 E: 518998.79
ELEVATION TOP OF WELL RISER: 32.38'	EA INSPECTOR: J. SHAPIRO
DEPTH TO WATER: DATE/TIME	WELL No. MW03-13R
DRILLING METHOD/DEPTH:	



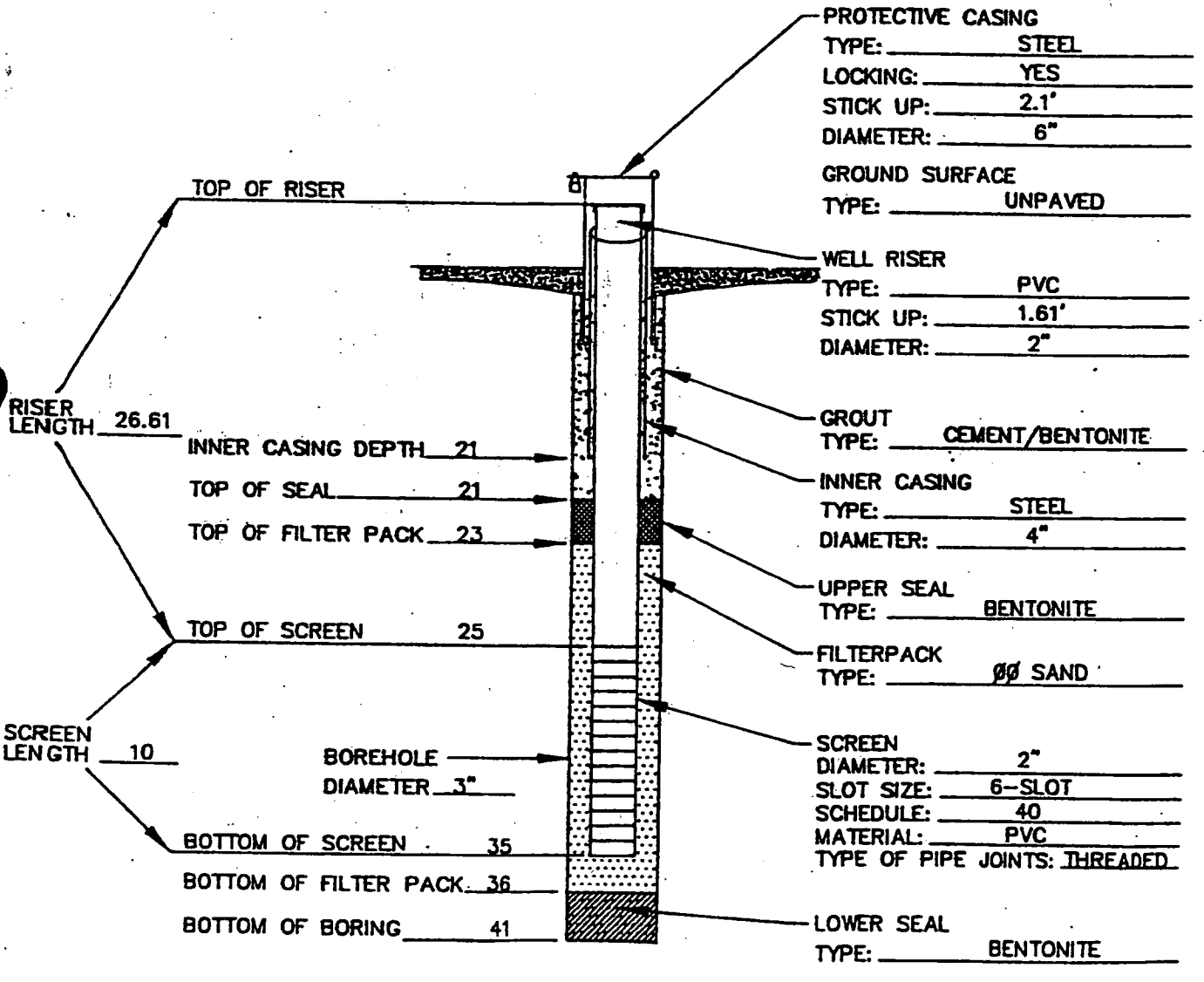
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. G:\DRAWINGS\29600.32\3243\MW03-13R.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NCBC DAVISVILLE/ IR PROGRAM SITE 03 / CED SOLVENT DISPOSAL AREA	
DATE INSTALLED: 05-25-95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 34.5'	COORDINATES: N: 194395.07 E: 518914.70
ELEVATION TOP OF WELL RISER: 36.11'	EA INSPECTOR: E. BARRETT
DEPTH TO WATER: DATE/TIME	WELL No. MW03-12D
DRILLING METHOD/DEPTH: 4 1/4" HSA, (0-19'), 4" CASING W/3 7/8" ROLLER BIT,(19-21'), 3" CASING W/2 7/8" ROLLER BIT,(21-41')	

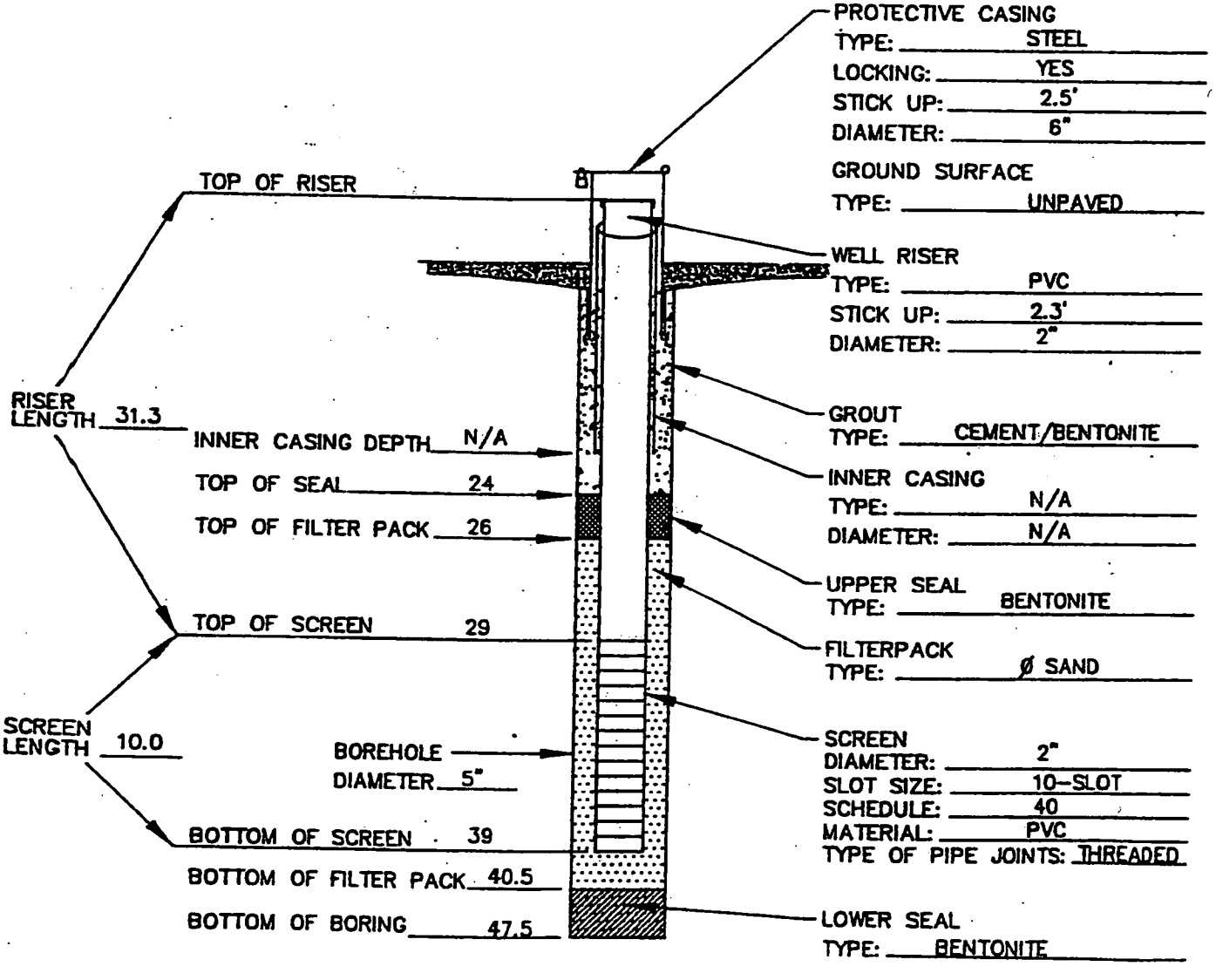


MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NCBC DAVISVILLE/ IR PROGRAM SITE 03 / CED SOLVENT DISPOSAL AREA	
DATE INSTALLED: 05-24-95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 30.2'	COORDINATES: N: 194146.39 E: 519003.92
ELEVATION TOP OF WELL RISER: 32.56'	EA INSPECTOR: D. METALLO
DEPTH TO WATER: DATE/TIME 6.80' 05-24-95 (1400)	WELL No. MW03-13D
DRILLING METHOD/DEPTH: 4 1/4" HSA, (0-30'), 5" FLUSH-JOINT CASING (30-39'), 4 7/8" ROLLER BIT (39-42.5'), NX CORE (42.5-47.5')	



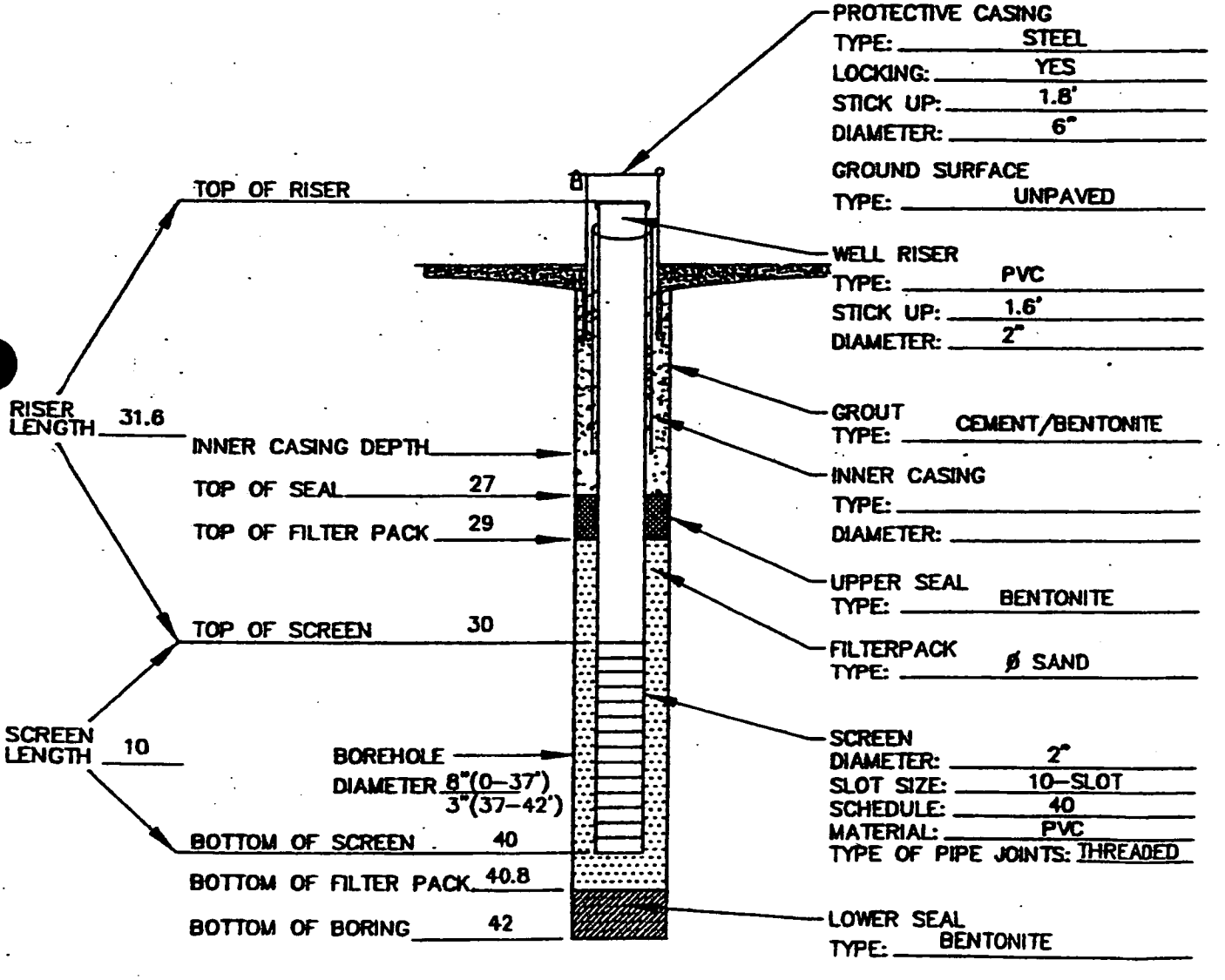
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. G:\DRAWING\29600.32\3243\MW03-13D.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NCBC DAVISVILLE / IR PROGRAM SITE 03 / CED SOLVENT DISPOSAL AREA	
DATE INSTALLED: 5-19-95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 32.4'	COORDINATES: N: 194265.30 E: 518494.75
ELEVATION TOP OF WELL RISER: 34.00'	EA INSPECTOR: J. SHAPIRO
DEPTH TO WATER: DATE/TIME	WELL No. MW03-14D
DRILLING METHOD/DEPTH: 4 1/4" HSA, (0-37'), 3" FLUSH JOINT CASING (37-42'), NX CORE (37-42')	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 194341.032 E: 518387.125
Surface Elevation:	30.824 ft
Well Riser Elevation:	32.294 ft

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: 5" Flush-Joint casing with 4.875" Rollerbit.		Boring No. EA - 101
Sampling Method: 3" and 2" I.D. Split-spoon		Sheet 1 of 3
Drilling Water Level / Date / Time		Start: 6/13/96 1010 — Drilling Times — Finish: 6/14/96 0740
Surface Conditions: Poison Ivy		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
3"	24 / 16	0	S-1 0-2	15*	4 50 34 5	0 1		0-8" - Light to moderate yellowish-brown fine to medium SAND, some coarse sand to subrounded gravel up to 0.25", dry 8-12" - Large (2") CONCRETE chunks, dry 12-16" - Gray SAND and GRAVEL from concrete, dry
3"	24 / 18	0	S-2 2-4	72*	6 6 7 8	2 3		0-6" - As in 0-8" above 6-14" - Moderate to dark brown very fine SAND and ORGANICS 14-18" - Moderate brown very fine to fine SAND grading to olive-brown at 16", moist
2"	24 / 19	0	S-3 4-6	62*	11 10 10 9	4 5		0-3" - As in 14-18" above, moist 3-19" - Bright brownish-orange (rusty) fine sand, well sorted, trace medium sand, grades to light orangish-brown at 14", moist
2"	24 / 13	0	S-4 6-8	64*	15 14 11 11	6 7 8		Light grayish-brown fine sand, trace medium sand, large (1") gravel at top of spoon, saturated
2"	24 / 13	9	S-5 9-11	11.8*	5 6 4 6	9 10 1 2 3		Light grayish-brown very fine to fine sand, some thin (0.01") lamina, saturated
2"	24 / 8	14	S-6 14-16	14.2*	4 6 6 8	4 5 6 7 8		Medium brownish-gray fine to coarse sand and subrounded to rounded gravel up to 1/8", saturated
2"	24 / 6	19	S-7 19-21	16.0*	20 40 30 22	9 20		Medium brownish-gray fine to coarse sand and subangular to subrounded gravel up to 1.5", broken fissile gravel in spoon tip, saturated

NOTES: * - HNu readings very slow risers, suspect moisture.

Sample interval submitted for analysis

Logged by: D. Street

Drilling Contractor: M&R Environmental Drilling

Driller: P. Goldthwait

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2"	Screen Interval:	33.5 - 23.5 ft bgs	Sandpack:	33.5 - 21.5 ft bgs	Grout:	19.5 - 0 ft bgs
Bottom of Hole:	41 ft bgs	Riser Interval:	23.5 - (+2.0) ft bgs	Bentonite:	21.5 - 19.5 ft bgs	Cover:	4" locking steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 194341.032 E: 518387.125
Surface Elevation:	30.824 ft
Well Riser Elevation:	32.294 ft

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: 5" Flush-Joint casing with 4.875" Rollerbit.		Boring No. EA - 101
Sampling Method: 3" and 2" I.D. Split-spoon		Sheet 2 of 3
Drilling Water Level / Date / Time	Start: 6/13/96 1010	Drilling Times — Finish: 6/14/96 0740
Surface Conditions: Poison Ivory		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						20		
						1		
						2		
						3		
2"	24 / 0	24	S-8 24-26	NA	1 / woh / woh / 8	4		No Recovery / No Sample
						5		
						6		
						7		
						8		
2"	24 / 18	29	S-9 29-31	4	30 / 24 / 34 / 100	9		Medium gray very fine to fine sand and subangular to angular gravel up to 1", fissile, blocky gravel, possible weathered rock, some medium sand, saturated
						30		
						1		
						2		
						3		Top of rock at 33.5 ft bls
						4		3.875" Rollerbit to 36 ft bls
						5		
						6		HX core from 36-41 ft bls (see core log description)
						7		
						8		
						9		
						0		BOH = 41 ft bls

NOTES:

Sample interval submitted for analysis

Logged by: D. Street

Drilling Contractor: M&R Environmental Drilling

Driller: P. Goldthwait

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2"	Screen Interval:	33.5 - 23.5 ft bgs	Sandpack:	33.5 - 21.5 ft bgs	Grout:	19.5 - 0 ft bgs
Bottom of Hole:	41 ft bgs	Riser Interval:	23.5 - (+2.0) ft bgs	Bentonite:	21.5 - 19.5 ft bgs	Cover:	4" locking steel

EA Engineering, Science, and Technol gy, Inc.

LOG OF CORE BORING

Coordinates:	N: 194341.032 E: 518387.125
Surface Elevation:	30.824 ft
Well Riser Elevation:	32.294 ft

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobil B-61 rig		Boring No. **EA-101**
Core Barrel used: HX Core		Sheet 3 of 3

Packer Test

Tested	No
Interval	
K-Value	

Start	Drilling Times	Finish
06/14/96 1110		06/14/96 1135

Core Run (ft)	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG Core Run Depth (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
				30					
				31					
				32					
				33					
				34					
				35					
Run #1 Rec = 100% =5.0/5.0				36		0-1.5' - Medium gray quartzite, medium grained, some black	1	6:10	36-37
				37		speckling, thin dark gray horizontal lamina, sharp contact with 1.5-2.4' - Dark gray phyllite, fine grained, sharp contact with	2	4:37	37-38
				38		2.4-3.95' - As in 0-1.5' above, sharp contact with 3.95-5.0' - Interbedded quartzite and phyllite	3	4:00	38-39
				39		(mix of 0-1.5 and 1.5-2.4) low angle bedding 1 Horizontal fracture at 1.6'	4	4:20	39-40
				40		1 Low angle fracture at 4.1' Iron stain on fractures	5	3:40	40-41
				41					
				42					
				43					
				44					
				45					
				46					
				47					
				48					
				49					

NOTES:

Core Run Interval

Logged by: D. Street

Drilling Contractor: M&R Environmental Drilling

Driller: P. Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 194235.924 E: 518418.900
Surface Elevation:	31.997 ft
Well Riser Elevation:	33.367 ft

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: Nike Site
Drilling Method: Mobile B-61 truck mounted rig, driving 2 in. OD split spoon sampler, using 5 in. ID FJ casing and 3 7/8 and 4 7/8 in. rollerbit.		Boring No. EA-102
Sampling Method: 2 in. OD split-spoon sampler driven by 140-lb hammer falling 30"		Sheet 1 of 3
Drilling Water Level: Date: Time:	Start 06/10/96 10:50 AM	Drilling Times / Finish 06/12/96 09:50 AM
Surface Conditions: Grass		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Strat. Unit	Ft bgs	USCS Log	SOIL DESCRIPTION
	24		S-1		2		0		0-4" Dark brown, medium sand with organic material throughout, no odor/stains.
SS	18	0	0-2	0.0	2				4-18" Light brown, medium to fine sand, trace silt, no odor/stains.
					3		1		
					2				
	24		S-2		2		2		Light brown, medium to fine sand, some organic material, no odor/stains.
SS	20	0	2-4	0.0	4				
					15		3		
					12				
	24		S-3		4		4		Dark gray, fine to medium sand, no odor/staining.
SS	16	0	4-6	0	8				
					14		5		
					15				
	24		S-4		14		6		Same as above, damp.
SS	20	0	6-8	0	14				
					15		7		
					15				
	24		S-5		12		8		Same as above, last 2 in. is weathered light gray rock.
SS	24	0	8-10	0	15				
					36		9		
					41				
							10		
							11		
							12		
							13		
	24		S-6		12		14		Dark gray, coarse to medium sandy gravel, few stones, subrounded to 1 1/2 in., wet,
SS	4	14	14-16	0.0	10				no odor, staining.
					6		15		
					6				
							16		
							17		
							18		
	24		S-7		4		19		Dark gray, fine to medium sand, wet, no odor/stains.
SS	18	19	19-21	0.0	4				Used the 300-lb hammer.
					6		20		
					8				

NOTES:

Sample interval

Sample interval submitted for analysis

NR - No reading

NA - Not applicable

Logged by: Kevin Caldwell

Drilling Contractor: M&R Environmental Drilling

Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2 in. ID SS	Screen Interval:	21.9 - 31.9 ft bgs	Sandpack:	20 - 32 ft bgs	Grout:	0 - 18 ft bgs
Bottom of Hole:	39.5 ft bgs	Riser Interval:	(+1.5) - 21.9 ft bgs	Bentonite:	18 - 20 ft bgs	Cover:	4 in. Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 194235.924 E: 518418.900
Surface Elevation: 31.997 ft
Well Riser Elevation: 33.367 ft

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: Nike Site
Drilling Method: Mobile B-61 truck mounted rig, driving 2 in. OD split spoon sampler, using 5 in. ID FJ casing and 3 7/8 and 4 7/8 in. rollerbit.		Boring No. EA-102
Sampling Method: 2 in. OD split-spoon sampler driven by 140-lb hammer falling 30"		Sheet 2 of 3
Drilling Water Level: Date:	Time:	Start 06/10/96 10:50 AM / Drilling Times / Finish 06/12/96 09:50 AM
Surface Conditions: Grass		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Strat. Unit	Ft bgs	USCS Log	SOIL DESCRIPTION
							20		
							21		
							22		
							23		
	24		S-8		48		24		Dark gray, clayey medium to coarse gravel, some coarse sand, stones to 2",
SS		24	24-26	0	41				no odor/staining.
					17		25		
					26				
							26		
							27		
							28		
	24		S-9		11		29		Dark gray, dense till, wet, no odor/stains.
SS	20	29	29-31	8.5	24				
					36		30		
					45				
							31		
							32		Top of rock noted at 32 ft bgs.
							33		
							34		
							35		
							36		
							37		
							38		
							39		
							40		

NOTES:
Sample interval
Sample interval submitted for analysis
NR - No reading
NA - Not applicable

Logged by: Kevin Caldwell
Drilling Contractor: M&R Environmental Drilling
Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2 in. ID SS	Screen Interval:	21.9 - 31.9 ft bgs	Sandpack:	20 - 32 ft bgs	Grout:	0 - 18 ft bgs
Bottom of Hole:	39.5 ft bgs	Riser Interval:	(+1.5) - 21.9 ft bgs	Bentonite:	18 - 20 ft bgs	Cover:	4 in. Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194235.924 E: 518418.9
Surface Elevation:	31.997
Well Riser Elevation:	33.367

Job. No. 29600.32.3213	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: 5" FJ casing with 4 7/8" rollerbit.		Boring No. EA-102
Core Barrel used: HX Core		Sheet 3 of 3

Packer Test

Tested	N/A	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	6/20/96 09:05	6/20/96 9:25

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
					32					
					33					
					34					
Run #1 34.5 - 39.5							0 - 1.4' Medium gray QUARTZITE, medium grained,	0-1	3:30	34.5 - 35.5
Rec = 99% = 4.95/5.0					35		some dark gray speckling.			
							1.4 - 2.5' Dark gray thin banding (horizontal to low	1-2	3:30	35.5 - 36.5
					36		angle), few quartz filled horizontal hairline fractures.			
RQD = 75% = 3.7/5.0							2.5 - 3.1' As in 0 - 1.4', broken zone 2.9 - 3.1'	2-3	4:00	36.5 - 37.5
					37		3.1 - 3.8' As in 1.4 - 2.5', sharp contact with 3.8 - 4.95'			
							light to medium gray QUARTZITE, fine to medium	3-4	4:00	37.5 - 38.5
					38		grained, minor dark gray speckling.			
								4-5	4:00	38.5 - 39.5
					39					
							9 low angle fractures at 0.5, 1.3, 1.85, 2.3, 3.05, 3.35,			
					40		3.80, 4.20, and 4.45 ft, with graphite and/or iron			
							staining.			
					41					
							1 high angle fracture at 2.55 - 3.0 ft with iron staining.			
					42					
							2 partially filled vertical hairline fractures at 0 - 1.1 and			
					43		0 - 0.4 ft.			
					44					
					45					
					46					
					47					
					48					
					49					
					50					
					51					
					52					

NOTES:

Core Run Interval ☐

Logged by: David Street

Drilling Contractor: M & R Environmental Drilling Co.

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N:194468.537 E: 518483.869
Surface Elevation:	33.454
Well Riser Elevation:	35.134

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville		Location: NIKE Site
Drilling Method: 4" Flush-Joint casing with 3.875" Rollerbit.			Boring No. EA - 103
Sampling Method: 3" and 2" I.D. Split-spoon			Sheet 1 of 3
Drilling Water Level	8'		Start: 06/17/96 — Drilling Times — Finish: 06/18/96
Date	6/17/96		
Time			
Surface Conditions: Grass			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
3"	24 / 14	0	S-1 / 0-2	45	2 3 3 6	0 1		Light to medium grayish-brown fine to coarse SAND and subrounded GRAVEL up to 0.125", organics, dry-moist
3"	24 / 20	0	S-2 / 2-4	7.0	3 6 10 15	2 3		As above, gravel up to 2", moist
	24 / 18	0	S-3 / 4-6	0.4	10 4 5 8	4 5		0-2" - As above, gravel up to 0.5" 2-14" - Dark brown fine SAND and ORGANICS 14-18" - Moderate olive-brown very fine to fine SAND, thin banding, moist
	24 / 24	0	S-4 / 6-8	0.4	8 14 12 12	6 7		Moderate orangish-brown very fine to fine sand, well sorted, some thin bright orange banding, wet
	24 / 24	0	S-5 / 8-10	0.4	14 18 14 20	8 9		0-4" - As above, saturated 4-10" - Medium brown fine to medium sand, some medium orange-brown lamina 10-16" - As in 0-4"above, no very fine sand, 16-20" - As in 4-10" above 16-24" - Light grayish-brown fine to medium sand, some thin medium brown and
						10 1 2 3		medium brown-orange lamina
	24 / 20	14	S-6 / 14-16	0.2	14 14 14 14	4 5		0-9" - Light grayish-brown very fine SAND and SILT, well sorted, thin horizontal light brown lamina 9-20" - medium gray fine to coarse SAND, well graded
						6 7 8		
	24 / 0	19	S-7 / 19-21	NA	51 54 34 36	9 20		No Recovery / No Sample - driller notes it being cobbly

NOTES:

Logged by: D. Street

Drilling Contractor: M&R Environmental Drilling

Driller: P. Goldthwait

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2"	Screen Interval:	35.5 - 25.5 ft bgs	Sandpack:	35.8 - 23.5 ft bgs	Grout:	21.5 - 0 ft bgs
Bottom of Hole:	43 ft bgs	Riser Interval:	25.5 - (+~1.5) ft bgs	Bentonite:	23.5 - 21.5 ft bgs	Cover:	4" locking steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N:194468.537 E: 518483.869
Surface Elevation:	33.454
Well Riser Elevation:	35.134

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: 5" Flush-Joint casing with 4.875" Rollerbit.		Boring No. EA - 103
Sampling Method: 3" and 2" I.D. Split-spoon		Sheet 2 of 3
Drilling Water Level / Date / Time		Start 06/17/96 — Drilling Times — Finish 06/18/96
Surface Conditions: Grass		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						20		
						1		
						2		
	24		S-8		2	3		
	9	23.5	23.5-25.5	0.0	3			Medium brown to orangish-brown fine to coarse sand, trace subangular
					5	4		gravel up to 0.25"
					6			
						5		
						6		
						7		
	4		S-9		100/0.3	8		Medium gray medium to coarse sand and subangular gravel up to 0.5", (note *)
	2	28.5	28.5-28.8	NA				driller notes being cobbly
						9		
						30		
						1		
						2		
	20		S-10		14	3		Medium gray subangular, blocky gravel up to 1.8 *, some medium grayish-brown
	11	33.5	33.5-35.2	0.0	16			and medium brown silt and fine sand in matrix, trace clay, possible weathered
					37	4		rock. Driller notes bedrock at 35.5, rollerbit 2.5' to confirm
					100/0.2			
						5		
						6		
						7		
						8		HX core from 38-43 ft bls (see core log description)
						9		
						40		
								BOH = 43 ft bls

NOTES:

* - Not enough sample for headspace, collected one jar for GC and one jar for Lab

Sample submitted for analysis

Logged by: D. Street

Drilling Contractor: M&R Environmental Drilling

Driller: P. Goldthwait

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2"	Screen Interval:	35.5 - 25.5 ft bgs	Sandpack:	35.8 - 23.5 ft bgs	Grout:	21.5 - 0 ft bgs
Bottom of Hole:	43 ft bgs	Riser Interval:	25.5 - (+1.5) ft bgs	Bentonite:	23.5 - 21.5 ft bgs	Cover:	4" locking steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N:194468.537 E: 518483.869
Surface Elevation:	33.454
Well Riser Elevation:	35.134

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: NIKE Site	
Drilling Method: Mobil B-61 rig		Boring No. EA-103	
Core Barrel used: HX Core		Sheet 3 of 3	
Packer Test		Start	Drilling Times / Finish
Tested: No		06/18/96 1118	06/18/96 1140
Interval:			
K-Value:			

Core Run (ft)	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core Run Depth (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
				30					
				31					
				32					
				33					
				34					
				35					
				36					
				37					
Run #1				38		0-3.55' - Interbedded medium gray quartzite, medium	1	3:30	38-39
						grained, black speckling and dark gray phyllite, fine grained,			
Rec = 96% = 4.8/5.0				39		beds are 0.03' to 0.4' thick (variable), very broken sharp	2	3:32	39-40
						contact with			
				40		3.55-4.8' - Dark gray phyllite, fine grained, few very thin	3	3:38	40-41
RQD = 77% = 3.7/5.0						(<0.01') medium gray lamina, 0.02' quartz vein at approx. 4.78'			
				41		5 horizontal fractures at 0.2', 0.4', 1.55', 2.1', and 4.6'	4	3:20	41-42
						3 Low angle fractures at 1.1', 2.45', and 4.0'			
				42		4 High angle fractures at 0.2-0.4', 3.2-3.55', 3.4-3.7',	5	3:16	42-43
						and 4.6-4.8'			
				43		2 Vertical fractures at 1.4-2.2' and 2.5-2.8'			
				44					
						Most fractures have iron staining, also various quartz filled			
				45		hairline fractures from 0.5-2.8'			
				46					
				47					
				48					
				49					

NOTES:

Core Run Interval

Logged by: D. Street

Drilling Contractor: M&R Environmental Drilling

Driller: P. Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 194695.733 E: 518826.24
Surface Elevation:	35.932
Riser Elevation:	37.402

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile B-61 rig using 4" ID flush-joint casing with 3.875" rollerbit.		Boring No. EA-104
Sampling Method: 3" and 2" ID split-spoon		Sheet 1 of 5
Drilling Water Level: Date: Time:	Start 06/26/96 1415 / Drilling Times / Finish 06/28/96 1030	
Surface Conditions: Grass		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Strat. Unit	Ft bgs		USCS Log	SOIL DESCRIPTION
	24		S-1		3		0			Moderate brown very fine SAND, little subrounded to subangular gravel
3"	17	0	0-2	1.6	7					up to 1", organic rich, dry
					7		1			
					8					
	24		S-2		14		2			Dark brown fine SAND and subrounded to subangular GRAVEL up to 1",
3"	18	0	2-4	2.2	16					some organics, dry
					26		3			
					30					
	24		S-3		16		4			0-5" - Medium brownish-gray fine SAND, little organics, moist
	19	0	4-6	3.0	13					5-14" - Dark yellowish-brown fine sand, little subangular gravel up to 0.5", moist
					16		5			14-17" - Medium yellowish-brown fine to medium sand, little subrounded gravel up
					15					to 0.25", moist / 17-19" - Medium gray fine sand
	24		S-4		7		6			0-7" - Mottled gray, yellowish-brown and medium brown fine to medium sand, thin
	11	0	6-8	NA	9					lamina of light brown sand, wet
					9		7			7-11" - Medium brownish-gray fine to coarse sand, trace subrounded gravel
					7					up to 0.5", wet to saturated
	24		S-5		5		8			0-10" - Medium gray fine to medium sand, trace coarse sand, wet
	15	0	8-10	3.4	2					10-15" - Dark brown very fine sand and organics, dense
					2		9			
					3					
							10			
							11			
							12			
							13			
	24		S-6		1		14			Moderate brown to reddish-brown organic PEAT, trace subrounded gravel up to 1",
	17	14	14-16	3.2	1					very dense
					2		15			
					3					
							16			
							17			
							18			
	24		S-7		8		19			Medium gray fine to medium sand, trace coarse sand
	11	19	19-21	2.8	9					

NOTES:

Logged by: D. Street

Drilling Contractor: M&R Environmental Drilling

Driller: P. Thornsbury

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2"	Screen Interval:	66 - 56 ft bgs	Sandpack:	66.2 - 55 ft bgs	Grout:	0 - 52 ft bgs
Bottom of Hole:	74 ft bgs	Riser Interval:	56 - (+1.5) ft bgs	Bentonite:	55 - 52 ft bgs	Cover:	4" steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 194695.733 E: 518826.24
Surface Elevation:	35.932
Riser Elevation:	37.402

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile B-61 rig using 4" ID flush-joint casing with 3.875" rollerbit.		Boring No. EA-104
Sampling Method: 3" and 2" ID split-spoon		Sheet 2 of 5
Drilling Water Level: Date: Time:		Start 06/26/96 1415 / Drilling Times / Finish 06/28/96 1030
Surface Conditions: Grass		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkg.	Blows per 6"	Strat. Unit	Ft bgs	USCS Log	SOIL DESCRIPTION
					18		20		
					42				
							1		
							2		
							3		
	24		S-8		11		4		Medium gray fine to coarse sand, trace subangular gravel up to 1", not enough
	9	24	24-26	NA	8				recovery for a headspace sample
					8		5		
					10				
							6		
							7		
							8		
	24		S-9		4		9		Medium gray fine to medium sand, trace coarse sand and gravel up to 1"
	3	29	29-31	NA	4				
					5		30		
					4				
							1		
							2		
							3		
	24		S-10		3		4		0-7" - As above
	9	34	34-36	NA	4				7-9" - Medium gray fine sand, well sorted
					4		5		
					5				
							6		
							7		
							8		
	24		S-11		3		39		Medium gray to dark grayish-brown fine to medium sand, loose
	7	39	39-41	5	4				

NOTES:

Sample interval submitted for analysis

Logged by: D. Street

Drilling Contractor: M&R Environmental Drilling

Driller: P. Thornsbury

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2"	Screen Interval:	66 - 56 ft bgs	Sandpack:	66.5 - 55 ft bgs	Grout:	0 - 52 ft bgs
Bottom of Hole:	74 ft bgs	Riser Interval:	56 - (+1.5) ft bgs	Bentonite:	55 - 52 ft bgs	Cover:	4" steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 194695.733 E: 518826.24
Surface Elevation:	35.932
Riser Elevation:	37.402

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile B-61 rig using 4" ID flush-joint casing with 3.875" rollerbit.		Boring No. EA-104
Sampling Method: 3" and 2" ID split-spoon		Sheet 3 of 5
Drilling Water Level: Date: Time:	Start 06/26/96 1415 / Drilling Times / Finish 06/28/96 1030	
Surface Conditions: Grass		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkl.	Blows per 6"	Strat. Unit	Ft bgs		USCS Log	SOIL DESCRIPTION
					6		40			
					9					
							1			
							2			
							3			
	24		S-12		2		4			As above, not enough recovery for headspace sample
	8	44	44-46	NA	4					
					6		5			
					8					
							6			
							7			
							8			
	24		S-13		2		9			0-5" - Grayish-brown very fine to fine sand, dense
	15	49	49-51	1.2	5					5-15" - Medium gray fine to coarse sand, well graded, loose
					12		50			
					15					
							1			
							2			
							3			
	24		S-14		8		4			Medium brown to orangish-brown fine to medium sand, some coarse sand
	14	54	54-56	1.4	14					
					12		5			
					10					
							6			
							7			
							8			
	24		S-15		6		59			Medium gray fine sand, some silt and medium sand
*	8	59	59-61	3.6	11					

NOTES: * - Sent for TCL VOC

Logged by: D. Street

Drilling Contractor: M&R Environmental Drilling

Driller: P. Thornsbury

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2"	Screen Interval:	66 - 56 ft bgs	Sandpack:	66.5 - 55 ft bgs	Grout:	0 - 52 ft bgs
Bottom of Hole:	74 ft bgs	Riser Interval:	56 - (+1.5) ft bgs	Bentonite:	55 - 52 ft bgs	Cover:	4" steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 194695.733 E: 518826.24
Surface Elevation:	35.932
Riser Elevation:	37.402

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile B-61 rig using 4" ID flush-joint casing with 3.875" rollerbit.		Boring No. EA-104
Sampling Method: 3" and 2" ID split-spoon		Sheet 4 of 5
Drilling Water Level: Date: Time:		Start 06/26/96 1415 / Drilling Times / Finish 06/28/96 1030
Surface Conditions: Grass		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above blk.	Blows per 6"	Strat. Unit	Ft bgs		USCS Log	SOIL DESCRIPTION
					11		60			
					14					
							1			
							2			
							3			
	24		S16		17		4			Medium gray blocky, angular, fissile gravel up to 2", some fine sand and silt in
	18	64	64-66	6.4	42					fractures, possible weathered rock
					37		5			
					52					
							6			
										Driller notes rock at 66.5 ft bls 3.875; Rollerbit to 69 ft bls
							7			HQ core from 69-74 ft bls (see core log description)
							8			
							9			
							70			
							1			
							2			
							3			
							74			BOH = 74 ft bls
							5			
							6			
							7			
							8			
							9			

NOTES:

Sample interval submitted for analysis

Logged by: D. Street

Drilling Contractor: M&R Environmental Drilling

Driller: P. Thornsbury

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2"	Screen Interval:	66 - 56 ft bgs	Sandpack:	66.5 - 55 ft bgs	Grout:	0 - 52 ft bgs
Bottom of Hole:	74 ft bgs	Riser Interval:	56 - (+1.5) ft bgs	Bentonite:	55 - 52 ft bgs	Cover:	4" steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194695.733 E: 518826.24
Surface Elevation:	35.932
Well Riser Elevation	37.402

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobie B-61 rig		Boring No. EA-104
Core Barrel used: HQ Core		Sheet 5 of 5

Packer Test

Tested	No
Interval	
K-Value	

Sart	Drilling Times	Finish
06/28/96 1330		06/28/96 1415

Core Run (ft)	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core Run Depth (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
				60					
				1					
				2					
				3					
				4					
				5					
				6					
				7					
				8					
Run #1				69		Light to moderate gray quartzite, fine to medium grained,	1	4:35	69-70
Rec = 93% =4.65\5.0				70		some black speckles, dark gray phyllite zone from 0.9-1.35', broken zone from 0.0-0.4'	2	4:22	70-71
				1		2 Horizontal fractures at 1.95' and 2.2'	3	4:50	71-72
RQD = 45% =2.1\4.65				2		1 Low angle fracture at 0.9'	4	4:17	72-73
				3		11 High angle fractures at 0.4-0.7', 0.4-0.8', 0.7-0.9', 0.8-1.0', 0.85-1.3', 1.0-1.3', 1.1-1.4', 1.4-1.7', (2x)2.0-2.2', and 4.35-4.6'	5	4:48	73-74
				74					
				5					
				6					
				7					
				8					
				9					

NOTES:

Core Run Interval

Logged by: D. Street

Drilling Contractor: M&R Environmental Drilling

Driller: P. Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville
Location:	Nike Site
Drilling Method: Mobile B-61 truck mounted rig, driving 2" and 3" OD (as noted) split spoon sampler, using 5" ID Flush-Joint casing and 4 7/8" rollerbit.	Boring No. **EA-105**
Sampling Method: 2" and 3" OD split-spoon sampler driven by 140-lb hammer falling 30"	Sheet 1 of 3
Drilling Water Level: Date: Time:	Start 06/04/96 8:55 / Drilling Times / Finish 06/05/96 11:30
Surface Conditions: Grass	

Coordinates: N: 194186.168 E: 517798.447
Surface Elevation: 30.636
Well Riser Elevation: 31.946

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Strat. Unit	Ft bgs	USCS Log	SOIL DESCRIPTION
3"	24		S-1		5		0		0-3" Dark brown, silty FINE SAND and grass, moist.
	17	0	0-2	0.4	25				3-17" Medium brown, silty (little) FINE SAND, trace angular gravel to 1.5", trace
					21		1		rootlets, dry.
					25				
3"	18		S-2		15		2		0-12" Light brown to olive gray at 8", silty (little) FINE SAND, little medium sand
	12	0	2-4	0.4	49				to subangular gravel to 2", dry.
					210/6"		3		
					–				
	1		S-x		120/1"	138*	4		Spoon refusal at 4'1" - pull ahead and drill offset location; soil appeared wet.
	1	0	4-4		–	140*			Olive gray silty (some) FINE to COARSE SAND, little subangular gravel to 2", moist.
3"	24		S-3		–	99*	5		
	14	4	4-6	0.4	–	97*			
	24		S-4		48		6		As above, gravel to 1.5", some weathered in place, dense, moist.
	15	4	6-8	0.2	36				
					39		7		
					30				
2"	24		S-5		25		8		0-9.5" Olive gray and yellowish-orange silty (little) FINE to MEDIUM SAND, little
	15	4	8-10	0	51				coarse sand, wet.
					69		9		9.5-15" As 6-8 ft interval, angular gravel to 3/4", dense, dry.
					51				
							10		
							11		Gravelly material in drill cuttings while drilling to 14 ft, cobble towards bottom but then
									broke through at approximately 14 ft bgs.
							12		
							13		
2"	13		S-6		37		14		Olive gray with spots of yellowish-orange silty FINE SAND, some medium sand to
	7	14	14-15	NA	69				subangular to subrounded gravel to 1", moist to wet.
					50/1"		15		(Not enough sample to fill headspace jar)
					–				
							16		
									Rollerbit broke through at 16 ft bgs.
							17		
							18		
3"	24		S-7		86		19		**No recovery. Loss of water circulation.
	0	19	19-21	NA	83				
					58		20		
					53				

NOTES:

Sample interval submitted for analysis
NR - No reading
NA - Not applicable
*Blow counts are for 2nd attempt
**Samples collected after attempted hydropunch

Logged by: Judi Shapiro
Drilling Contractor: M&R Environmental Drilling
Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Screen/Riser:	2 "	Screen Interval:	30 - 20 ft	Sandpack:	30.5 - 18 ft	Grout:	14.5 - 0 ft
Bottom of Hole:	37.5 ft	Riser Interval:	20 ft-(+~1.5) ft bgs	Bentonite:	18 - 14.5 ft	Cover:	4 in. locking steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 194186.168 E: 517798.447
Surface Elevation: 30.636
Well Riser Elevation: 31.946

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	Nike Site

Drilling Method: Mobile B-61 truck mounted rig, driving 2" and 3" OD (as noted) split spoon sampler, using 5" ID Flush-Joint casing and 4 7/8" rollerbit.

Boring No. **EA-105**

Sampling Method: 2" and 3" OD split-spoon sampler driven by 140-lb hammer falling 30"

Sheet 2 of 3

Drilling Water Level:
Date: Time:
Surface Conditions: Grass

Start	Drilling Times	Finish
06/04/96 8:55		06/05/96 11:30

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Strat. Unit	Ft bgs	USCS Log	SOIL DESCRIPTION
							20		
							21		
							22		
							23		
3"	24		S-8		28		24		**Olive gray blocky, subangular to subrounded GRAVEL and COBBLES to 3", in a
	12	24	24-26	NR*	51				matrix of silty (little) fine to coarse sand, wet.
					63		25		
					45				
2"	17		S-9		29		26		**Dark gray to olive gray silty fine to coarse sand, some angular, subangular and sub-
	12	24	26-27.5	NR*	39				rounded gravel to 1", trace to little clay, wet.
					109/5"		27		
									Rollerbitted through at 29 ft bgs (possible boulder 27.5 - 29 ft bgs).
							28		
3"	19		S-10		25		29		Olive gray and dark gray silty FINE to COARSE SAND, some subangular to sub-
	13	27.5	29-30.5	3	22				rounded gravel to 2", wet. Piece of platy phyllite at very bottom of spoon - possible
					60		30		top of rock.
					100/1"				
							31		
							32		
2"	2 0	30.5	S-x	NA	100/2"				Appears to be drill cuttings.
							33		
							34		
							35		
							36		
							37		
							38		
							39		
							40		

NOTES:

Sample interval
Sample interval submitted for analysis
NR - No reading (interference by moisture)
NA - Not applicable
*Blow counts are for 2nd attempt
**Samples collected after hydropunch

Logged by: Judi Shapiro

Drilling Contractor: M&R Environmental Drilling

Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2"	Screen Interval:	30 - 20 ft	Sandpack:	30.5 - 18 ft	Grout:	14.5 - 0 ft
Bottom of Hole:	37.5 ft	Riser Interval:	20 ft (-1.5 ft)	Bentonite:	18 - 14.5 ft	Cover:	4 in. locking steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194186.168 E: 517798.447
Surface Elevation:	30.636
Well Riser Elevation:	31.946

Job. No. 29600.32.3213	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: 5" Flush-Joint casing with 4 7/8" rollerbit.		Boring No. **EA-105**
Core Barrel used: HX core		Sheet 3 of 3

Packer Test

Tested		
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	06/05/96 12:55 PM	06/05/96 01:20 PM

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
				27					
				28					
				29					
				30					
				31					
				32					
Run #1 32.5 - 37.5				33		Dark gray PHYLLITE, some visible fine grained mica, minor healed fractures (some healed with a white	0-1	4:00	32.5 - 33.5
Rec = 100% = 5.0/5.0				34		mineral) from 3.5 to 4 ft. Horizontal fractures at 1.3, 1.9 and 2.55 ft. Oxidation	1-2	3:00	33.5 - 34.5
RQD = 90.4% = 4.52/5.0				35		visible on latter two fractures. Partial high-angle fracture from 3.85 to 3.9 ft.	2-3	4:30	34.5 - 35.5
				36			3-4	3:10	35.5 - 36.5
				37			4-5	3:20	36.5 - 37.5
				38					
				39					
				40					
				41					
				42					
				43					
				44					
				45					
				46					
				47					

NOTES: Lost approximately 300 gal of water during coring

Logged by: Judi Shapiro

Drilling Contractor: M & R Environmental Drilling Co.

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 194892.574 E: 518325.631
Surface Elevation: 31.865 ft
Well Riser Elevation: 33.165 ft

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	NIKE Site

Drilling Method: 4" Flush-Joint casing with 3.875" Rollerbit.

Boring No. **EA - 106**

Sampling Method: 3" and 2" I.D. Split-spoon

Sheet 1 of 3

Drilling Water Level		
Date		
Time		

Surface Conditions: Grass

Start	Drilling Times	Finish
06/21/96 0900		06/21/96 1430

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
	24		S-1		4	0		0-2" - Moderate dark brown to yellowish-brown fine to medium SAND, some coarse
3"	21	0	0-2	0.0	15			sand and organics, moist; 2-8" - Medium gray fine to medium sand and subrounded
					15	1		gravel up to 0.25", large (2") gravel at 8", loose, moist; 8-21" - Medium brownish-
					37			gray fine sand and subrounded gravel up to 0.5", tight, moist
	24		S-2		41	2		0-3" - As in 8-21 above, moist; 3-13" - Medium brown fine to medium sand, some
3"	18	0	2-4	0.0	45			coarse sand and gravel up to 0.5", moist, grades to brownish-gray color at 11"
					26	3		13-15" - Dark brown SILT, some very fine sand, trace organics, tight, moist
					25			15-18" - Medium brown fine sand, trace subrounded gravel up to 0.25", tight, moist
	24		S-3		9	4		0-8" - As in 15-18" above, no gravel
	16	0	4-6	0.2	10			8-16" - Bright orange to orangish-brown very fine to fine sand, little medium sand,
					12	5		some reddish-brown mottling, moist to wet
					12			
	24		S-4		8	6		As in 8-16" above, some thin (<2') layers of fine to medium sand, saturated
	22	0	6-8	0.0	10			
					11	7		
					14			
						8		
	24		S-5		3	9		Medium gray very fine SAND and SILT, well sorted, loose
	12	9	9-11	0.0	4			
					7	10		
					9			
						1		
						2		
						3		
	24		S-6		5	4		Medium gray very fine SAND and 2-3" bands of medium dark gray medium to coarse
	14	14	14-16	0.0	6			sand, trace subangular to subrounded gravel
					8	5		
					11			
						6		
						7		
						8		
	24		S-7		13	9		Medium grayish-brown fine to coarse SAND and subangular to subrounded
		19	19-21	NA	10			GRAVEL up to 1", loose
					9	20		
					14			

NOTES:

Sample interval submitted for analysis

Logged by: D. Street

Drilling Contractor: M&R Environmental Drilling

Driller: P. Thornsbury

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2"	Screen Interval:	42 - 32 ft bgs	Sandpack:	42.2 - 31 ft bgs	Grout:	29 - 0 ft bgs
Bottom of Hole:	47 ft bgs	Riser Interval:	32 - (+1.5) ft bgs	Bentonite:	31 - 29 ft bgs	Cover:	4" locking steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 194892.574 E: 518325.631
Surface Elevation:	31.865 ft
Well Riser Elevation:	33.165 ft

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: 4" Flush-Joint casing with 3.875" Rollerbit.		Boring No. EA - 106
Sampling Method: 3" and 2" I.D. Split-spoon		Sheet 2 of 3

Drilling Water Level			Start	Drilling Times	Finish
Date			06/21/96		06/21/96
Time			0900		1430

Surface Conditions: Grass

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						20		
						1		
						2		
						3		
	24 10	24	S-8 24-26	NA	31 13 30 18	4		As above, no headspace sample, driller notes losing water, cobbly
						5		
						6		
						7		
						8		
	24 10	29	S-9 29-31	NA	14 26 29 37	9		As above
						30		
						1		
						2		
						3		
	24 12	34	S-10 34-36	0.0	21 25 28 36	4		Medium gray subangular GRAVEL up to 2", some fine sand, silt and clay, very blocky, possible weathered rock
						5		
						6		
						7		
						8		
	16 12	39	S-11 39-40.3	0.0	32 96 100/0.3	9		As above, weathered rock
						40		Bedrock at 40.3, 3.875" Rollerbit to 42 ft bls

NOTES:

Sample interval submitted for analysis

Logged by: D. Street

Drilling Contractor: M&R Environmental Drilling

Driller: P. Thornsbury

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2"	Screen Interval:	42 - 32 ft bgs	Sandpack:	42.2 - 31 ft bgs	Grout:	29 - 0 ft bgs
Bottom of Hole:	47 ft bgs	Riser Interval:	32 - (+1.5) ft bgs	Bentonite:	31 - 29 ft bgs	Cover:	4" locking steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 194892.574 E: 518325.631
Surface Elevation: 31.865
Well Riser Elevation: 33.165

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	NIKE Site

Drilling Method: Mobil B-61 rig

Boring No. **EA-106**

Core Barrel used: NQ Core

Sheet 3 of 3

Packer Test

Tested	No
Interval	
K-Value	

Start	Drilling Times	Finish
06/24/96 0920		06/24/96 0942

Core Run (ft)	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG Core Run Depth (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
				30					
				31					
				32					
				33					
				34					
				35					
				36					
				37					
				38					
				39					
				40					
				41					
Run #1 Rec = 52% = 2.6/5.0 RQD = 15% = 0.4/2.6				42		Dark gray phyllite, fine grained, many convoluted hairline fractures throughout with iron staining	0-1	3:09	42-43
				43		0.0-1.0' - Broken zone, many iron stained rock chips	1-2	2:26	43-44
				44		3 Low angle fractures at 1.3' and 1.5 (x pattern) and 1.8'			
				45		1 High angle fracture at 1.9-2.2'	2-3	2:53	44-45
				46			3-4	4:42	45-46
				47			4-5	4:04	46-47
				48					
				49					

NOTES:

Core Run Interval

Logged by: D. Street

Drilling Contractor: M&R Environmental Drilling

Driller: P. Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville
Location: NIKE Site	
Drilling Method: 4" Flush-Joint casing with 3.875" Rollerbit.	
Boring No. EA-107	
Sampling Method: 2" and 3" OD split-barrel sampler driven by 140 lb	
Sheet 1 of 3	

Coordinates: N: 193879.826 E: 517684.09
Surface Elevation: 29.869
Well Riser Elevation: 31.339

Drilling Water Level		
Date		
Time		

Surface Conditions: Grass

Start	Drilling Times	Finish
6/25/96 07:15 AM		6/25/96 01:50 PM

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
3"	24 / 23	0	S-1 / 0-2	3.6	4 / 12 / 18 / 25	0 / 1		Moderate to dark brown FINE to COARSE SAND and subrounded GRAVEL up to 2", some organics, coal, dry to moist.
3"	24 / 18	0	S-2 / 2-4	0.4	38 / 69 / 106 / 180	2 / 3		As above, large gravel in spoon tip, moist.
	24 / 2	0	S-3 / 4-6	NA	16 / 11 / 10 / 9	4 / 5		Dark brown ORGANIC MATTER, gravel approximately 2" in spoon tip, wet, not enough for headspace.
	24 / 6	0	S-4 / 6-8	NA	8 / 14 / 16 / 20	6 / 7 / 8		0-3" Dark brown FINE to COARSE SAND, trace subrounded gravel up to 1/2", wet to saturated. 3-6" Medium gray FINE to MEDIUM SAND, well sorted, saturated, not enough for headspace.
	24 / 11	9	S-5 / 9-11	0	8 / 8 / 10 / 10	9 / 10 / 11 / 12 / 13		As in 3-6" above, trace coarse sand.
	24 / 12	14	S-6 / 14-16	0.1	3 / 3 / 4 / 5	14 / 15 / 16 / 17 / 18		As above.
	24 / 13	19	S-7 / 19-21	0	6 / 5 / 8 / 13	19 / 20		0-7" Moderate olive-brown SILT, thin light brown lamina, trace clay. 7-13" Medium brownish-gray VERY FINE to FINE SAND, trace to little silt.

NOTES:

Sample interval submitted for analysis

Logged by: David Street

Drilling Contractor: M & R Environmental Drilling

Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Screen/Riser:	2"	Screen Interval:	41.0 - 31.0 ft bgs	Sandpack:	41.2 - 30.0 ft bgs	Grout:	28.0 - 0 ft bgs
Bottom of Hole:	47	Riser Interval:	31 .0 ft bgs - 1.5 ft ags	Bentonite:	30.0 - 28.0 ft bgs	Cover:	4" steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 193879.826 E: 517684.09
Surface Elevation:	29.869
Well Riser Elevation:	31.339

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: 4" Flush-Joint casing with 3.875" Rollerbit.		Boring No. EA-107
Sampling Method: 2" and 3" OD split-barrel sampler driven by 140 lb		Sheet 2 of 3
Drilling Water Level / Date / Time		Start 6/25/96 07:15 AM; Drilling Times; Finish 6/25/96 01:50 PM
Surface Conditions: Grass		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						20		
						21		
						22		
						23		
	24		S-8		31	24		Medium gray, grayish-brown and light brown subangular, blocky GRAVEL up to 2",
	12	24	24-26	0.4	29			some fine to medium sand and silt, possible weathered rock, driller notes
					22	25		hard at 28.5 ft.
					26			
						26		
						27		
						28		
	24		S-9		97	29		As above, not enough for headspace.
	9	29	29-31	NA	91			
					39	30		
					51			
						31		
						32		
						33		
	18		S-10		39	34		Moderate grayish-brown FINE to COARSE SAND and subangular to subrounded
	11	34	34-35.5	2.0	71			GRAVEL up to 2", dense, not weathered rock.
					100/6"	35		
						36		
						37		
						38		
	10		S-11		39	39		Moderate to dark gray FINE SAND, SILT and subangular GRAVEL up to 1/2", trace
	5	39	39-39.9	NA	100/4"			clay, very dense and compact, moist.
						40		Bedrock at 39.9 ft bgs; rollerbit to 42 ft bgs.
								HQ core from 42 - 47 ft bgs.

NOTES:

Sample interval submitted for analysis DUP-2

Logged by: David Street

Drilling Contractor: M & R Environmental Drilling

Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Dia.Screen./Riser:	2"	Screen Interval:	41.0 - 31.0 ft bgs	Sandpack:	41.2 - 30.0 ft bgs	Grout:	28.0 - 0 ft bgs
Bottom of Hole:	47	Riser Interval:	31 .0 ft bgs - 1.5 ft ags	Bentonite:	30.0 - 28.0 ft bgs	Cover:	4" steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Job. No. 29600.32.3213	Client: NORDIV/NAVFAC NCBC Davisville
Location: NIKE Site	
Drilling Method:	
Boring No. EA-107	
Ordinates: N: 193879.826 E: 517684.09	
Surface Elevation: 29.869	
Well Riser Elevation: 31.339	
Core Barrel used: HQ Core	
Sheet 3 of 3	

Packer Test

Tested	N/A	
Interval		

See packer test log if applicable

Start	Drilling Times	Finish
6/25/96 15:30		6/25/96 15:55

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
				39					
				40					
				41					
Run #1 42.0 - 47.0 Rec = 90% = 4.5/5.0 RQD = 58% = 2.6/4.5				42		Medium to dark gray PHYLLITE, fine grained, some black speckles, pyrite from 3.0 - 3.5 ft.	0-1	3:06	42 - 43
				43		2 horizontal fractures at 1.45 and 2.05 ft	1-2	4:34	43 - 44
				44		3 low angle fractures at 0.8, 1.9 and 2.0 ft 2 high angle fractures at 1.25 - 1.4 and 2.6 - 3.0 ft with	2-3	4:52	44 - 45
				45		3 low angle fractures at 0.8, 1.9 and 2.0 ft milky white substance along plane.	3-4	4:56	45 - 46
				46		1 vertical fracture at 1.0 - 1.2 ft few hairline fractures throughout	4-5	4:42	46 - 47
				47					
				48					
				49					
				50					
				51					
				52					
				53					
				54					
				55					
				56					
				57					
				58					
				59					
				60					

NOTES:

Logged by: David Street

Drilling Contractor: M & R Environmental Drilling Co.

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 193739.593 E: 518114.543
Surface Elevation: 32.244
Well Riser Elevation: 33.504

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	Nike Site

Drilling Method: Mobile B-61 truck mounted rig, driving 2" and 3" OD (as noted) split spoon sampler, using 5" ID Flush-Joint casing and 4 7/8" rollerbit.

Boring No. **EA-108**

Sampling Method: 2" and 3" OD split-spoon sampler driven by 140-lb hammer falling 30"

Sheet 1 of 3

Drilling Water Level:
Date: Time:
Surface Conditions: Sand/hydroseed

Start	Drilling Times	Finish
6/6/96		6/7/96
10:30		13:00

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Strat. Unit	Ft bgs	USCS Log	SOIL DESCRIPTION
3"	24		S-1		5		0		Yellowish-orange and olive gray silty (little) FINE SAND, trace coarse sand to
	18	0	0-2	1.0	4				subrounded gravel to 1", little organics, dry.
					4		1		
					5				
3"	24		S-2		10		2		0-17" Yellowish-orange silty (little) FINE SAND, one piece of fractured gravel at
	20	0	2-4	0.6	9				approximately 5" (oxidized phyllite - angular pieces to 2.5"), dry.
					7		3		17-20" Dark gray silty (little) FINE SAND, dry.
					10				
2"	24		S-3		5		4		0-7" Yellowish-orange and olive gray silty (little) FINE SAND, some medium to coarse
	16	0	4-6	0.6	4				sand at 5-7", dry.
					5		5		7-16" Medium gray SILT with bands of yellowish-orange silty fine sand at bottom
					7				4", dry.
2"	24		S-4		13		6		0-14" Yellowish-orange with bands of medium gray clayey-silty (little to some) FINE
	17	0	6-8	0.6	15				SAND, little medium sand from 6-8", wet.
					16		7		14-17" Medium gray very fine sand, moist.
					18				
2"	24		S-5		12		8		0-10" Olive gray silty VERY FINE SAND, wet.
	14	0	8-10	0.6	12				10-14" Laminae of yellowish-orange FINE SAND and dark gray silty FINE SAND, wet.
					15		9		
					20				
							10		
							11		
							12		
							13		
3"	24		S-6		9		14		Olive gray MEDIUM to FINE SAND, some bands (each approximately 1" thick)
	21	14	14-16	1.6	15				of very fine to fine sand, wet.
					18		15		
					24				
							16		
							17		
							18		
3"	24		S-7		10		19		Olive gray and yellowish-orange FINE to COARSE SAND, little subrounded to
	8	19	19-21	1.8	11				rounded gravel (up to 1.5"), wet.
					8		20		
					10				

NOTES:

Sample submitted for analysis
Dup - 1

Logged by: Judi Shapiro

Drilling Contractor: M&R Environmental Drilling

Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2"	Screen Interval:	29.25 - 19.25 ft bgs	Sandpack:	29.5 - 17.25 ft bgs	Grout:	15.25 - 0 ft bgs
Bottom of Hole:	36 ft bgs	Riser Interval:	19.25 - (+1.5) ft bgs	Bentonite:	17.5 - 15.25 ft bgs	Cover:	4" locking steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville
Location: Nike Site	
Drilling Method: Mobile B-61 truck mounted rig, driving 2 in. and 3 in. OD (as noted) split spoon sampler, using 5" ID Flush-Joint casing and 4 7/8" rollerbit.	Boring No. **EA-108**
Sampling Method: 2 in. and 3 in. OD split-spoon sampler driven by 140-lb hammer falling 30"	Sheet 2 of 3
Drilling Water Level: Date: Time:	Start 6/6/96 10:30 — Drilling Times — Finish 6/7/96 13:00
Surface Conditions: Grass	

Coordinates: N: 193739.593 E: 518114.543
Surface Elevation: 32.244
Well Riser Elevation: 33.504

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Strat. Unit	Ft bgs	USCS Log	SOIL DESCRIPTION
							20		
							21		
							22		
							23		
3"	24		S-8		58		24		Olive gray matrix of very fine to medium sand, most of sample is large pieces of angular
	9	24	24-26	2.0	46				to subangular gravel, cored by sampler, ranging in thickness from 1/4" to 2", wet.
					34		25		(Most of gravel appears to be schistose -metaquartzite)
					32				
							26		
							27		
							28		
									Driller noted change in cuttings at 28.5 ft bgs. Could be top of weathered rock
3"	6	6 29	S-9	2.8	200/6"		29		Dark gray angular GRAVEL to 2" (phyllite) in matrix of shards of broken rock, wet.
			29-29.5						
							30		
							31		
							32		
							33		
							34		
							35		
							36		
							37		
							38		
							39		
							40		

NOTES:

Logged by: Judi Shapiro

Drilling Contractor: M&R Environmental Drilling

Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Dia.Screen/Riser: 2"
Bottom of Hole: 36 ft bgs
Screen Interval: 29.25 - 19.25 ft bgs
Riser Interval: 19.25 - (+1.5) ft bgs
Sandpack: 29.5 - 17.25 ft bgs
Bentonite: 17.5 - 15.25 ft bgs
Grout: 15.25 - 0 ft bgs
Cover: 4" locking steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 193739.593 E: 518114.543
Surface Elevation:	32.244
Well Riser Elevation:	33.504

Job. No. 29600.32.3213	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: 5" Flush-Joint casing with 4 7/8" rollerbit.		Boring No. **EA-108**
Core Barrel used: HX Core		Sheet 3 of 3

Packer Test

Tested	N/A	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	6/7/96 8:10	6/7/96 9:10

Core Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
Run #1 31.0 - 36.0				31		Dark gray GRAPHITIC SCHIST with platy mineralization	0-1	12:40*	31.0 - 32.0
						(pyrrhotite) in some fractures. Grades into			
Rec = 93% = 4.67/5.0				32		PHYLLITE at approximately 1 ft to very fine grained	1-2	8:00	32.0 - 33.0
						QUARTZITE at 2.2" back to PHYLLITE at 3.4 ft.			
RQD = 63% = 2.95/4.67				33		Band of deformed medium to coarse grained quartz	2-3	9:00	33.0 - 34.0
						inclusions in matrix from 2.2 to 2.7 ft			
				34		Broken zone from 0 - 1 ft.	3-4	3:30	34.0 - 35.0
						High angle fracture from 1.8 - 2.2 ft, slickensides along			
				35		fracture. High angle fracture from 2.7 - 3.15 ft,	4-5	5:30	35.0 - 36.0
						oxidation apparent.			
				36		Horizontal fractures with iron staining from 3.4 to 3.6 ft.			
				37					
				38					
				39					
				40					
				41					
				42					
				43					
				44					
				45					
				46					
				47					
				48					

NOTES: *Difficulty coring - core barrel binding up.
Very little water loss - approximately 20 gallons.

Logged by: Judi Shapiro

Drilling Contractor: M & R Environmental Drilling Co.

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville
Location: NIKE Site	
Drilling Method: 4" Flush-Joint casing with 3.875" Rollerbit.	
Boring No. **EA-109**	
Sampling Method: 2" and 3" OD split-barrel samplers driven with 140 lb. hammer	
Sheet 1 of 3	

Coordinates: N: 194096.176 E: 518286.568
Surface Elevation: 31.888
Well Riser Elevation: 33.388

Drilling Water Level		
Date		
Time		

Start	Drilling Times	Finish
6/19/96 14:20		6/20/96 10:00

Surface Conditions: Grassy

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
3"	24 / 21	0	S-1 / 0-2	0	2 4 4 7	0 1		0-6" Medium dark brown FINE SAND, some subangular to subrounded gravel up to 2", organics, dry. 6-21" Moderate yellowish-brown FINE to MEDIUM SAND, some subangular to sub-rounded gravel up to 1", dry to moist.
3"	24 / 19	0	S-2 / 2-4	0	12 14 14 15	2 3		0-9" Moderate yellosih-brown MEDIUM to COARSE SAND and subrounded GRAVEL up to 1/4", some to little subangular gravel up to 2", moist. 9-19" Dark yellowish-brown VERY FINE to FINE SAND, some dark brown mottling from 9-12", trace to little silt, trace subangular gravel up to 1/4", moist.
	24 / 18	0	S-3 / 4-6	0.2	8 9 9 11	4 5		0-7" Light orangish-brown VERY FINE SAND, some silt, little light brown mottling throughout, moist to wet. 7-18" Light brown VERY FINE SAND, some silt, some medium brown mottling, wet.
	24 / 23	0	S-4 / 6-8	0	12 14 11 12	6 7		As in 7-18" interval above, some thin light orangish-brown lamina (horizontal) throughout, some fine sand, wet to saturated.
	24 / 24	0	S-5 / 8-10	0.3	11 12 11 10	8 9		Light brown to light brownish-gray VERY FINE SAND, some fine sand and silt, thin lamina of gray and medium brown very fine sand, saturated.
						10 11 12 13		
	24 / 10	14	S-6 / 14-16	0	2 2 3 5	14 15		Light brownish-gray to olive gray VERY FINE SAND and SILT, little fine sand, one subangular gravel approximately 1/2" in spoon tip.
						16 17 18		
	24 / 9	19	S-7 / 19-21	0	3 5 10 11	19 20		0-2" As above. 2-6" Moderate brownish-gray FINE to COARSE SAND, trace subangular gravel up to 1/8", thin orange-brown lamina. 6-9" Medium grayish-brown VERY FINE SAND, thin moderate brown lamina.

NOTES:

Samole submitted for analysis

Logged by: David Street

Drilling Contractor: M & R Environmental Drilling Co.

Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2"	Screen Interval:	36 - 26 ft bgs	Sandpack:	36.2 - 25 ft bgs	Grout:	23 - 0 ft bgs
Bottom of Hole:	41	Riser Interval:	26 - (+1.5) ft bgs	Bentonite:	25 - 23 ft bgs	Cover:	4" steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 194096.176 E: 518286.568
Surface Elevation: 31.888
Well Riser Elevation: 33.388

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: 4" Flush-Joint casing with 3.875" Rollerbit.		Boring No. EA-109
Sampling Method: 2" and 3" OD split-barrel samplers driven with 140 lb. hammer		Sheet 2 of 3
Drilling Water Level / Date / Time		Start 6/19/96 14:20 / Drilling Times / Finish 6/20/96 10:00
Surface Conditions: Grassy		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						20		
						21		
						22		
						23		
	24		S-8		14	24		0-6" Dark gray VERY FINE SAND and subrounded GRAVEL up to 1/2", some silt,
	12	24	24-26	NA	23			trace clay, very tight and compact, till-like.
					17	25		6-12" Moderate brownish-gray FINE to COARSE SAND and subangular GRAVEL
					16			up to 1/4", loose, not enough for headspace.
						26		
						27		
	24		S-9		10	28		As in 6-12" above, gravel up to 1", not enough sample for headspace.
	10	29	29-31	NA	14			
					13	29		
					14			
						30		
						31		
						32		
						33		
	16		S-10		34	34		Dark gray angular, blocky, fissile, GRAVEL up to 2", little clay and silt in partings,
	9	34	34-35.3	NA	71			trace fine sand, possible weathered rock, not enough for headspace.
					100/4"	35		
						36		
						37		
						38		
						39		
						40		

NOTES:

Sample submitted for analysis

Logged by: David Street

Drilling Contractor: M & R Environmental Drilling Co.

Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Dia.Screen/Riser:	2"	Screen Interval:	36 - 26 ft bgs	Sandpack:	36.2 - 25 ft bgs	Grout:	23 - 0 ft bgs
Bottom of Hole:	41	Riser Interval:	26 - (+1.5) ft bgs	Bentonite:	25 - 23 ft bgs	Cover:	4" steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194096.176 E: 518286.568
Surface Elevation:	31.888
Well Riser Elevation:	33.388

Job. No. 29600.32.3213	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: rollerbit.		Boring No. EA-109
Core Barrel used: HQ Core		Sheet 3 of 3

Packer Test

Tested	N/A	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	6/20/96 11:12 AM	6/20/96 12:03 PM

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
				33					
				34					
				35					
Run #1 36.0 - 41.0				36		0 - 1.0 Light gray QUARTZITE, fine grained, some quartz healed fractures with pyrite, minor speckling.	0-1	3:52	36 - 37
Rec = 100% = 5.0/5.0				37		1.0 - 1.8 Dark gray PHYLLITE, fine grained, very broken, some iron stains.	1-2	6:20*	37 - 38
RQD = 10% = 0.5/5.0				38		1.8 - 2.7 As in 0 - 1.0	2-3	6:15*	38 - 39
				39		2.7 - 3.2 As in 1.0 - 1.8 3.2 - 3.6 As in 0 - 1.0	3-4	7:20*	39 - 40
				40		3.6 - 4.4 As in 1.0 - 1.8 4.4 - 5.0 As in 0 - 1.0	4-5	6:40*	40 - 41
				41		Horizontal fractures at 1.1, 1.2, 1.4, 1.7, 1.85, 2.0, 4.05, 4.25 and 4.8 ft.			
				42					
				43		9 low angule fractures at 0.45, 1.5, 2.75, 2.8, 2.9, 3.15, 3.3, 3.4, 3.65 and 3.9 ft			
				44		5 high angle fractures at 0.0 - 0.5, 1.5 - 1.8, 3.4 - 3.9, 3.9 - 4.5 and 4.8 - 5.0 ft			
				45		2 vertical fractures at 1.2 - 1.5 ft and 1.8 - 2.7 ft			
				46		3 broken zones at 1.2 - 1.5, 1.7 - 1.85 and 3.7 - 3.95 ft			
				47		Many quartz with pyrite healed fractures, some iron staining			
				48					
				49					
				50					
				51					
				52					
				53					

NOTES: *Difficulty coring - core barrel binding up and trouble with water return.

Logged by: David Street

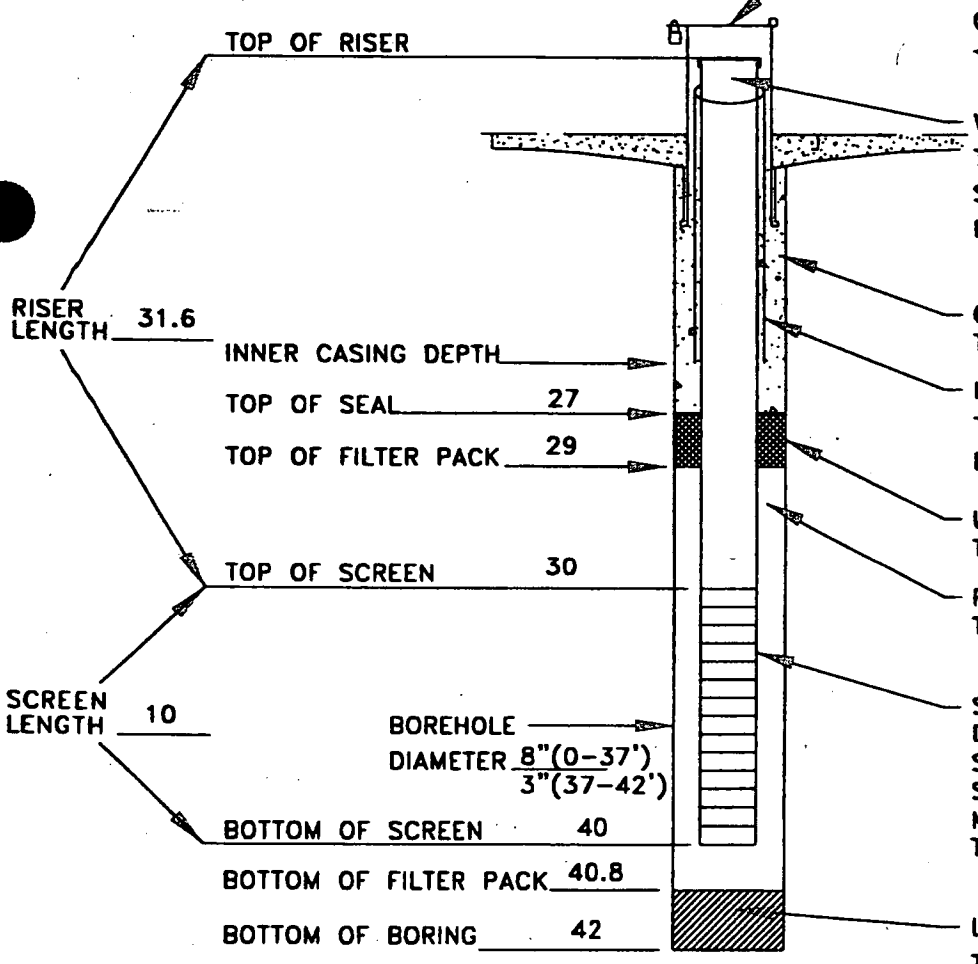
Drilling Contractor: M & R Environmental Drilling Co.

Driller: Phil Thornsbury

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NCBC DAVISVILLE / IR PROGRAM SITE 03 / CED SOLVENT DISPOSAL AREA	
DATE INSTALLED: 5-19-95 / 11/20/96	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 32.4'	COORDINATES: N: 194265.30 E: 518494.75
ELEVATION TOP OF WELL RISER: 34.00'	EA INSPECTOR: J. SHAPIRO/KEVIN CALDWELL
DEPTH TO WATER: DATE/TIME	WELL No. MW03-14D
DRILLING METHOD/DEPTH: 4 1/4" HSA, (0-37'), 3" FLUSH JOINT CASING (37-42'), NX CORE (37-42')	

ON 11/20/96, PVC WAS REPLACE WITH STAINLESS STEEL DRILLED AND SCREENED TO THE SAME DEPTH AND INTERVAL



PROTECTIVE CASING
TYPE: STEEL
LOCKING: YES
STICK UP: 1.8'
DIAMETER: 6"

GROUND SURFACE
TYPE: UNPAVED

WELL RISER
TYPE: ~~PVC~~ STAINLESS STEEL
STICK UP: 1.6'
DIAMETER: 2"

GROUT
TYPE: CEMENT/BENTONITE

INNER CASING
TYPE:
DIAMETER:

UPPER SEAL
TYPE: BENTONITE

FILTERPACK
TYPE: Ø SAND

SCREEN
DIAMETER: 2"
SLOT SIZE: 10-SLOT
SCHEDULE: 40
MATERIAL: ~~PVC~~ STAINLESS STEEL
TYPE OF PIPE JOINTS: THREADED

LOWER SEAL
TYPE: BENTONITE

MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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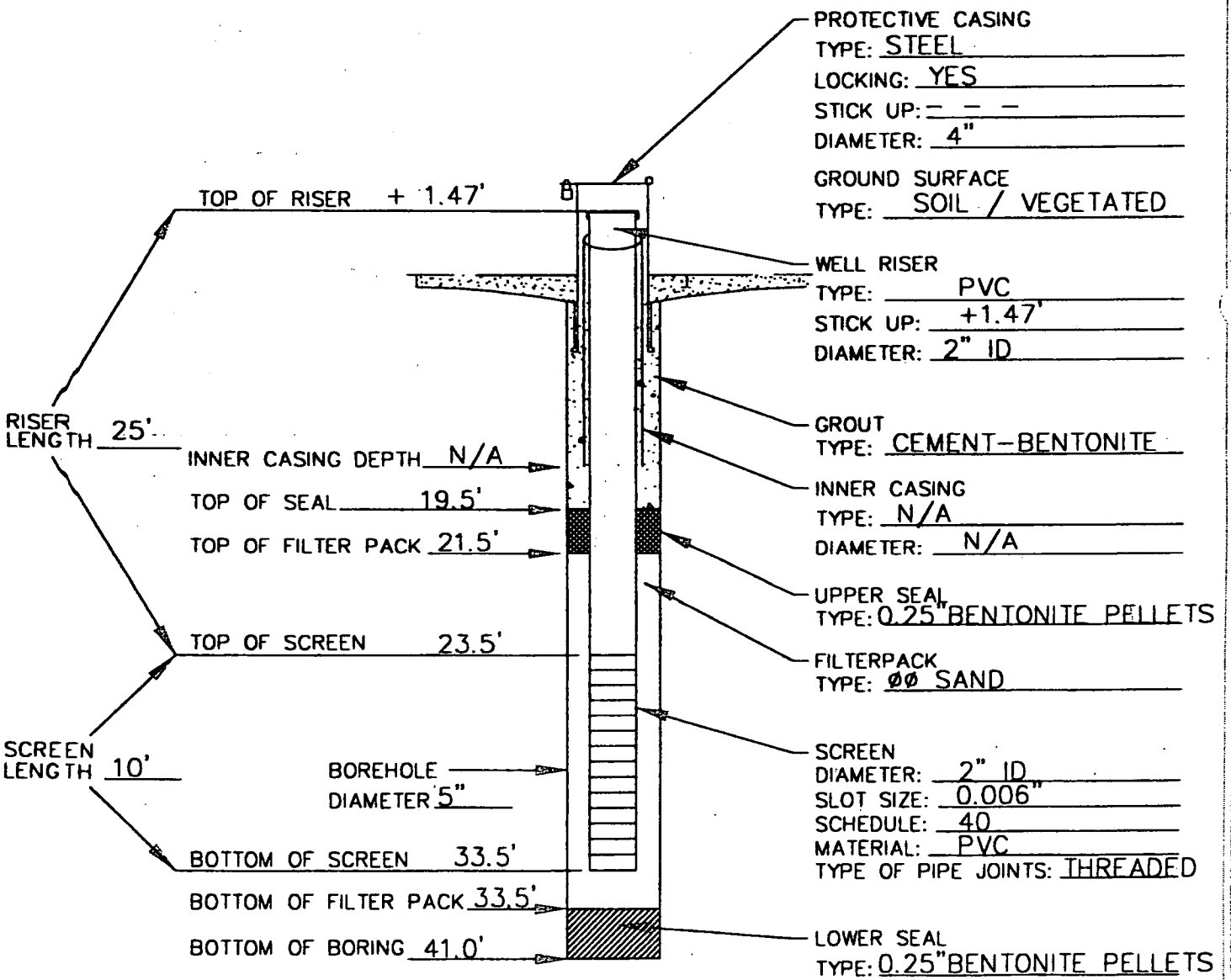
MONITORING WELL CONSTRUCTION

EA-101

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, NIKE SITE SOURCE AREA CHARACTERIZATION	
DATE INSTALLED: 6-14-96	PROJECT No. 29600.32.3213
ELEVATION OF GROUND SURFACE: 30.82 ' MSL ELEVATION TOP OF WELL RISER: 32.29 ' MSL	COORDINATES: N: 194341.032 E: 518387.125
DEPTH TO WATER: — (BELOW GROUND SURFACE) DATE/TIME: —	EA INSPECTOR: D. STREET
DRILLING METHOD & DEPTH: 5" FLUSH JOINT CASING WITH 4.875" ROLLERBIT. HX CORE 36-41'BGS	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASUREMENTS IN FT. BELOW GROUND SURFACE)

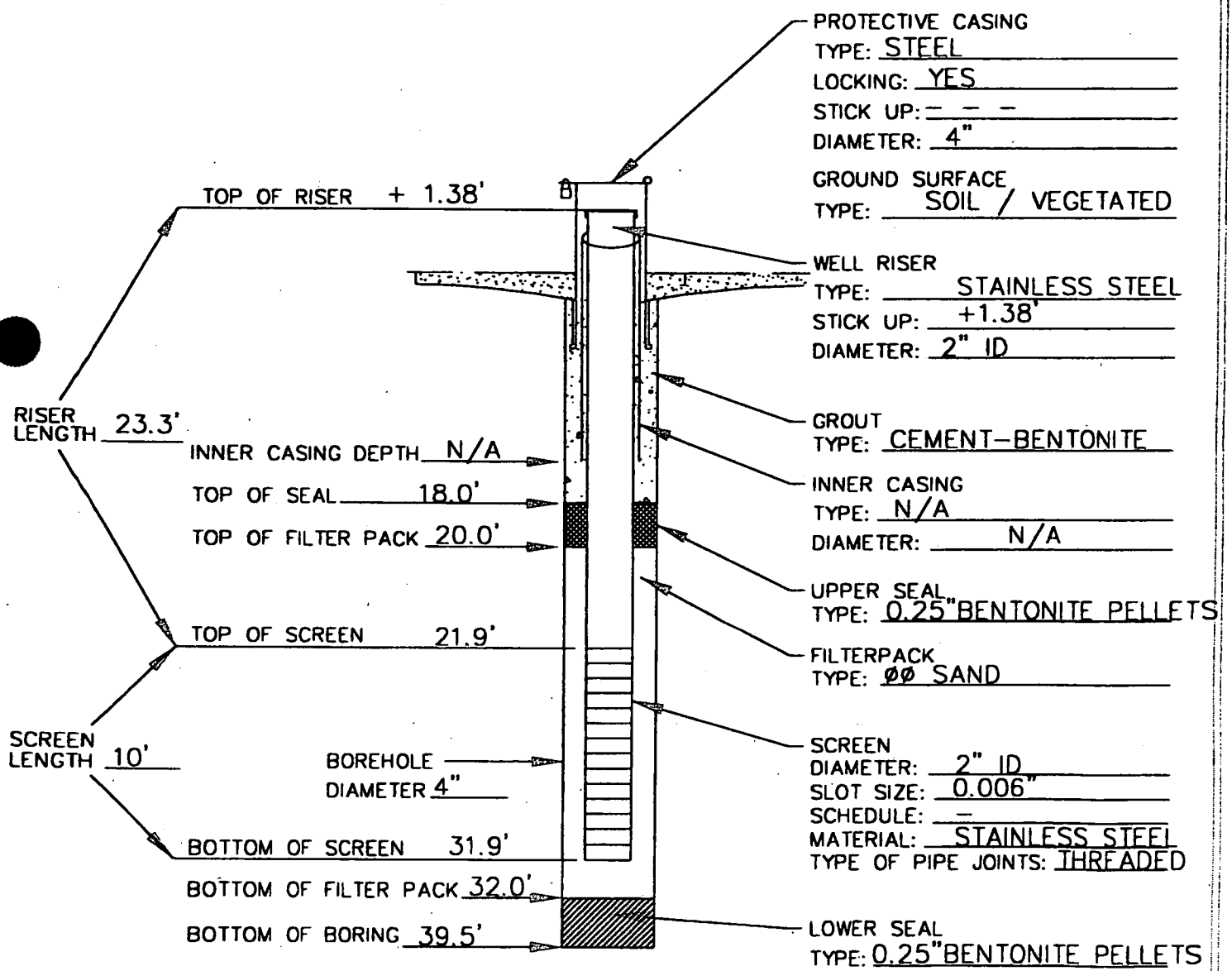
EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. F:\PROJECTS\29600.32\3213\CADD.DWG

MONITORING WELL CONSTRUCTION

EA-102

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, NIKE SITE SOURCE AREA CHARACTERIZATION	
DATE INSTALLED: 6-12-96	PROJECT No. 29600.32.3213
ELEVATION OF GROUND SURFACE: 31.99 ' MSL ELEVATION TOP OF WELL RISER: 33.37 ' MSL	COORDINATES: N: 194235.924 E: 518418.9
DEPTH TO WATER: — (BELOW GROUND SURFACE) DATE/TIME: —	EA INSPECTOR: D. STREET
DRILLING METHOD & DEPTH: 4" FLUSH JOINT CASING, 3.875" ROLLERBIT, HQ CORE 34.5'-39.5' BGS	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASUREMENTS IN FT. BELOW GROUND SURFACE)

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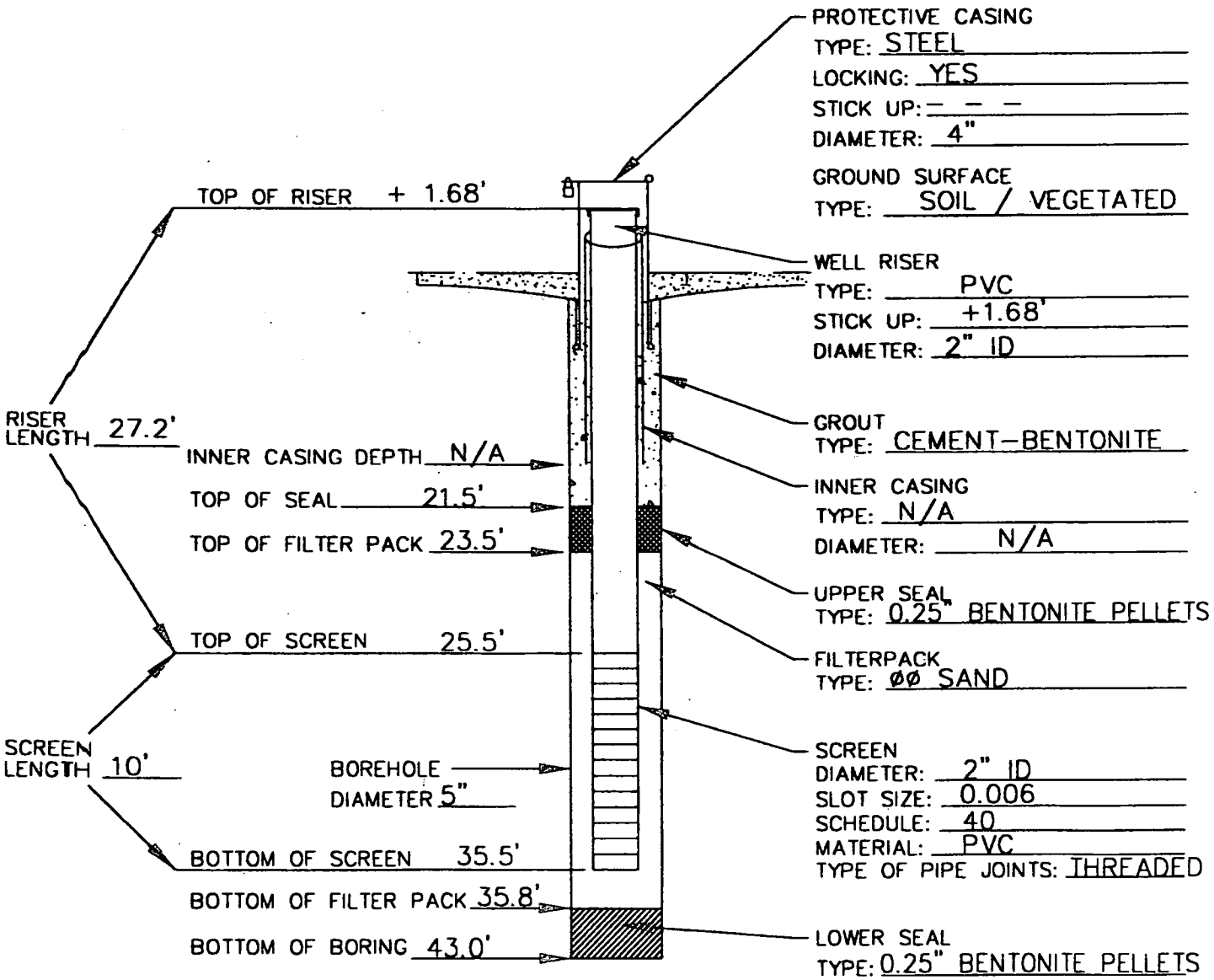
MONITORING WELL CONSTRUCTION

EA-103

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, NIKE SITE SOURCE AREA CHARACTERIZATION	
DATE INSTALLED: 6-19-96	PROJECT No. 29600.32.3213
ELEVATION OF GROUND SURFACE: 33.45' MSL ELEVATION TOP OF WELL RISER: 35.13 ' MSL	COORDINATES: N: 194468.537 E: 518483.869
DEPTH TO WATER: 8.78' (BELOW GROUND SURFACE) DATE/TIME: 7-18-96 1022	EA INSPECTOR: D. STREET
DRILLING METHOD & DEPTH: 5" FLUSH JOINT CASING, 4.875" ROLLERBIT TO 38', HX CORE 38'-43' BGS	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASUREMENTS IN FT. BELOW GROUND SURFACE)

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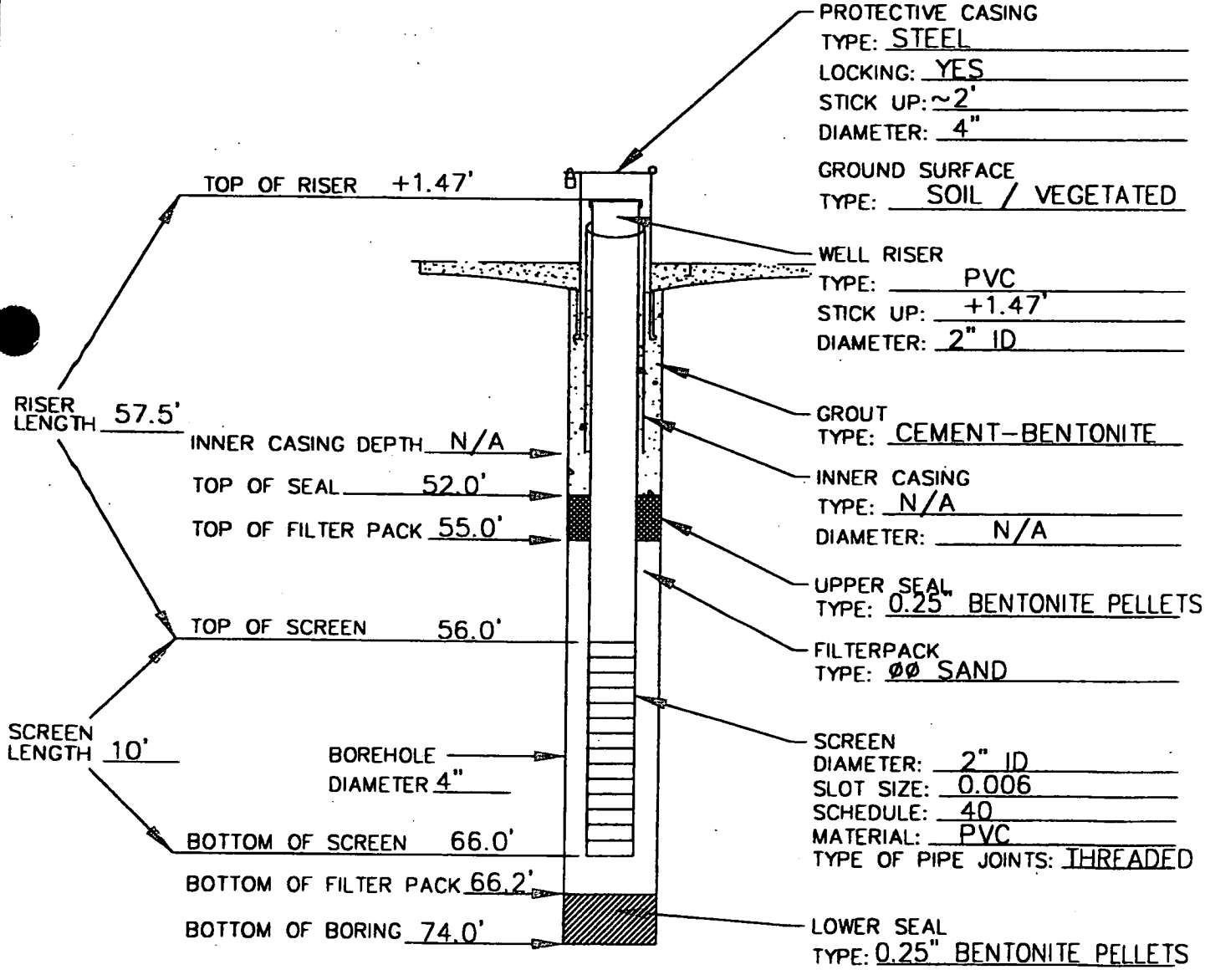
MONITORING WELL CONSTRUCTION

EA-104

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, NIKE SITE SOURCE AREA CHARACTERIZATION	
DATE INSTALLED: 6-28-96	PROJECT No. 29600.32.3213
ELEVATION OF GROUND SURFACE: 35.93' MSL ELEVATION TOP OF WELL RISER: 37.40 ' MSL	COORDINATES: N: 194695.733 E: 518826.24
DEPTH TO WATER: 11.75' (BELOW GROUND SURFACE) DATE/TIME: 7-18-96 0959	EA INSPECTOR: D. STREET
DRILLING METHOD & DEPTH: 4" FLUSH JOINT CASING, 3.875" ROLLERBIT TO 69', HQ CORE 69'-74' BGS	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASUREMENTS IN FT. BELOW GROUND SURFACE)

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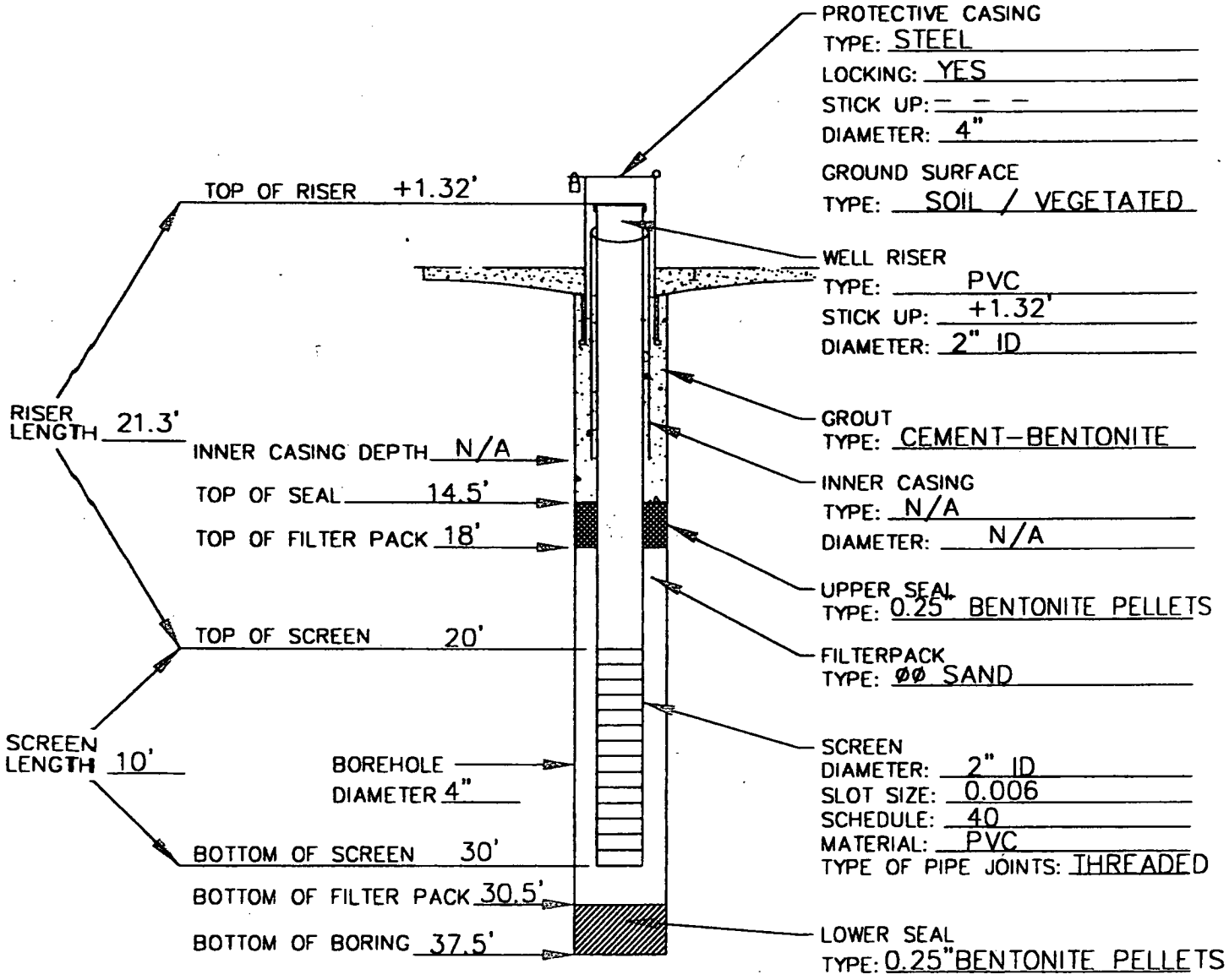
MONITORING WELL CONSTRUCTION

EA-105

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, NIKE SITE SOURCE AREA CHARACTERIZATION	
DATE INSTALLED: 6-5-96	PROJECT No. 29600.32.3213
ELEVATION OF GROUND SURFACE: 30.63' MSL ELEVATION TOP OF WELL RISER: 31.95 ' MSL	COORDINATES: N: 194188.168 E: 517798.447
DEPTH TO WATER: 5.65' (BELOW GROUND SURFACE) DATE/TIME: 6-6-96 0700	EA INSPECTOR: J. SHAPIRO
DRILLING METHOD & DEPTH: 5" FLUSH JOINT CASING TO 15', 4.875" ROLLERBIT TO 19', 4"FLUSH JOINT CASING, 3.875" ROLLERBIT TO 32.5', HX CORE 32.5'-37.5' BGS	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASUREMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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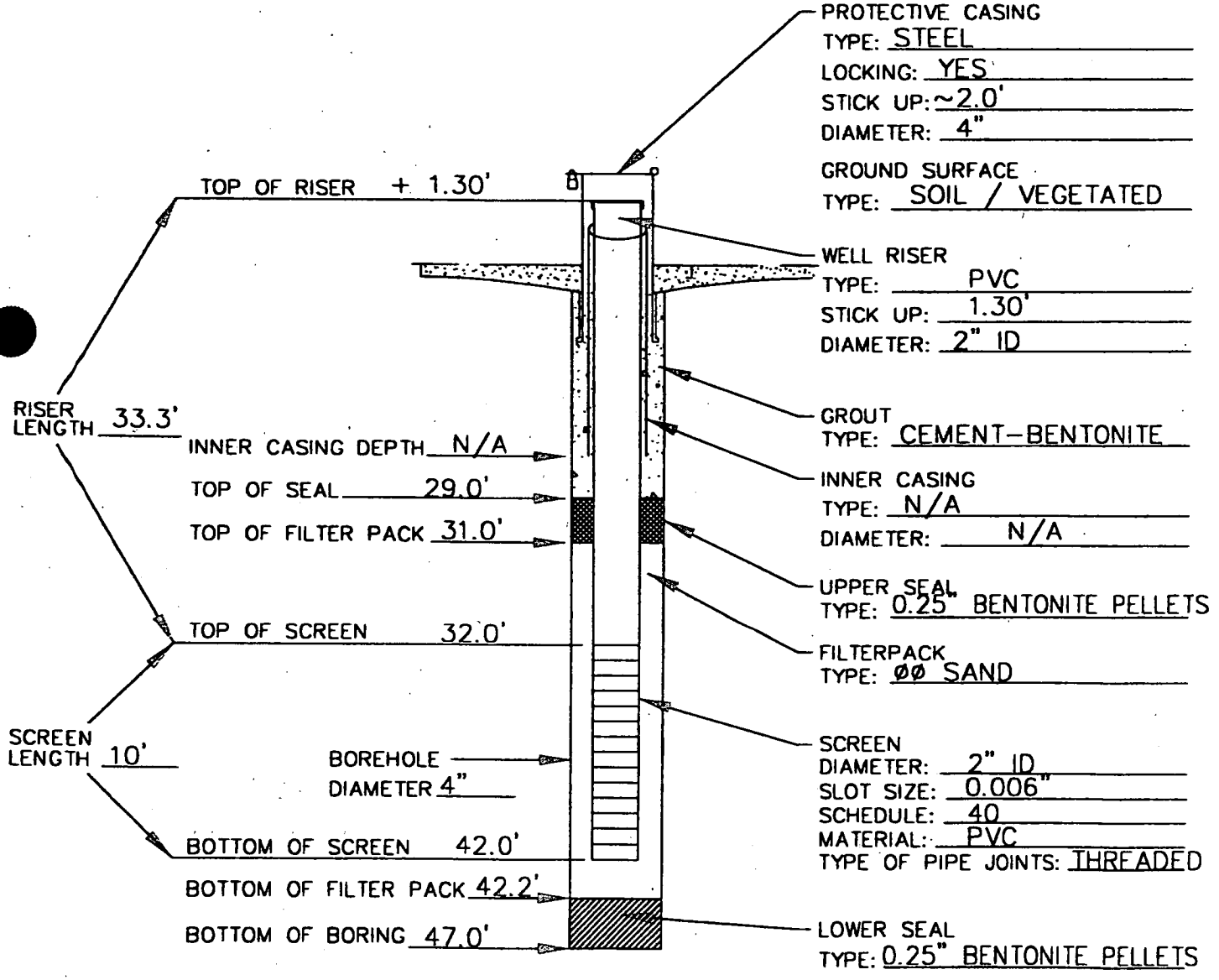
MONITORING WELL CONSTRUCTION

EA-106

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, NIKE SITE SOURCE AREA CHARACTERIZATION	
DATE INSTALLED: 6-24-96	PROJECT No. 29600.32.3213
ELEVATION OF GROUND SURFACE: 31.86 ' MSL ELEVATION TOP OF WELL RISER: 33.17 ' MSL	COORDINATES: N: 194892.574 E: 518325.631
DEPTH TO WATER: 7.03' (BELOW GROUND SURFACE) DATE/TIME: 7-18-96 1038	EA INSPECTOR: D. STREET
DRILLING METHOD & DEPTH: 4" FLUSH JOINT CASING, 3.875" ROLLERBIT TO 42', NQ CORE 42-47' BGS	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASUREMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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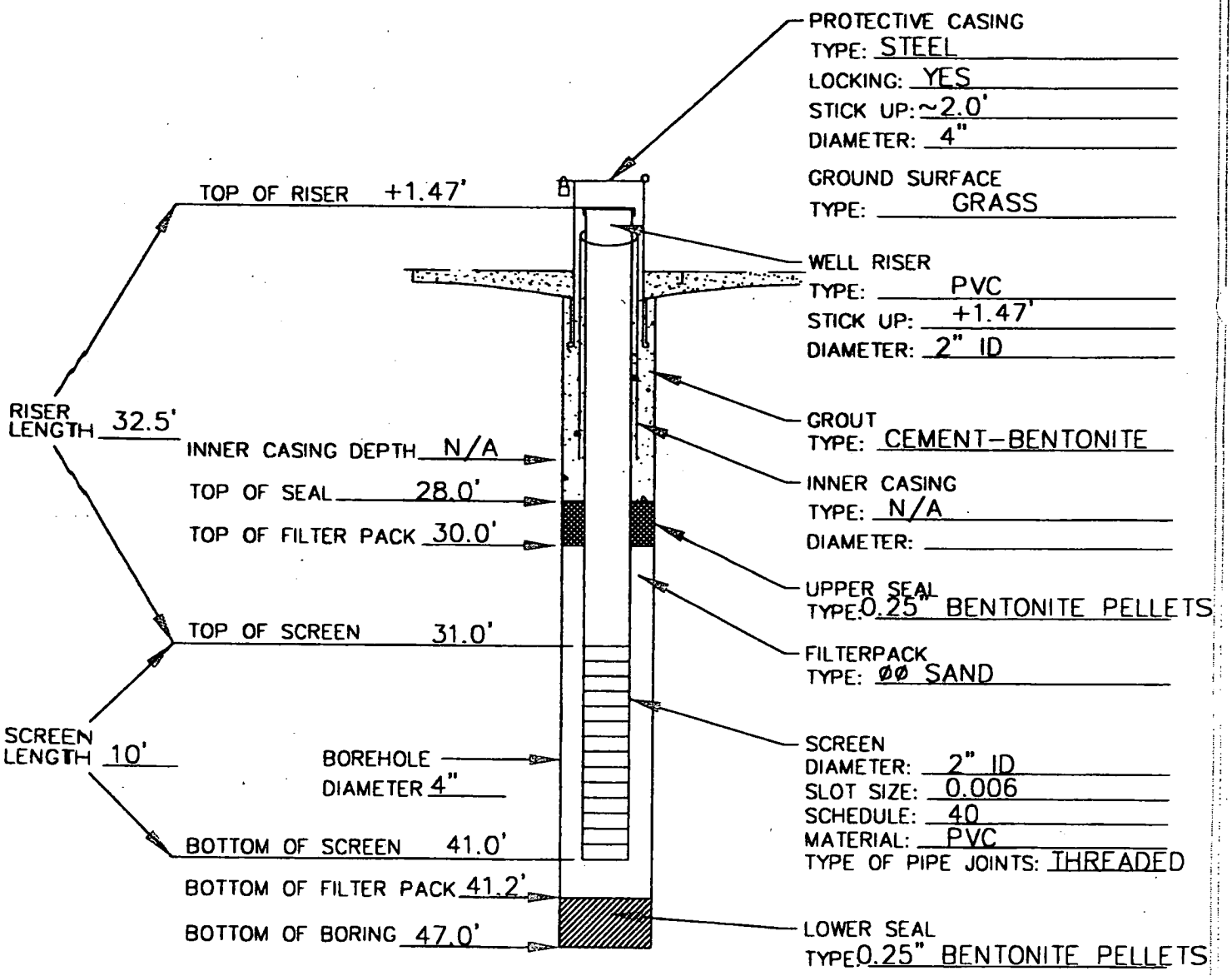
MONITORING WELL CONSTRUCTION

EA-107

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, NIKE SITE SOURCE AREA CHARACTERIZATION	
DATE INSTALLED: 6-26-96	PROJECT No. 29600.32.3213
ELEVATION OF GROUND SURFACE: 29.87' MSL ELEVATION TOP OF WELL RISER: 31.34 ' MSL	COORDINATES: N: 193879.826 E: 517684.09
DEPTH TO WATER: — (BELOW GROUND SURFACE) DATE/TIME: — —	EA INSPECTOR: D. STREET
DRILLING METHOD & DEPTH: 4" FLUSH JOINT CASING, 3.875" ROLLERBIT TO 42', HQ CORE 42'-47' BGS	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASUREMENTS IN FT. BELOW GROUND SURFACE)

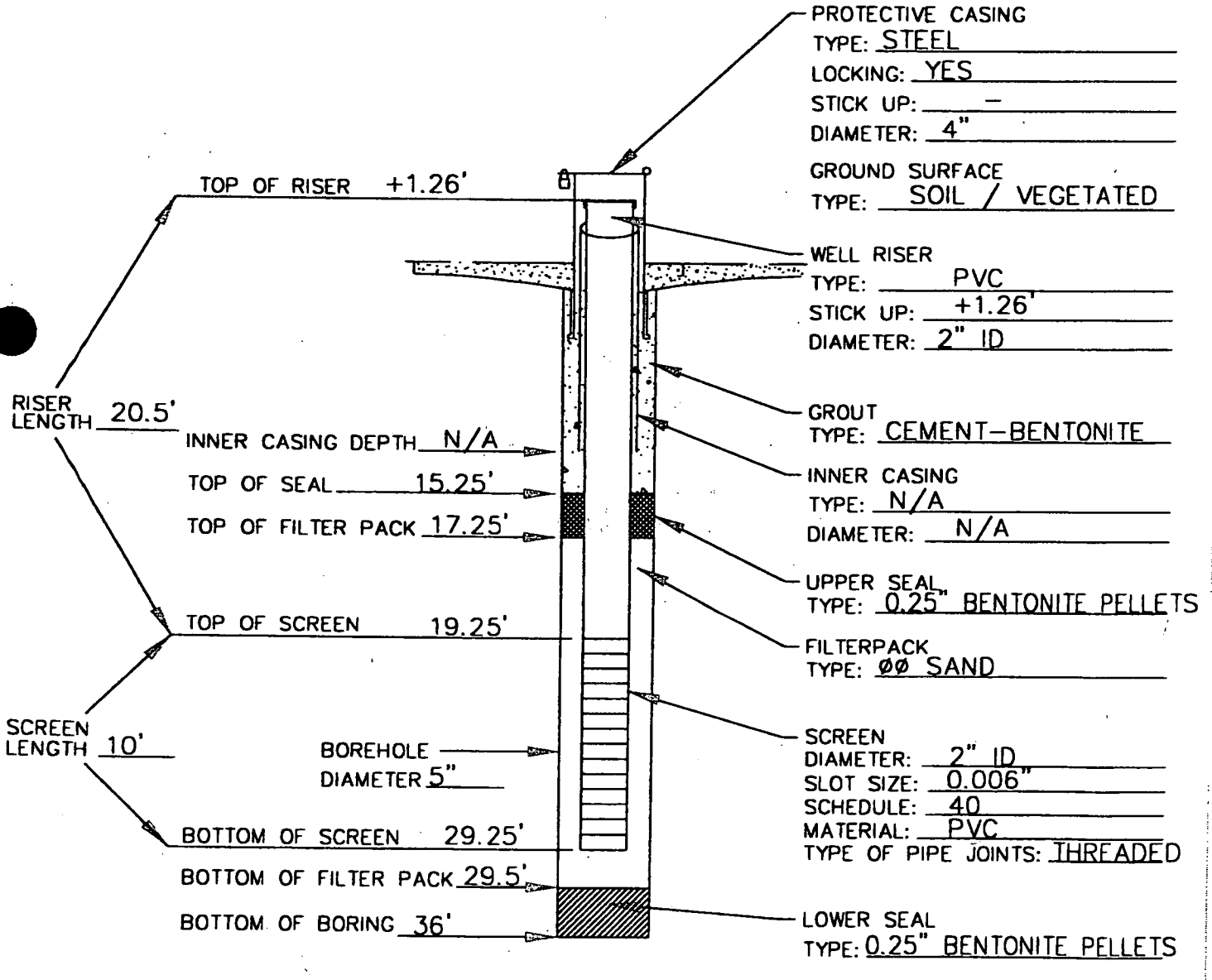
EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. F:\PROJECTS\29600.32\3213\CAD0.DWG

MONITORING WELL CONSTRUCTION

EA-108

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, NIKE SITE SOURCE AREA CHARACTERIZATION	
DATE INSTALLED: 6-7-96	PROJECT No. 29600.32.3213
ELEVATION OF GROUND SURFACE: 32.24 ' MSL ELEVATION TOP OF WELL RISER: 33.50' MSL	COORDINATES: N: 193739.593 E: 518114.543
DEPTH TO WATER: 6.95' (BELOW GROUND SURFACE) DATE/TIME: 7-18-96 1104	EA INSPECTOR: J. SHAPIRO
DRILLING METHOD & DEPTH: 5" FLUSH JOINT CASING, 4.875" ROLLERBIT TO 36', HX CORE 31'-36' BGS	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASUREMENTS IN FT. BELOW GROUND SURFACE)

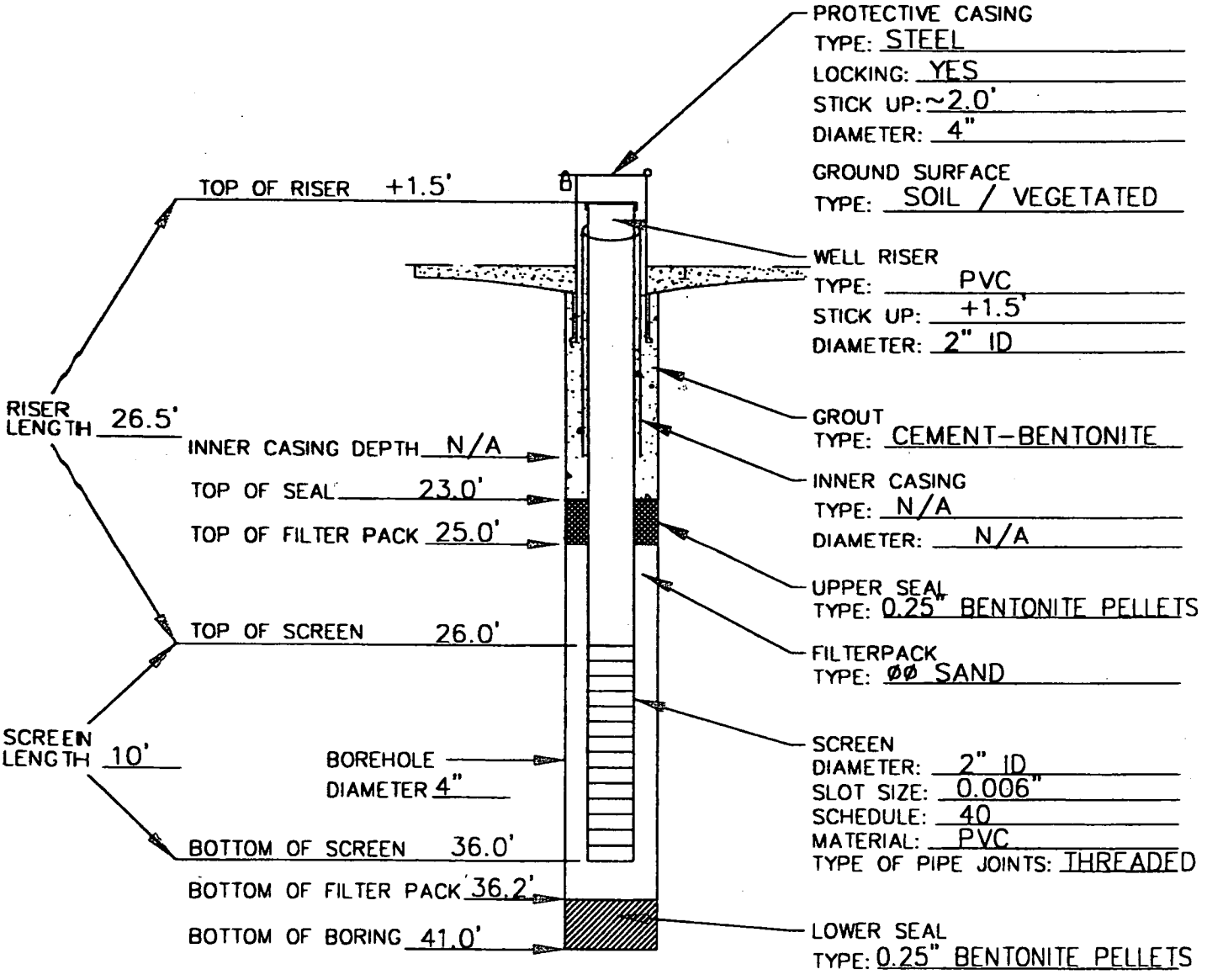
EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. F:\PROJECTS\29600.32\3213\CADD.DWG

MONITORING WELL CONSTRUCTION

EA-109

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, NIKE SITE SOURCE AREA CHARACTERIZATION	
DATE INSTALLED: 6-20-96	PROJECT No. 29600.32.3213
ELEVATION OF GROUND SURFACE: 31.89 ' MSL ELEVATION TOP OF WELL RISER: 33.39 ' MSL	COORDINATES: N: 194096.176 E: 518286.57
DEPTH TO WATER: 6.76' (BELOW GROUND SURFACE) DATE/TIME: 7-18-96 1107	EA INSPECTOR: D. STREET
DRILLING METHOD & DEPTH: 4" FLUSH JOINT CASING, 3.875" ROLLERBIT TO 36', HQ CORE 36'-41' BGS	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASUREMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. F:\PROJECTS\29600.32\3213\CAD0.DWG

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	38.08 ft
Riser Elevation:	37.50 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194555 E: 520460

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville				Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 5 in. ID FJ casing with 4 7/8 in. rollerbit					Boring No. MW01-08D
Sampling Method: 2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)					Sheet 1 of 4
					Drilling
Water Level:	19.93	19.48			Start: 10/05/95 08:30 AM
Time:	01:40 PM				Finish: 10/06/95 10:30 AM
Date:	10/10/95	11/09/95			
Reference:	Grade	TOR			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Pavement (rollerbitted through pavement prior to sampling)
SS	24 / 15	0	S-1 / 0-2	49.3	9, 10, 14, 21	0	SM	0-1" Yell/orange fine to medium sand, trace fine gravel, angular (A), dry. 1-15" Bands of yell/orange, olive gray and dark gray silty fine sand, trace gravel up to 1.5", most flat and sub-angular to sub-rounded (SA-SR), one blocky piece at tip of spoon, dry.
						1		
						2		
						3		
SS	24 / 3	4	S-2 / 4-6	47.3	4, 13, 14, 21	4	SM	Lt. brown and olive gray, silty fine to medium sand, wet.
						5		
						6		
						7		
						8		
SS	24 / 13	9	S-3 / 9-11	47.3	33, 23, 15, 21	9	GP/ SM	0-3" Lt. gray gravel up to 1", A, with little silty fine to coarse sand, wet. 3-13" Dk. gray silt with little medium sand to fine gravel, dry.
						10		**Sheen on recirculating water, no elevated HNu readings.
						11		
						12		
						13		
SS	24 / 13	14	S-4 / 14-16	49.3	16, 17, 15, 13	14	SM	0-3" Olive gray silty fine to medium sand, little coarse sand to fine gravel, flat, A, wet. 3-13" Yell/orange silty (some) medium to fine sand, little coarse gravel up to 1.5", blocky, SR-R (Rounded), wet.
						15		
						16		
						17		
						18		**Bottom of casing broke off at 14 ft - pulled off and started offset hole.
SS	24 / 16	19	S-5 / 19-21	45.3	19, 21, 20, 17	19	SM	0-6" Lt. Brown silty fine to medium sand, some coarse sand to fine gravel, trace coarse gravel up to 1", SA-SR, blocky, wet. 6-16" Dk. Brown silty fine sand to fine gravel, wet
						20		

Logged by: J. Shapiro Date: 10/05/95

Drilling Contractor: M & R Environmental Driller: P. Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser: 2 in. ID Screen Interval: 35-45 ft Sandpack: 33 ft - 46.5 ft bgs Grout: 0-31 ft bgs

Bottom of Hole: 53 ft Riser Interval: Grade - 35 ft bgs Bentonite: 31 ft - 33 ft bgs, 46.5 ft - 53 ft bgs Cover: Road box

Sample interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville		Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 5 in. ID FJ casing with 4 7/8 in. rollerbit			Boring No. MW01-08D
Sampling Method: 2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)			Sheet 2 of 4
			Drilling
Water Level:		Start	Finish
Time:			
Date:		10/05/95	10/06/95
Reference:		08:30 AM	10:30 AM

Surface Elevation: 38.08 ft
Riser Elevation: 37.50 ft
Reference Elevation: mean sea level
Coordinates: N: 194555 E: 520460

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions:
						20		
						21		
						22		
						23		
SS	24 / 6	24	S-6 / 24-26	49.2	7, 9, 10, 12	24, 25	SP	Olive gray fine to medium sand, wet.
						26		
						27		
						28		
SS	24 / 15	29	S-7 / 29-31	59.2	7, 6, 6, 8	29, 30	ML	0-6" Olive gray silt and very fine sand, wet. 6-15" Olive gray silt to fine sand, wet.
						31		
						32		
						33		
SS	24 / 12	29	S-8 / 34-36	57.2	4, 5, 7, 7	34, 35	SM/ SP	0-3" Olive gray silty fine sand, trace medium sand to fine gravel, wet. 3-12" Dark gray fine to medium sand, little silt, trace coarse sand to fine gravel, wet.
						36		
						37		
						38		
SS	24 / 11	29	S-9 / 39-41	57.2	4, 6, 7, 7	39, 40	SM	Alternating bands of dark gray silty fine sand with little medium sand and silty medium sand with little coarse sand, wet.

Logged by: J. Shapiro Date: 10/05/95

Drilling Contractor: M & R Environmental Driller: P. Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser: 2 in. ID
Bottom of Hole: 53 ft
Screen Interval: 35-45 ft
Riser Interval: Grade - 35 ft bgs
Sandpack: 33 ft - 46.5 ft bgs
Bentonite: 31 ft - 33 ft bgs
46.5 ft - 53 ft bgs
Grout: 0-31 ft bgs
Cover: Road box

Sample interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	38.08 ft
Riser Elevation:	37.50 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194555 E: 520460

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville		Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 5 in. ID FJ casing with 4 7/8 in. rollerbit			Boring No. MW01-08D
Sampling Method:	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)		Sheet 3 of 4

					Drilling Start	Drilling Finish
Water Level:						
Time:						
Date:					10/05/95	10/06/95
Reference:					08:30 AM	10:30 AM

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft		USCS Log	Surface Conditions:
						40			
						41			
						42			
						43			
	24		S-10		20	44		SM	Dark gray silty fine sand, little medium sand, trace coarse sand to gravel, up to 1",
SS	6	44	44-46	59.3	16				blocky, wet.
					11	45			
					7				
						46			
						47			Driller noted rock at approximately 46.5 ft, rollerbitted in 3 ft, cored 49-53 ft
									Bottom of hole = 53 ft
						48			
						49			
						50			
						51			
						52			
						53			
						54			
						55			
						56			
						57			
						58			
						59			
						60			

Logged by: J. Shapiro Date: 10/05/95

Drilling Contractor: M & R Environmental Driller: P. Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in. ID	Screen Interval:	35-45 ft	Sandpack:	33 ft - 46.5 ft bgs	Grout:	0-31 ft bgs
Bottom of Hole:	53 ft	Riser Interval:	Grade - 35 ft bgs	Bentonite:	31 ft - 33 ft bgs 46.5 ft - 53 ft bgs	Cover:	Road box

Sample interval

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	38.08 ft
Surface Elevation:	37.50 ft
Casing Above Surface:	mean sea level
Reference Elevation:	N: 194555 E: 520460

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville				Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 5 in. ID FJ casing 4 7/8" RB.					Boring No. MW01-08D
					Sheet 4 of 4
Core Bit Size:	HX Core bit (2.4")				Drilling Start / Finish
Water Level:	19.87				
Time:	10:30 AM				10/06/95 09:40 AM / 10/06/95 10:15 AM
Date:	10/06/95				
Reference:	Grade				

Core Run RQD % / Run #	REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	Surface Conditions: LITHOLOGIC LOG	DRILLING LOG: Core Footage	Time (mins)	Core Depth (ft)
					40					
					41					
					42					
					43					
					44					
					45					
					46					
					47					
					48					
Run #1					49		Medium gray, massive, fine-grained quartzite.	0-1	4:42	49-50
RQD =56% 2.1/3.8					50		Predominantly quartz with dark minerals (some biotite), little mica.	1-2	5:00	50-51
REC = 95% 3.8/4.0					51		Approx. 49.5 to 51 ft interval, broken pieces of rock.	2-3	10:00	51-52
					52		Two fractures between 51 and 52 ft interval; calcite prese	3-4	8:40	52-53
					53					
					54					
					55					
					56					
					57					
					58					
					59					
					60					

Logged by: J. Shapiro Date: 10/06/95

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

Core Run Interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville				Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 5 in. ID FJ casing and 4 7/8 in. rollerbit.					Boring No. MW01-09D
Sampling Method: 2" diameter split-barrel sampler driven 24" by 300-lb hammer falling 30" (SS)					Sheet 1 of 4
Water Level:	22.55				Drilling Start: 10/11/95 10:00 AM
Time:	07:45 AM				Drilling Finish: 10/12/95 09:20 AM
Date:	10/12/95				
Reference:	Grade				

Surface Elevation: 39.72 ft
Riser Elevation: 39.18 ft
Reference Elevation: mean sea level
Coordinates: N: 194498 E: 520719

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Pavement (rollerbitted through pavement prior to sampling)
SS	24 / 4	0	S-1 0-2	0.0	6 / 5	0	SM	0-2" Olive gray silty fine and medium sand, dry.
					5 / 3	1		2-4" Light gray silty fine sand, dry.
						2		@2" fissile, flat gravel up to 1"
						3		
SS	24 / 8	0	S-2 4-6	0.0	2 / 2	4	GM	Olive gray silt, some fine sand to fine gravel, trace coarse gravel up to 1",
					4 / 3	5		Sub-angular (SA), dry.
						6		
						7		
						8		
SS	24 / 18	9	S-3 9-11	0.0	4 / 7	9	SM	0-6" Olive gray silt, band of fine sand @2.5-3", moist.
					8 / 6	10		6-9" Olive gray silt, some fine sand to gravel up to 1", SA, moist.
						11		9-18" Lt. brown silty fine to medium sand, some coarse sand to gravel up to 1",
						12		blocky, Sub-angular to sub-rounded (SA-SR), moist.
						13		
SS	24 / 9	14	S-4 14-16	1.4	4 / 7	14	SM	Lt. brown and olive gray, silt to medium sand, some coarse sand to gravel
					7 / 7	15		up to 2", blocky, SA-SR, wet.
						16		
						17		
						18		
SS	24 / 5	19	S-5 19-21	0.0	5 / 6	19	SM	No recovery on 1st attempt - sent spoon back down.
					6 / 6	20		Olive gray silt to medium sand, little coarse sand, wet. Large piece of
								gravel, 1", Angular (A), at top of spoon.

Logged by: J. Shapiro Date: 10/11/95

Drilling Contractor: M & R Environmental Driller: P. Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser: 2 in. PVC Screen Interval: 37.5 ft - 41.5 ft bgs Sandpack: 36.5 ft - 42 ft bgs Grout: 0 - 34.5 ft bgs

Bottom of Hole: 48 ft bgs Riser Interval: Grade - 37.5 ft bgs Bentonite: 34.5 ft - 36.5 ft bgs, 42 ft - 48 ft bgs Cover: Road box

▨ Sample interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	39.72 ft
Riser Elevation:	39.18 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194498 E: 520719

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville			Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 5 in. ID FJ casing and 4 7/8 in. rollerbit.				Boring No. MW01-09D
Sampling Method: 2" diameter split-barrel sampler driven 24" by 300-lb hammer falling 30" (SS)				Sheet 2 of 4
				Drilling Start: 10/11/95 10:00 AM; Finish: 10/12/95 09:20 AM
Water Level: 22.55				
Time: 07:45 AM				
Date: 10/12/95				
Reference: Grade				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Pavement (rollerbitted through pavement prior to sampling)
						20		
						21		
						22		
						23		
SS	24 / 11	24	S-6 / 24-26	0.4	6 / 9 / 7 / 5	24 / 25	SM	0-2" Lt. yell/orange silty fine sand, trace medium sand, wet. 2-4" Olive gray silt, some fine sand, wet. 4-6" Lt. brown silty fine sand, wet. 6-8" Rust orange silty fine sand, wet.
						26		8-11" Lt. brown silty fine sand, wet.
						27		
						28		
SS	24 / 19	29	S-7 / 29-31	0.0	5 / 9 / 15 / 18	29 / 30	SM	Olive gray silt to fine sand, moist (shoe is wet).
						31		
						32		
						33		
SS	24 / 16	34	S-8 / 34-36	0.6	5 / 7 / 9 / 12	34 / 35	SM	0-13" Olive gray silt, moist to wet (some fine sand in top 1"). 13-16" Olive gray silt to medium sand, wet.
						36		
						37		
						38		
SS	24 / 8	39	S-9 / 39-41	0.0	6 / 6 / 13 / 11	39 / 40	GM	Olive gray silt to gravel up to 1", some blocky, some fissile, SA, wet. (TILL; bottom of spoon possibly weathered rock).

Logged by: J. Shapiro Date: 10/11/95

Drilling Contractor: M & R Environmental Driller: P. Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser: 2 in. PVC Screen Interval: 37.5 ft - 41.5 ft bgs Sandpack: 36.5 ft - 42 ft bgs Grout: 0 - 34.5 ft bgs

Bottom of Hole: 48 ft bgs Riser Interval: Grade - 37.5 ft bgs Bentonite: 34.5 ft - 36.5 ft bgs, 42 ft - 48 ft bgs Cover: Road box

Sample interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville				Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 5 in. ID FJ casing and 4 7/8 in. rollerbit.					Boring No. MW01-09D
Sampling Method: 2" diameter split-barrel sampler driven 24" by 300-lb hammer falling 30" (SS)					Sheet 3 of 4
					Drilling
Water Level:	22.55				Start: 10/11/95 10:00 AM; Finish: 10/12/95 09:20 AM
Time:	07:45 AM				
Date:	10/12/95				
Reference:	Grade				

Surface Elevation: 39.72 ft
Riser Elevation: 39.18 ft
Reference Elevation: mean sea level
Coordinates: N: 194498 E: 520719

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft		USCS Log	Surface Conditions: Pavement (rollerbitted through pavement prior to sampling)
						40			
						41			
						42			Driller noted change to rock at 42 ft bgs, rollerbitted to 43 ft bgs., cored 43 to 48 ft bgs.
						43			Bottom of hole = 48 ft
						44			
						45			
						46			
						47			
						48			
						49			
						50			
						51			
						52			
						53			
						54			
						55			
						56			
						57			
						58			
						59			
						60			

Logged by: J. Shapiro Date: 10/11/95

Drilling Contractor: M & R Environmental Driller: P. Thornsbury

WELL SPECIFICATIONS:

Dia. of Riser: 2 in. PVC Screen Interval: 37.5 ft - 41.5 ft bgs Sandpack: 36.5 ft - 42 ft bgs Grout: 0 - 34.5 ft bgs

Bottom of Hole: 48 ft bgs Riser Interval: Grade - 37.5 ft bgs Bentonite: 34.5 ft - 36.5 ft bgs, 42 ft - 48 ft bgs Cover: Road box

▨ Sample interval

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	39.72 ft
Surface Elevation:	39.18 ft
Casing Above Surface:	mean sea level
Reference Elevation:	N: 194498 E: 520719

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville		Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 5 in. ID FJ casing 4 7/8" RB.			Boring No. MW01-09D
			Sheet 4 of 4

					Drilling	
Core Bit Size:	HX Core bit (2.4")				Start	Finish
Water Level:						
Time:						
Date:					10/12/95	10/12/95
Reference:					08:40 AM	09:20 AM

Core Run RQD % / Run #	REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	Surface Conditions: LITHOLOGIC LOG	DRILLING LOG: Core Footage	Time (mins)	Core Depth (ft)
					40					
					41					
					42					
Run #1					43		Medium gray, massive, fine-grained, quartzite.	0-1	4:00	43-44
RQD = 100% 5.0'/5.0'							Predominantly quartz with biotite, and feldspar (?).			
					44		Competent.	1-2	4:30	44-45
					45		Low angle fracture at approximately 46 ft	2-3	4:15	45-46
REC = 100% 5.0'/5.0'					46			3-4	4:00	46-47
					47			4-5	4:20	47-48
					48					
					49					
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					
					60					

Logged by: J. Shapiro Date: 10/06/95

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

Core Run Interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	24.68 ft
Riser Elevation:	26.29 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194988 E: 521372

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville				Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - 4 in. flush jointed casing/rollerbit - drive & wash - NX core					Boring No. MW01-13D
Sampling Method: 2 " diameter split-barrel sampler "Standard" driven 24" by a 140-lb hammer falling 30" (SS)					Sheet 1 of 4
					Drilling
Water Level:	14.7	15.54			Start: 10/06/95
Time:	0930	0750			Finish: 10/12/95
Date:	10/09/95	10/18/95			
Reference:	at grade	at grade			1110 / 1030

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft		USCS Log	Surface Conditions: Soil
2 in. S.S.	24 / 19		S - 1 / 0 - 2	0	1 3				0 - 2" Organic duff, leaves, roots, dk. brown, moist 2 - 8" Loam, brown, dry
					4 4	1		SP	8 - 19" Medium sand, brown, moist, loose
						2			
						3			
2 in. S.S.	24 / 6		S - 2 / 4 - 6	0	15 20	4		SP	0 - 2" Medium sand, dk. gray, wet 2 - 6" Medium sand, tan to brown, wet, medium dense
					14 14	5			
						6			
						7			
						8			
2 in. S.S.	24 / 9		S - 3 / 9 - 11	4	15 11	9		SP	0 - 2" Coarse sand, wet (wash) 2 - 6" Medium sand and fine to coarse gravel, dk. brown to brown, wet
					14 11	10			6 - 9" Fine to medium sand, lt. tan to gray, slightly moist, medium dense
						11			
						12			
						13			
2 in. S.S.	24 / 13		S - 4 / 14 -16	0	25 25	14		SP/	0 - 1" Coarse sand, dk. gray, wet (wash) 1 - 8" Very fine sand and silt w/ little fine gravel, dk. gray, moist
					20 23	15		SM	8 - 13" As above - color grades from rust to tan in distinctive layers (1/8 to 1/4") w/ two 1" lenses of medium sand @ 8" & 10.5", dk. gray, moist, dense
						16			
						17			
						18			
2 in. S.S.	24 / 9		S - 5 / 19 - 24	0	16 12	19		SP	0 - 1" Coarse sand and gravel (wash) 1 - 9" Medium to coarse sand, dk. gray, wet w/ few, small rust colored mottles
					11 12	20			medium dense

Logged by: Paul W. Higgins Date: 11/17/95

Drilling Contractor: M & R Environmental Drilling Driller: Brad Haase / Bob Barbery

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	64 - 74 ft.	Sandpack:	62 - 75 ft.	Grout:	0 - 60 ft.
Bottom of Hole:	82 ft.	Riser Interval:	~+1.5 - 64 ft.	Bentonite:	60 - 62 & 75 - 82 ft.	Cover:	Steel casin

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville		Location: IR Program Site 01
Drilling Method: See Page # 1			Boring No. MW01-13D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)		Sheet 2 of 4
			Drilling
Water Level:		Start	Finish
Time:			
Date:			
Reference:			

Surface Elevation: _____
Riser Elevation: _____
Reference Elevation: _____
Coordinates: _____

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions:
						21		
						22		
						23		
2 in. S.S	24 11		S - 6 24 - 26	0	9 13	24	SW	0 - 1" Coarse sand (wash) 1 - 11" Medium to coarse sand w/ trace fine gravel, dk. gray, wet
					11 12	25		few small rust colored mottles, medium dense
						26		
						27		
						28		
2 in. S.S	24 13		S - 7 29 - 31	0	9 14	29	SP	0 - 3" Medium to coarse sand, (wash) 3 - 5" Medium sand, gray, wet, grading into fine sand, gray to brown, wet
					14 18	30		5 - 7" Silt and very fine sand, gray, wet 7 - 8" Medium sand, rust colored, wet
						31	SM	8 - 13" Silt to fine sand, gray, moist, dense
						32		
						33		
2 in. S.S.	24 11		S - 8 34 - 36	0	6 17	34	SP	0 - 11" Fine sand, gray, moist, dense
					19 23	35		
						36		
						37		
						38		
2 in. S.S	24 13		S - 9 39 - 41	0	8 20	39	ML	0 - 3" Fine sand, gray, moist 3 - 9.5" Silt w/ trace very fine sand, dk. gray, moist to wet
					20 19	40	SP	9.5 - 13" Medium sand, dk. gray, moist to wet, dense
						41		

Logged by: Paul W. Higgins Date: 11/17/95

Drilling Contractor: _____ Driller: _____

WELL SPECIFICATIONS:

Diam. of Riser: _____ Screen Interval: _____ Sandpack: _____ Grout: _____

Bottom of Hole: _____ Riser Interval: _____ Bentonite: _____ Cover: _____

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville		Location: IR Program Site 01
Drilling Method: See Page # 1			Boring No. MW01-13D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)		Sheet 3 of 4
			Drilling: Start / Finish

Surface Elevation:
Riser Elevation:
Reference Elevation:
Coordinates:

Water Level:					
Time:					
Date:					
Reference:					

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft		USCS Log	Surface Conditions:
						42			
						43			
2 in. S.S.	24 17		S - 10 44 - 46	0	11 16	44		ML	0 - 14" Silt, dk. gray, moist w/ many very thin layers of silt (1/16 - 1/8") 14 - 17" Silt dk. gray, moist, grading into a very fine sand, dk. gray, moist, dense
					19 27	45			
						46			
						47			
						48			
2 in. S.S	24 14		S - 11 49 - 51	0	11 19	49		ML	0 - 1" Silt, gray, wet (wash) 1 - 14" Silt, dk. gray, wet w/ minor zones of very fine sand and silt in small clumps and lenses, lt. gray, wet, dense
					21 24	50			
						51			
						52			
						53			
2 in. S.S.	24 2		S - 12 54 - 56	0	6 12	54		ML	0 - 2" Silt, gray, wet, medium dense
					11 12	55			
						56			
						57			
						58			
2 in. S.S.	24 9		S - 13 59-61	0	30 55	59		GM	0 - 9" Fine to coarse sand w/ little fine and coarse gravel, dk. gray, moist (till) very dense
					48 60	60			
						61			
						62			

Logged by: Paul W. Higgins Date: 11/17/95

Drilling Contractor: Driller:

WELL SPECIFICATIONS:

Diam. of Riser: Screen Interval: Sandpack: Grout:
Bottom of Hole: Riser Interval: Bentonite: Cover:

Sample interval
Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville		Location: IR Program Site 01
Drilling Method: See Page # 1			Boring No. MW01-13D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)		Sheet 4 of 4
			Drilling: Start / Finish

Surface Elevation:
Riser Elevation:
Reference Elevation: mean sea level
Coordinates:

	Water Level:	Time:	Date:	Reference:

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions:
						63		
					30	64		
2 in. S.S.	24 / 11		S - 14 / 64 - 66	1	45 / 40 / 51	65	GM	0 - 1" Gravel (wash) 1 - 11" Fine to coarse sand w/ little fine and coarse gravel, gray, wet (till) very dense
						66		
						67		
						68		
					45	69		0 - 1" Coarse sand w/ rock frags (wash)
2 in. S.S.	24 / 10		S - 15 / 69 - 71	0	30 / 25 / 30	70	GM	1 - 10" Fine to coarse sand w/ little fine gravel, gray, wet, very dense (till)
						71		
						72		
						73		
					47	74		0 - 1" Till, wet (wash)
2 in. S.S.	24 / 8		S - 16 / 74 - 76	0	46 / 110/3"	75	SM	1 - 8" Very fine to fine sand, dk. gray, wet, very dense
						76		Refusal @ ~75'
						77		Rollerbit to 77'
						78		Cored to 82'
						79		See Log of Core Boring for bedrock description
						80		See Monitoring Well Construction Form for well installation description
						81		
						82		Bottom of hole @ 82'

Logged by: Paul W. Higgins Date: 11/17/95

Drilling Contractor: _____ Driller: _____

WELL SPECIFICATIONS:

Diam. of Riser: _____ Screen Interval: _____ Sandpack: _____ Grout: _____

Bottom of Hole: _____ Riser Interval: _____ Bentonite: _____ Cover: _____

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194988 E: 521372
Surface Elevation:	24.68 ft
Riser Elevation:	26.29 ft
Reference Elevation:	mean sea level

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville				Location: IR Program Site 01	
Drilling Method: Mobil B-61 Rig - using 4" I.D. FJ Casing and 4 7/8" Rollerbit.					Boring No. MW01-13D	
					Sheet 1 of 1	
					Drilling	
Core Bit Size:	HX Core bit (2.4")				Start	Finish
Water Level:	15.54				10/10/95	10/10/95
Time:	0750				1330	1355
Date:	10/18/95					
Reference:	grade					

Core Run RQD % / Run #	REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	Surface Conditions: LITHOLOGIC LOG	DRILLING LOG: Core Footage	Time (mins)	Core Depth
					63					
					64					
					65					
					66					
					67					
					68					
					69					
					70					
					71					
					72					
					73					
					74					
					75					
					76					
Run # 1 RQD = 40% (12" for 30") Rec. = 50% (30" for 60")			Banding @ 0 deg.	Qtz w/ Chlorite	77		0-7"- coarse grained quartzite, light tan fracture @ 7" (rust stained), massive w/ biotite, feldspars	0 - 1	1:00	77-78
					78		7-8"- zone of phyllite, dark gray, very fine grained	1 - 2	0:40	78-79
					79		8-30"- medium grained quartzite w/ minor zones of fine grained quartzite w/ some shale/phyllite mixed in w/ dk. gray/black bands II to CA	2 - 3	1:15	79-80
					80		25-30"- core is broken into 2-3" frags w/ some qtz & chlorite healed fratures	3 - 4	2:05	80-81
					81			4 - 5	2:45	81-82
					82					
					83					

Logged by: Paul W. Higgins

Date: 10 October, 1995

Drilling Contractor: M & R Environmental Drilling

Driller: Brad Haase / Bob Barbery

Core Run Interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	36.25 ft
Riser Elevation:	37.62 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194691 E: 521358

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	IR Program Site 01
Drilling Method: Mobile B-61 Rig - 4 in. flush jointed casing/rollerbit - drive & wash - NX coring		Boring No. MW01-14D
Sampling Method: "Standard" 2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)		Sheet 1 of 5
		Drilling

					Start	Finish
Water Level:	25.5	24.5	21.0	22.79		
Time:	0830	0750	0900	0800	02-Oct-95	05-Oct-95
Date:	10/03/95	10/05/95	10/06/95	10/18/95		
Reference:	at grade	at grade	at grade	at grade	12:00 PM	10:25 AM

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Grass, adjacent to a paved driveway
2 in. S.S.	24 15		S - 1 0 - 2	0	4 7			0 - 3" Organic duff intermixed w/ loam, brown, dry 3 - 9" Loam, brown, dry
					7 7	1	SW	9 - 15" Medium to coarse sand w/ some fine gravel, dk. brown, dry (fill) medium dense
						2		
						3		
2 in. S.S.	24 10		S - 2 4 - 6	0	10 7	4	SW	0 - 2" Fine sand w/ some coarse gravel, olive to brown, dry 2 - 10" Medium to coarse sand w/ some fine gravel, brown to dk. brown, dry
					6 7	5		medium dense
						6		
						7		
						8		
2 in. S.S.	24 14		S - 3 9 - 11	0	19 23	9		0 - 6" Coarse sand w/ some medium sand, some coarse gravel, dk. brown to gray, wet (wash)
					27 17	10	SW	6 - 10" Medium to coarse sand w/ trace fine gravel, lt. gray to black layers (gleyed), dry, dense
						11		10 - 12" Medium to coarse sand, brown, dry, w/ few small iron oxide stained (rust colored) mottles, dense
						12		12 - 14" Coarse sand and fine gravel w/ little fine to medium sand, gray, dry, dense
						13		
2 in. S.S.	24 8		S - 4 14 - 16	0	60 110/4"	14	SW	0 - 8" Medium sand to coarse gravel w/ little fine sand gray to dk. brown, moist, w/ few iron oxide (rusty) mottles, very dense
						15		
						16		
						17		
						18		
2 in. S.S.	24 12		S - 5 19 - 21	0	28 26	19	SW	0 - 5" Medium sand to coarse gravel, lt. tan to gray, wet 5 - 12" As above, moist w/ few small iron oxide colored mottles, very dense
					34 17	20		

Logged by: Paul W. Higgins Date: 11/20/95

Drilling Contractor: M & R Environmental Drilling Driller: Brad Haase / Bob Barbery

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	81 - 89 ft.	Sandpack:	79 - 90 ft.	Grout:	0 - 76 ft.
Bottom of Hole:	100 ft.	Riser Interval:	~ + 1.5 - 81 ft.	Bentonite:	76 - 79 & 90 - 100 ft.	Cover:	Steel casin

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Techn logy, Inc.

LOG OF SOIL BORING

Surface Elevation: _____
Riser Elevation: _____
Reference Elevation: _____
Coordinates: _____

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	IR Program Site 01
Drilling Method: See Page # 1		Boring No. MW01-14D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)	Sheet 2 of 5
		Drilling Start / Finish

Water Level:				
Time:				
Date:				
Reference:				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions:
						21		
						22		
						23		
2 in. S.S.	24 / 14		S - 6 / 24 - 26	0	20 / 83	24		0 - 2" Medium to coarse sand, wet (wash)
					94 / 61	25	SW	2 - 6" Fine to medium sand w/ little fine gravel , dk. brown, moist
						26		6 - 14" Medium sand w/ little fine fine gravel, trace fine sand, trace coarse sand
						27		few small mottles(?) -fine sand lenses from 12 - 14", red to brown
						28		very dense
2 in. S.S.	24 / 15		S - 7 / 29 - 31	0	26 / 23	29		0 - 2" Medium to coarse sand, trace fine gravel, reddish tan, wet (wash)
					18 / 15	30	SW	2 - 10" Fine to medium sand w/ little coarse sand to coarse gravel
						31		red to tan to black staining, moist, dense
						32		10 - 15" Coarse sand w/ trace fine gravel, color grades from tan to dk. gray/black,
						33		moist, dense
2 in. S.S.	24 / 13		S - 8 / 34 - 36	0	33 / 32	34		0 - 4" Medium to coarse sand w/ trace fine gravel, dk. brown, wet
					32 / 40	35	SW	4 - 8" Medium to coarse sand w/ little fine gravel, tan to rusty yellow, wet
						36		8 - 13" Coarse sand w/ litle fine to medium sand, dk. brown, wet, dense
						37		
						38		
2 in. S.S.	24 / 14		S - 9 / 39 - 41	None Taken	10 / 14	39		0 - 2" Silt w/ some fine to coarse gravel, gray, wet (wash)
					13 / 17	40	SP	2 - 14" Fine sand, gray, moist, medium dense
						41		From 3 - 5" fine to medium sand

Logged by: Paul W. Higgins Date: 11/20/95

Drilling Contractor: _____ Driller: _____

WELL SPECIFICATIONS:

Diam. of Riser: _____ Screen Interval: _____ Sandpack: _____ Grout: _____

Bottom of Hole: _____ Riser Interval: _____ Bentonite: _____ Cover: _____

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation: _____
Riser Elevation: _____
Reference Elevation: _____
Coordinates: _____

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	IR program Site 01
Drilling Method: See Page # 1		Boring No. MW01-14D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)	Sheet 3 of 5
		Drilling Start / Finish
Water Level:		
Time:		
Date:		
Reference:		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions:
						42		
						43		
2 in. S.S.	24 / 12		S - 9 44 - 46	0	15 / 18	44	SP	0 - 9" Medium sand, gray, moist
					22 / 24	45		9 - 12" Fine sand, gray, moist, dense
						46		
						47		
						48		
2 in. S.S.	24 / 13		S - 10 49 - 51	0	15 / 18	49		0 - 2" Medium sand, brown to gray, wet (wash)
					20 / 18	50	SP	2 - 5" Medium sand, dk. gray, moist
						51		5 - 13" Fine sand, gray, moist w/ 2 lenses of very fine sand, dk. gray, moist @ 5-5.5 & 9.5-10", slowly grades into a very fine sand at bottom of spoon dense
						52		
						53		
2 in. S.S	24 / 15		S - 11 54 - 56	0	13 / 21	54	SP	0 - 3" Fine sand ,gray, wet (wash)
					26 / 40	55	SM	3 - 10" Very fine sand, gray , moist
						56		10 - 12" Silt to very fine sand , gray, moist, dense
						57		12 - 15" Very fine sand, gray to olive gray, moist, dense
						58		
2 in. S.S.	24 / 15		S - 12 59 - 61	0	23 / 30	59		0 - 3" Fine Sand, gray, wet (wash)
					40 / 57	60	ML	3 - 15" Silt, dk. gray, wet, very dense
						61		
						62		

Logged by: Paul W. Higgins Date: 11/20/95

Drilling Contractor: _____ Driller: _____

WELL SPECIFICATIONS:

Diam. of Riser: _____ Screen Interval: _____ Sandpack: _____ Grout: _____

Bottom of Hole: _____ Riser Interval: _____ Bentonite: _____ Cover: _____

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and T chnology, Inc.

LOG OF SOIL BORING

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville		Location: IR Program S ite 01
Drilling Method: See Page # 1			Boring No. MW01-14D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)		Sheet 4 of 5
			Drilling Start / Finish
Water Level:			
Time:			
Date:			
Reference:			

Surface Elevation:
Riser Elevation:
Reference Elevation:
Coordinates:

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions:
						63		
						64		
2 in. S.S.	24 / 12		S - 13 64 - 66	0	23 / 30 / 40 / 57	65 / 66	ML / SM	0 - 3" Medium sand, lt. gray, wet (wash) 3 - 11" Silt, dk. gray, moist, very dense 11 - 11.25" Silty clay lense, olive gray, moist 11.25 - 12" Fine sand, dk. gray, moist
						67		
						68		
						69		
2 in. S.S.	24 / 12		S - 14 69 - 71	0	18 / 25 / 33 / 43	70 / 71	SM	0 - 2" Medium sand, gray, moist (wash) 2 - 12" Silt w/ trace very fine sand, dk. gray, moist, very dense from 9 - 10" fine sand lense , lt. gray, moist
						72		
						73		
						74		
2 in. S.S.	24 / 16		S-15 74 - 76	0	11 / 18 / 20 / 30	75 / 76	SM	0 - 1" Very fine to fine sand,gray, wet (wash) 1 - 8" Silt w/ trace very fine sand, gray, wet, dense 8 - 16" Silt to very fine sand, gray, moist, dense
						77		
						78		
						79		
2 in. S.S.	24 / 17		S - 16 79 - 81	0.2	8 / 17 / 28 / 38	80 / 81	ML	0 - 16" Silt, dk. gray, wet 16 - 17" Silt w/ trace fine gravel, dk. gray, wet, very dense
						82		

Logged by: Paul W. Higgins Date: 11/20/95

Drilling Contractor: Driller:

WELL SPECIFICATIONS:

Diam. of Riser: Screen Interval: Sandpack: Grout:

Bottom of Hole: Riser Interval: Bentonite: Cover:

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:
Riser Elevation:
Reference Elevation:
Coordinates:

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	IR program Site 01
Drilling Method: See Page # 1		Boring No. MW01-14D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)	Sheet 5 of 5

					Drilling	
Water Level:					Start	Finish
Time:						
Date:						
Reference:						

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft		USCS Log	Surface Conditions:
						83			
2 in. S.S.	24 13		S - 17 84 - 86	0	39 27	84			0 - 3" Medium sand to coarse gravel, dk gray, wet (wash)
					34 46	85		SW	3 - 7" Medium sand w/ little coarse sand , trace fine gravel, dk. gray, moist to wet
						86			7 - 13" Medium to coarse sand w/ trace fine to coarse gravel, dk. gray, moist, very dense
						87			
						88			
2 in. S.S.	24 6		S - 18 89 - 91	0	70 110/3"	89			0 - 1" Gravel w/ some coarse sand (wash)
						90		GM	1 - 3" Medium to coarse sand w/ some rock frags (1/4 - 1/2") weathered bdrock ? lt. gray to gray,slightly moist - iron oxide staining in clumps (weathered rock ?)
						91			3 - 6" Weathered rock fragments w/ some coarse sand, lt. gray to rust colored moist, very dense
						92			
						93			
2 in. S.S.	24 9		S - 19 94 - 96	0	67 71	94		GM	0 - 5" Weathered rock, lt. gray, some iron oxide staining in fractures w/ some medium to coarse sand, brown, (in fracture zones), very dense
					110/1"	95			5 - 7" Weathered rock , lt. gray to rust colored w/ areas of silty clay within the more weathered zones
						96		SP	7 - 9" Medium to coarse sand, brown to dk. brown, wet, very dense
						97			
						98			Refusal @ 95'
						99			Rollerbit to 98'
						100			HQ core to 100'
						101			Bottom of Hole @ 100 feet
						102			See Log of Core Boring for bedrock description
						103			See Monitoring Well Construction Form for well installation details

Logged by: Paul W. Higgins Date: 11/20/95

Drilling Contractor: Driller:

WELL SPECIFICATIONS:

Diam. of Riser: Screen Interval: Sandpack: Grout:
Bottom of Hole: Riser Interval: Bentonite: Cover:

Sample interval
Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194691 E: 521358
Surface Elevation:	36.25 ft
Riser Elevation:	37.62 ft
Reference Elevation:	mean sea level

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville			Location: IR Program Site O1
Drilling Method: Mobil B-61 Rig - using 4" I.D. FJ Casing and 4 7/8" Rollerbit.				Boring No. MW01-14D
				Sheet 1 of 1
				Drilling
Core Bit Size:	HX Core bit (2.4")			Start / Finish
Water Level:	23.92'			10/04/95 / 10/04/95
Time:	800			1050 / 1200
Date:	10/18/95			
Reference:	T.O.R.			

Core Run RQD % / Run #	Core Run REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG
					83		Surface Conditions:	
					84			
					85			
					86			
					87			
					88			
					89			
					90			
					91			
					92			
					93			
					94			
					95			
					96			
					97			Core Footage / Time (mins) / Core Depth
Run # 1					98		0-3.5"- Dark gray phyllite - very fine grained, fracture	0 - 1 / 3:00 / 98-99
			Frac @	Qtz w/			@ 2" partially healed w/ qtz-some rusty staining	
RQD = 75%			45-60 deg.	Chlorite	99		3.5-15"- gray phyllite w/ bands of darker rock, quartz	1 - 2 / 2:50 / 99-100
(18" for 24")			to CA	some			healed fractures from 5-8", some w/ small vugs & qtz	
				Talc	100		x-tals.	
Rec. = 100%							15-24"- dk. gray phyllite w/ fracture zone from 18-22"	
(24 " for 24")					101		1 open fracture (1/8") w/ rust staining, most qtz healed	
							some chlorite associated w/ the qtz.	
					102			
					103			

Logged by: Paul W. Higgins Date: 04 October, 1995

Drilling Contractor: M & R Environmental Drilling Driller: Brad Haase / Bob Barbery

Core Run Interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:
Riser Elevation:
Reference Elevation:
Coordinates:

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	IR program Site 01
Drilling Method: See Page # 1		Boring No. MW01-14D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)	Sheet 5 of 5
Water Level:		Drilling Start / Finish
Time:		
Date:		
Reference:		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft		USCS Log	Surface Conditions:
						83			
2 in. S.S.	24 / 13		S - 17 84 - 86	0	39 / 27	84			0 - 3" Medium sand to coarse gravel, dk gray, wet (wash)
					34 / 46	85		SW	3 - 7" Medium sand w/ little coarse sand , trace fine gravel, dk. gray, moist to wet
						86			7 - 13" Medium to coarse sand w/ trace fine to coarse gravel, dk. gray, moist, very dense
						87			
						88			
2 in. S.S.	24 / 6		S - 18 89 - 91	0	70 / 110/3"	89			0 - 1" Gravel w/ some coarse sand (wash)
						90		GM	1 - 3" Medium to coarse sand w/ some rock frags (1/4 - 1/2") weathered bdrock ? lt. gray to gray,slightly moist - iron oxide staining in clumps (weathered rock ?)
						91			3 - 6" Weathered rock fragments w/ some coarse sand, lt. gray to rust colored moist, very dense
						92			
						93			
2 in. S.S.	24 / 9		S - 19 94 - 96	0	67 / 71 / 110/1"	94		GM	0 - 5" Weathered rock, lt. gray, some iron oxide staining in fractures w/ some medium to coarse sand, brown, (in fracture zones), very dense
						95			5 - 7" Weathered rock , lt. gray to rust colored w/ areas of silty clay within the more weathered zones
						96		SP	7 - 9" Medium to coarse sand, brown to dk. brown, wet, very dense
						97			
						98			Refusal @ 95'
						99			Rollerbit to 98'
						100			HQ core to 100'
						101			Bottom of Hole @ 100 feet
						102			See Log of Core Boring for bedrock description
						103			See Monitoring Well Construction Form for well installation details

Logged by: Paul W. Higgins Date: 11/20/95

Drilling Contractor: Driller:

WELL SPECIFICATIONS:

Diam. of Riser: Screen Interval: Sandpack: Grout:

Bottom of Hole: Riser Interval: Bentonite: Cover:

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194691 E: 521358
Surface Elevation:	36.25 ft
Riser Elevation:	37.62 ft
Reference Elevation:	mean sea level

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville				Location: IR Program Site 01
Drilling Method: Mobil B-61 Rig - using 4" I.D. FJ Casing and 4 7/8" Rollerbit.					Boring No. MW01-14D
					Sheet 1 of 1
					Drilling: Start / Finish
Core Bit Size:	HX Core bit (2.4")				
Water Level:	23.92'				10/04/95 / 10/04/95
Time:	800				1050 / 1200
Date:	10/18/95				
Reference:	T.O.R.				

Core Run RQD % / Run #	Core Run REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG
					83		Surface Conditions:	
					84			
					85			
					86			
					87			
					88			
					89			
					90			
					91			
					92			
					93			
					94			
					95			
					96			
					97			Core Footage / Time (mins) / Core Depth
Run # 1					98		0-3.5"- Dark gray phyllite - very fine grained, fracture	0 - 1 / 3:00 / 98-99
			Frac @	Qtz w/			@ 2" partially healed w/ qtz-some rusty staining	
RQD = 75%			45-60 deg.	Chlorite	99		3.5-15"- gray phyllite w/ bands of darker rock, quartz	1 - 2 / 2:50 / 99-100
(18" for 24")			to CA	some			healed fractures from 5-8", some w/ small vugs & qtz	
				Talc	100		x-tals.	
Rec. = 100%							15-24"- dk. gray phyllite w/ fracture zone from 18-22"	
(24 " for 24")					101		1 open fracture (1/8") w/ rust staining, most qtz healed	
							some chlorite associated w/ the qtz.	
					102			
					103			

Logged by: Paul W. Higgins Date: 04 October, 1995

Drilling Contractor: M & R Environmental Drilling Driller: Brad Haase / Bob Barbery

Core Run Interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	32.76 ft
Riser Elevation:	32.39 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194858 E: 520699

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville			Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 4 " and 5" ID FJ casing and 3 7/8 in. and 4 7/8 in. rollerbit.				Boring No. MW01-15D
Sampling Method: 2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)				Sheet 1 of 4
				Drilling
Water Level:				Start: 10/12/95 02:20 PM
Time:				Finish: 10/13/95 11:30 AM
Date:				
Reference:				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Pavement (rollerbitted through pavement prior to sampling)
	24		S-1		7	0	SP/	0-6" Olive gray fine to medium sand, trace to little silt, little coarse sand to gravel
SS	14	0	0-2	6.6	21		SW	up to 1", sub-angular to sub-round, (SA-SR), dry.
					17	1		6-10" Lt. yell/orange fine to coarse sand, trace silt, trace fine gravel up to 0.75",
					20			SA-SR, dry.
						2		10-14" Olive gray fine to medium sand, little to some coarse sand to fine gravel,
								little silt, dry.
						3		
	24		S-2		5	4	SM	0-8" Olive gray silty fine sand, trace medium to coarse sand, trace organics, dry.
SS	19	4	4-6	3.2	4			8-12" Dk. brown silty fine sand, dry.
					8	5		12-19" Lt. brown with some rust colored spots from 12-14", silty fine sand, little
					7			medium to coarse sand, dry to moist, tip of spoon wet.
						6		
						7		
						8		
	24		S-3		15	9	GM/	0-7" Olive gray silt, some medium sand to gravel up to 1.5", blocky, SA-SR, wet.
SS	10	4	9-11	4.8	35		SM	7-10" Olive gray silty fine sand, little medium sand to fine gravel, one 2" piece of
					28	10		gravel, blocky, SA, moist.
					28			
						11		
						12		
						13		
	24		S-4		11	14	SM	Olive gray silt to fine gravel, little coarse gravel up to 2", blocky, angular (A), wet.
SS	12	14	14-16	5.4	12			@ 1-2" Olive gray medium to fine sand, trace silt, trace coarse sand, wet.
					19	15		
					25			
						16		
						17		
						18		
	24		S-5		11	19	GM	0-6" Olive gray coarse sand to fine gravel, some silty fine to medium sand, trace
SS	12	19	19-21	0.3	13			coarse gravel up to 1", SA-SR, wet.
					11	20		6-12" As above, without coarse gravel.
					10			

Logged by: J. Shapiro Date: 10/13/95

Drilling Contractor: M & R Environmental Driller: P. Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in. PVC	Screen Interval:	46 ft - 51 ft bgs	Sandpack:	45 ft - 51.5 ft bgs	Grout:	0-42 ft bgs
Bottom of Hole:	56.25 ft bgs	Riser Interval:	Grade - 46 ft bgs	Bentonite:	42 ft - 45 ft bgs 51.5 ft - 56.25 ft bgs	Cover:	Road box

Sample interval

EA Engine ring, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	32.76 ft
Riser Elevation:	32.39 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194858 E: 520699

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville			Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 5" ID FJ casing and 4 7/8 in. rollerbit.				Boring No. MW01-15D
Sampling Method: 2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)				Sheet 2 of 4
				Drilling
Water Level:				Start: 10/12/95 02:20 PM
Time:				Finish: 10/13/95 11:30 AM
Date:				
Reference:				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Pavement (rollerbitted through pavement prior to sampling)
						20		
						21		
						22		
						23		
SS	24 8	24	S-6 24-26	0.2	8 15 21 14	24 25	SM	0-6" Olive gray silt to medium sand, wet. 2" piece of gravel, blocky, SR at 4-6" 6-8" Lt. brown silty (little) fine to coarse sand, little fine gravel, little silt, wet.
						26		
						27		
						28		
SS	24 18	29	S-7 29-31	1.3	7 14 15 16	29 30	SP	0-7" Lt. yell/orange fine to medium sand, wet. 7-18" Olive gray fine sand, little silt at bottom 1", wet.
						31		
						32		
						33		
SS	24 16	34	S-8 34-36	0.3	2 3 6 9	34 35	SP/ SM	0-5" Olive gray fine sand, wet. 5-14" Olive gray very fine to fine sand, wet. 14-16" Olive gray silt and very fine sand, wet.
						36		
						37		
						38		
SS	24 18	39	S-9 39-41	4.4	9 15 19 16	39 40	ML/ SM	0-6" Olive gray very fine to fine sand, wet. 6-18" Olive gray silt with lenses (up to 1/4") of very fine to fine sand.

Logged by: J. Shapiro Date: 10/13/95

Drilling Contractor: M & R Environmental Driller: P. Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in. PVC	Screen Interval:	46 ft - 51 ft bgs	Sandpack:	45 ft - 51.5 ft bgs	Grout:	0-42 ft bg
Bottom of Hole:	56.25 ft bgs	Riser Interval:	Grade - 46 ft bgs	Bentonite:	42 ft - 45 ft bgs 51.5 ft - 56.25 ft bgs	Cover:	Road box

Sample interval

EA Engineering, Science, and Technol gy, Inc.

LOG OF SOIL BORING

Surface Elevation:	32.76 ft
Riser Elevation:	32.39 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194858 E: 520699

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville		Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 5" ID FJ casing and 4 7/8 in. rollerbit.			Boring No. MW01-15D
Sampling Method:	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)		Sheet 3 of 4
			Drilling
Water Level:		Start	Finish
Time:			
Date:		10/12/95	10/13/95
Reference:		02:20 PM	11:30 AM

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Pavement (rollerbitted through pavement prior to sampling)
						40		
						41		
						42		
						43		
	24		S-10		2	44	ML	0-4" Olive gray clay to silt.
SS	17	44	44-46	0.6	5			4-5" Olive gray silt with some medium to coarse sand, wet.
					12	45		5-17" Olive gray silt with little fine sand to fine gravel, little to some clay, wet. (TILL?)
					26			
						46		
						47		
						48		
	24		S-11		6	49	SP/	0-9" Olive gray fine sand grading to medium sand, trace fine gravel, some
SS	13	49	49-51	0.7	16		GW	gravel up to 1", blocky, SA-SR, at 8-9", wet.
					20	50		9-13" Olive gray fine to coarse gravel up to 1.5", flat, angular, loose silty fine sand
					25			matrix, wet (weathered rock).
						51		
								Rollerbitted to 51.5 ft, cored 51.5 to 56.25 ft
						52		
						53		
						54		
						55		
						56		
						57		
						58		
						59		
						60		

Logged by: J. Shapiro Date: 10/13/95

Drilling Contractor: M & R Environmental Driller: P. Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in. PVC	Screen Interval:	46 ft - 51 ft bgs	Sandpack:	45 ft - 51.5 ft bgs	Grout:	0-42 ft bgs
Bottom of Hole:	56.25 ft bgs	Riser Interval:	Grade - 46 ft bgs	Bentonite:	42 ft - 45 ft bgs 51.5 ft - 56.25 ft bgs	Cover:	Road box

Sample interval

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	32.76 ft
Riser Elevation:	32.39 ft
Casing Above Surface:	mean sea level
Reference Elevation:	N: 194858 E: 520699

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville				Location: IR Program Site 01	
Drilling Method: Mobile B-61 Rig - using 5 in. ID FJ casing 4 7/8" RB.					Boring No. MW01-15D	
					Sheet 4 of 4	
					Drilling	
Core Bit Size:	HX Core bit (2.4")				Start	Finish
Water Level:						
Time:						
Date:					10/12/95	10/12/95
Reference:					08:30 AM	09:20 AM

Core Run RQD % / Run #	Core Run REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core Footage	Time (mins)	Core Depth (ft)
					50		Surface Conditions:			
					51			Core Footage	Time (mins)	Core Depth (ft)
					52		(51.5 - 52') Medium gray, fine grained mica schist. Predominantly quartz, muscovite, biotite, feldspar (?). Very fractured. Fractures are weathered.	0-1	3:35	51.5-52.5
					53			1-2	3:15	52.5-53.5
					54		(52-55.5) Dark gray micaceous fine grained schist/phyllite. Apparent lineation of mica (weathered biotite). Biotite (grains visible to naked eye) in fine-grained groundmass.	2-3	5.15	53.5-54.5
					55			3-4.25	5:15	54.5-55.75
					56		(51' - 53') Large, high angle (near vertical) weathered fracture. (52.5' -54') Broken pieces of rock. (54' - 55.5') Two high angle (near vertical), weathered fractures.	4.25-5	4:00	55.75-56.2
					57					
					58					
					59					
					60					
					61					
					62					
					63					
					64					
					65					
					66					
					67					
					68					
					69					
					70					

Logged by: J. Shapiro Date: 10/13/95

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

Core Run Interval

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE – SITE 01	
DATE INSTALLED: 10/4/95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 36.25 (FAMSL)	COORDINATES: N: 194691.25 E: 521358.92
ELEVATION TOP OF WELL RISER: 37.62 (FAMSL)	EA INSPECTOR: PAUL W. HIGGINS
DEPTH TO WATER: 22.79' B.G. DATE/TIME 10/18/95 @08:00	WELL No. MW01-14D
DRILLING METHOD/DEPTH: 4" ID FLUSH JOINTED CASING – DRIVE & WASH-HX CORE	

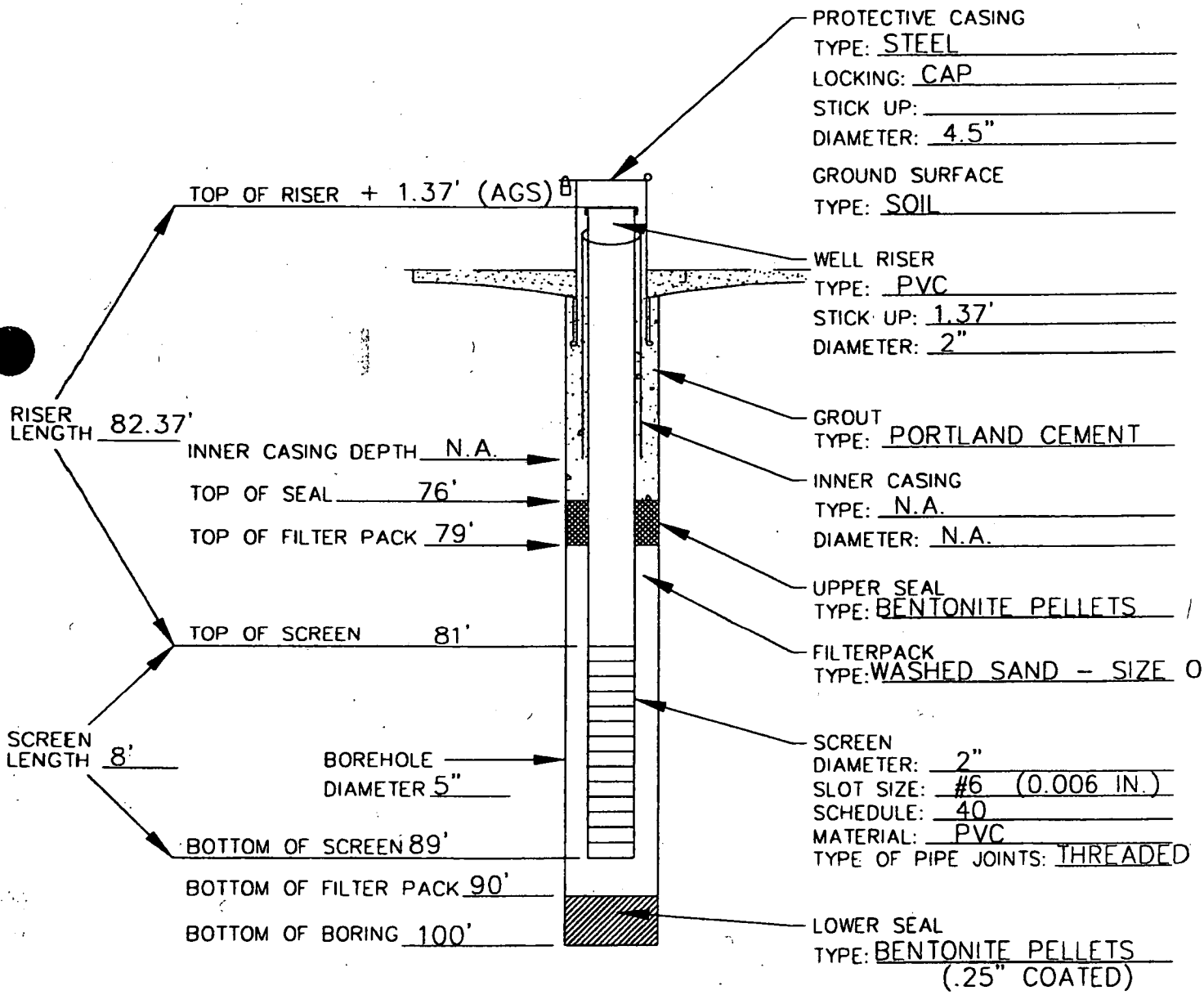


FIGURE 4-8
MONITORING WELL CONSTRUCTION
ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE (BGS)
AGS=ABOVE GROUND SURFACE

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. F:\PROJECTS\29600.32\3993\CADD\MW01-14D.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE – SITE 01	
DATE INSTALLED: 10/5/95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 36.16 (FAMSL)	COORDINATES: N: 194684.85 E: 521355.30
ELEVATION TOP OF WELL RISER: 37.38 (FAMSL)	EA INSPECTOR: PAUL W. HIGGINS
DEPTH TO WATER: 23.15' B.G. DATE/TIME 10/18/95 @08:00	WELL No. MW01-14S
DRILLING METHOD/DEPTH: HSA – 4.5" I.D./7.5" O.D.	

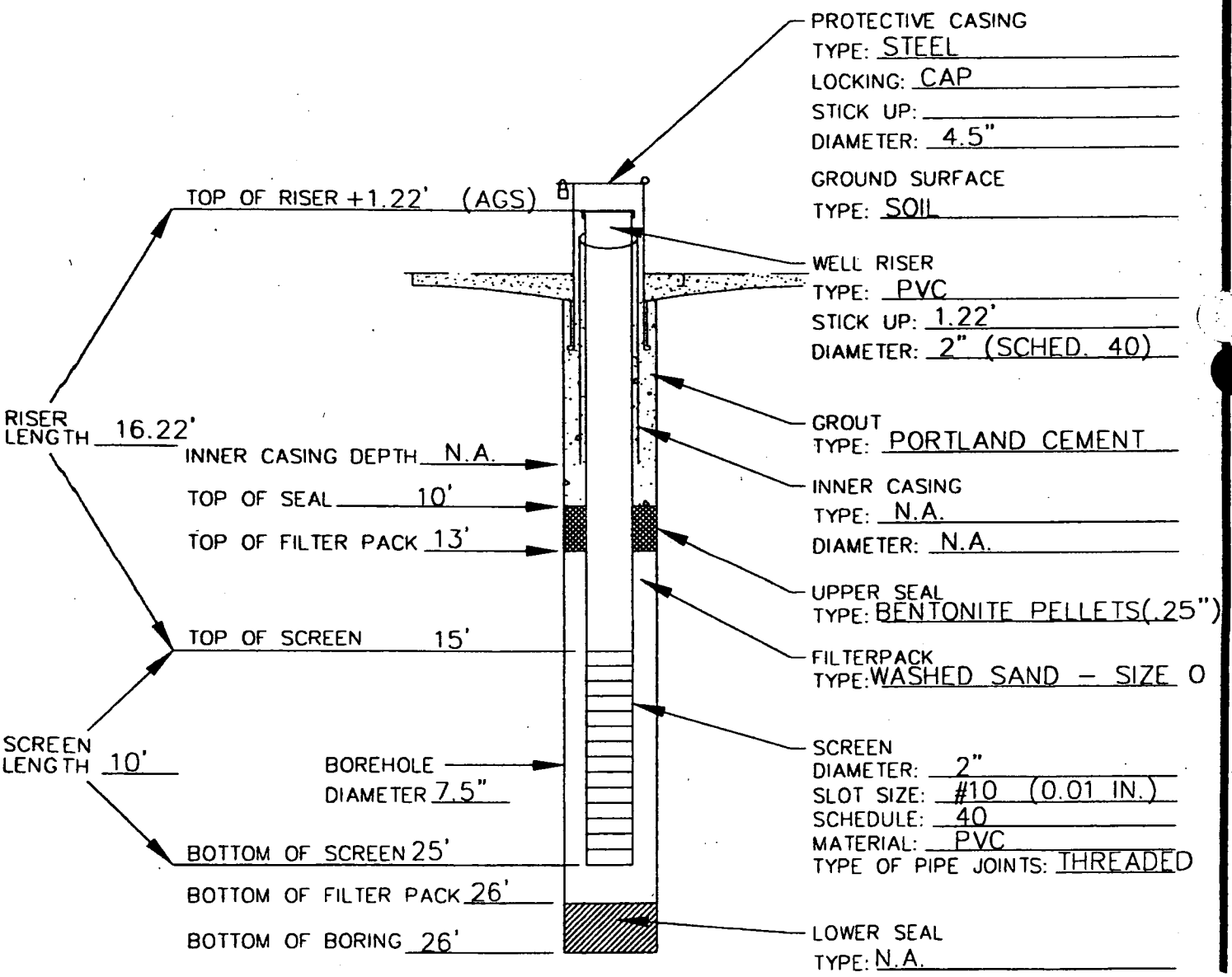


FIGURE 4-8
MONITORING WELL CONSTRUCTION
ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE
AGS=ABOVE GROUND SURFACE (BGS)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. F:\PROJECTS\29600.32\3993\CADD\MW01-14S.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 01	
DATE INSTALLED: 10-06-95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 38.08 (FAMSL)	COORDINATES: N: 194555.48 E: 520460.59
ELEVATION TOP OF WELL RISER: 37.50 (FAMSL)	EA INSPECTOR: JUDI SHAPIRO
DEPTH TO WATER: 19.93 DATE/TIME 10-10-95 1340	WELL No. MW01-08D
DRILLING METHOD/DEPTH: 5" FJ CASING TO 46', 4 7/8" RB TO 49', HX CORE TO 53'	

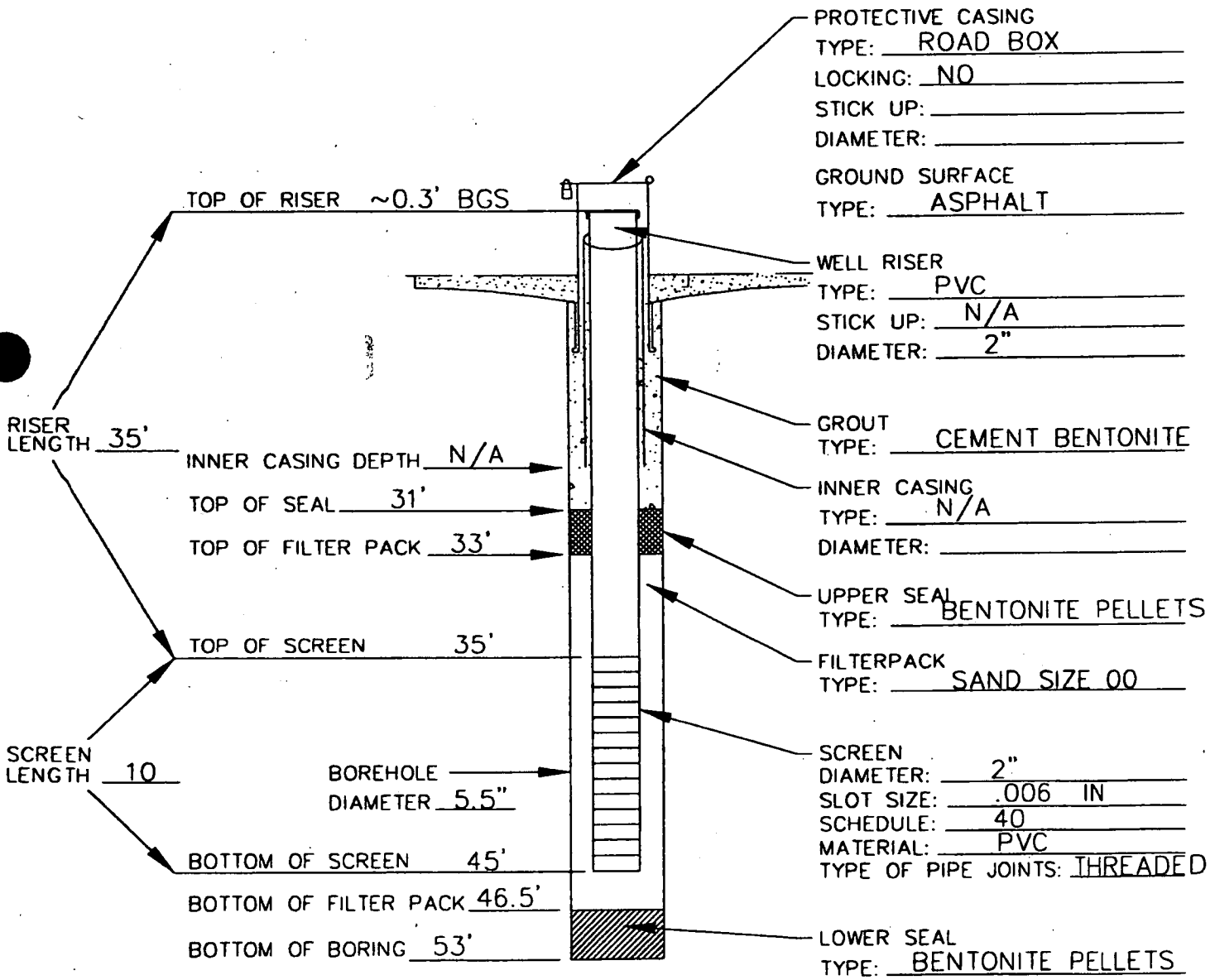


FIGURE 4-8
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. F:\PROJECTS\29600.32\3993\CADD\MW01-08D.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 01	
DATE INSTALLED: 10-10-95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 36.37 (FAMSL)	COORDINATES: N: 194730.73 E: 520602.20
ELEVATION TOP OF WELL RISER: 35.96 (FAMSL)	EA INSPECTOR: JUDI SHAPIRO
DEPTH TO WATER: 19.45 DATE/TIME 10-25-95 0930	WELL No. MW01-12D
DRILLING METHOD/DEPTH: 4"/5" FJ CASING, 3 7/8 / 4 7/8" RB TO ROCK, HX CORE	

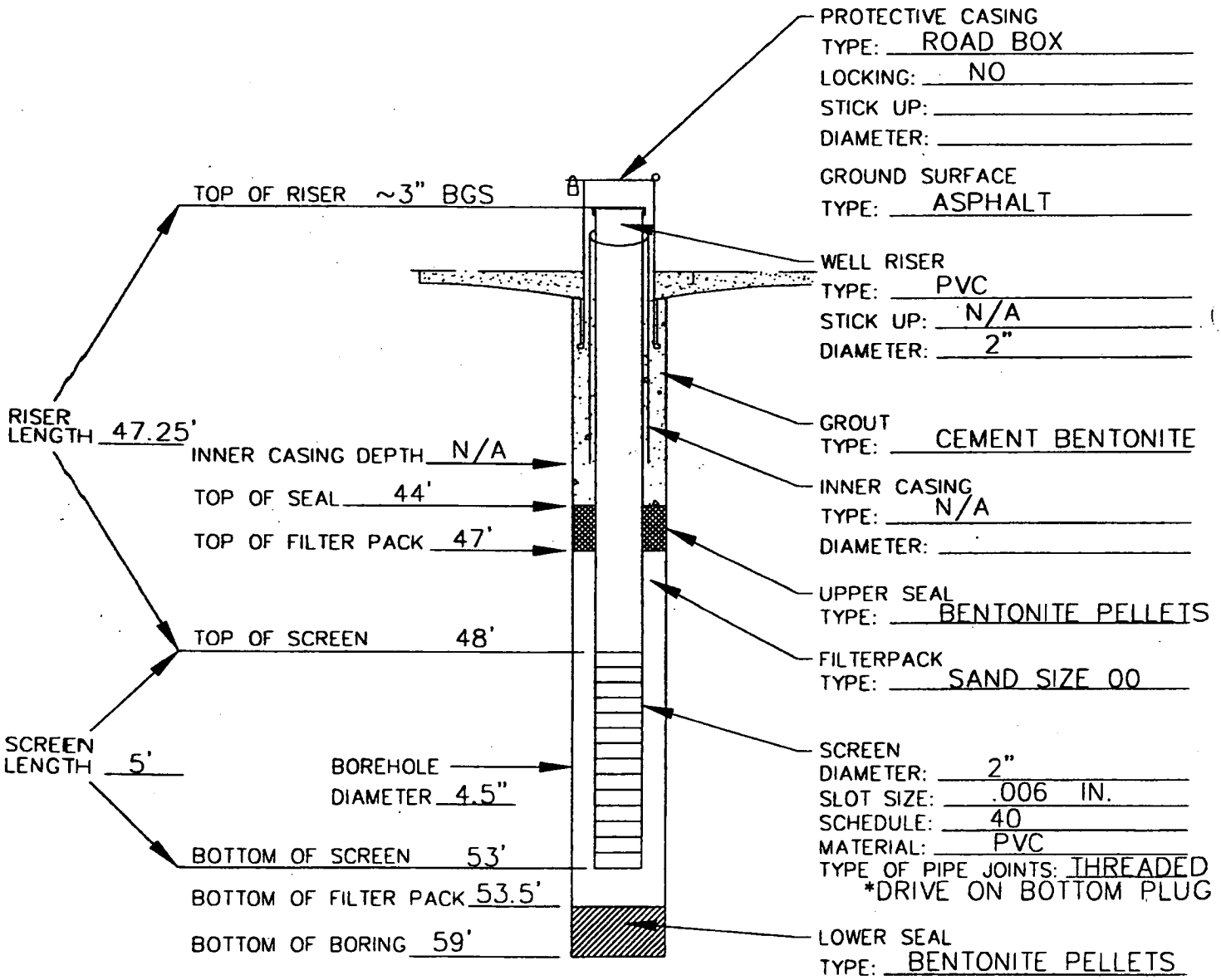


FIGURE 4-8
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. F:\PROJECTS\29600.32\3993\CADD\MW01-12D.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 01	
DATE INSTALLED: 10-10-95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 36.34 (FAMSL)	COORDINATES: N: 194729.88 E: 520597.27
ELEVATION TOP OF WELL RISER: 36.01 (FAMSL)	EA INSPECTOR: JUDI SHAPIRO
DEPTH TO WATER: 19.85 DATE/TIME 10-11-95 0700	WELL No. MW01-12S
DRILLING METHOD/DEPTH: 5" FJ CASING, 4 7/8" RB	

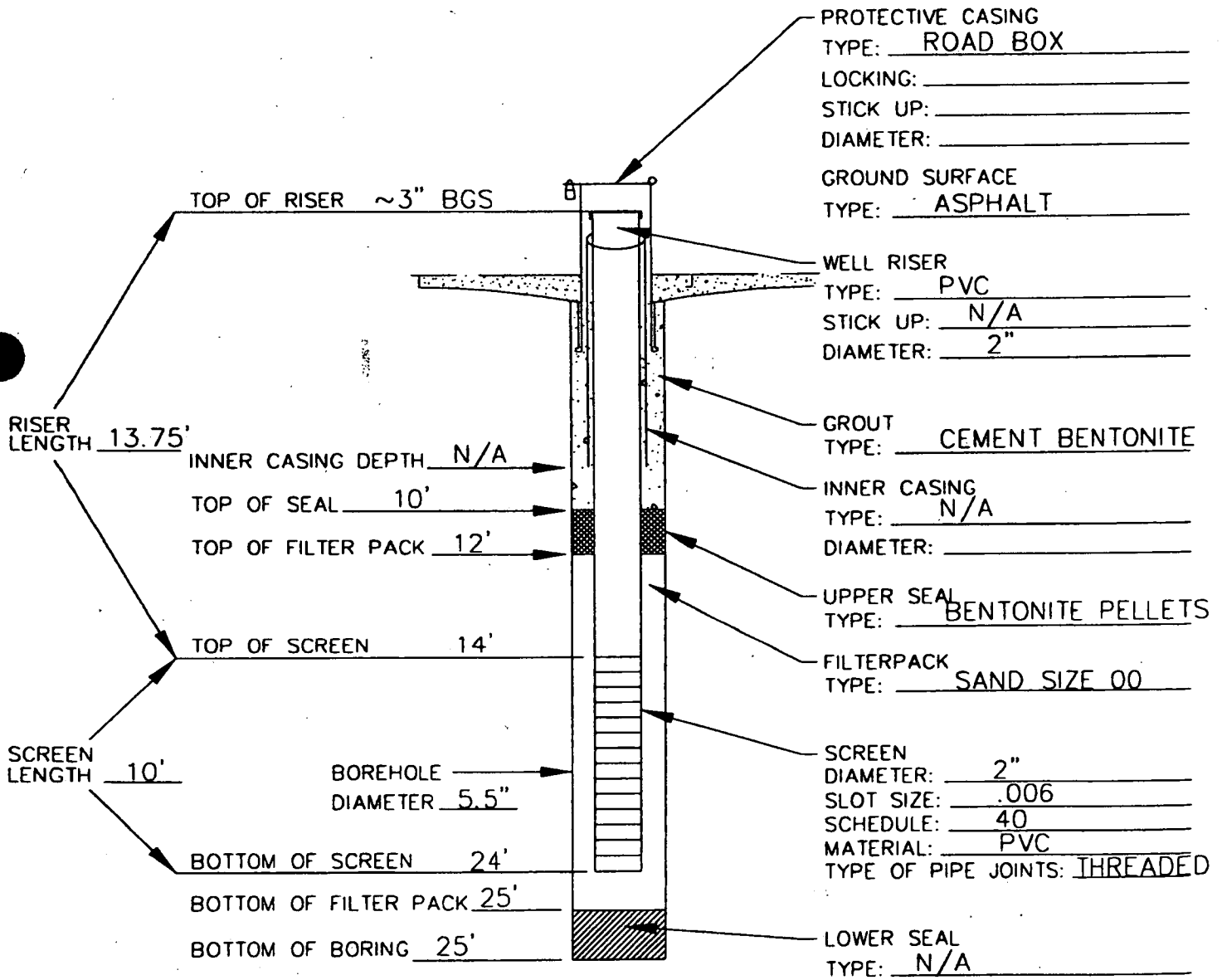


FIGURE 4-8
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. F:\PROJECTS\29600.32\3993\CADD\MW01-12S.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE – SITE 01	
DATE INSTALLED: 10/11/95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 24.68 (FAMSL)	COORDINATES: N: 194988.78 E: 521372.36
ELEVATION TOP OF WELL RISER: 26.29 (FAMSL)	EA INSPECTOR: PAUL W. HIGGINS
DEPTH TO WATER: 13.9' B.G. DATE/TIME 10/18/95 @08:00	WELL No. MW01-13D
DRILLING METHOD/DEPTH: 4" I.D. FLUSH JOINTED CASING – DRIVE & WASH-HX CORE	

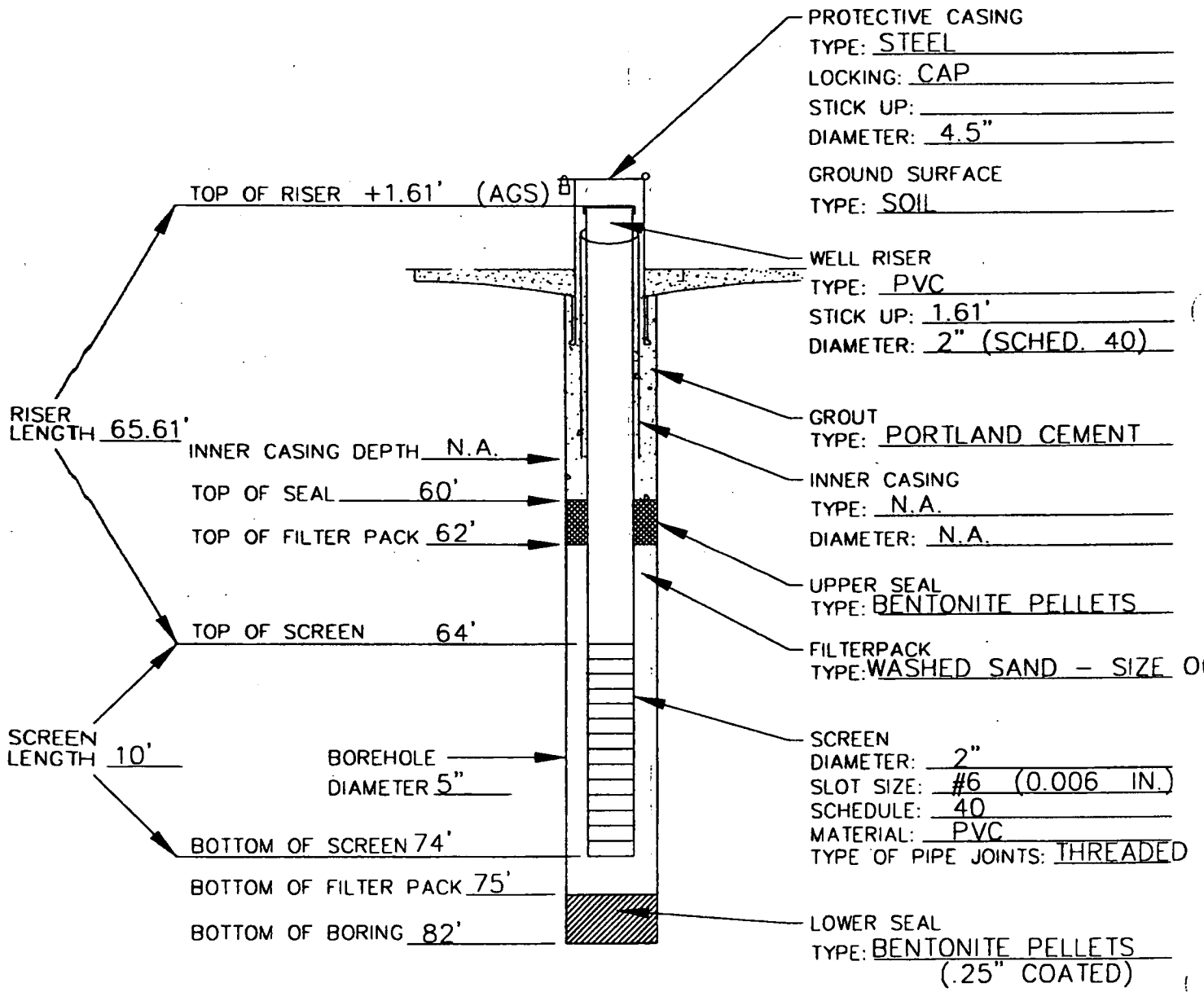


FIGURE 4-8
MONITORING WELL CONSTRUCTION
ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE (BGS)
AGS=ABOVE GROUND SURFACE

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No F:\PROJECTS\29600.32\3993\CADD\MW01-13D.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 01	
DATE INSTALLED: 10-12-95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 39.72 (FAMSL)	COORDINATES: N: 194498.35 E: 520719.25
ELEVATION TOP OF WELL RISER: 39.18 (FAMSL)	EA INSPECTOR: JUDI SHAPIRO
DEPTH TO WATER: 22.00 DATE/TIME 10-27-95 1500	WELL No. MW01-09D
DRILLING METHOD/DEPTH: 5" FJ CASING , 4 7/8" RB TO ROCK, HX CORE	

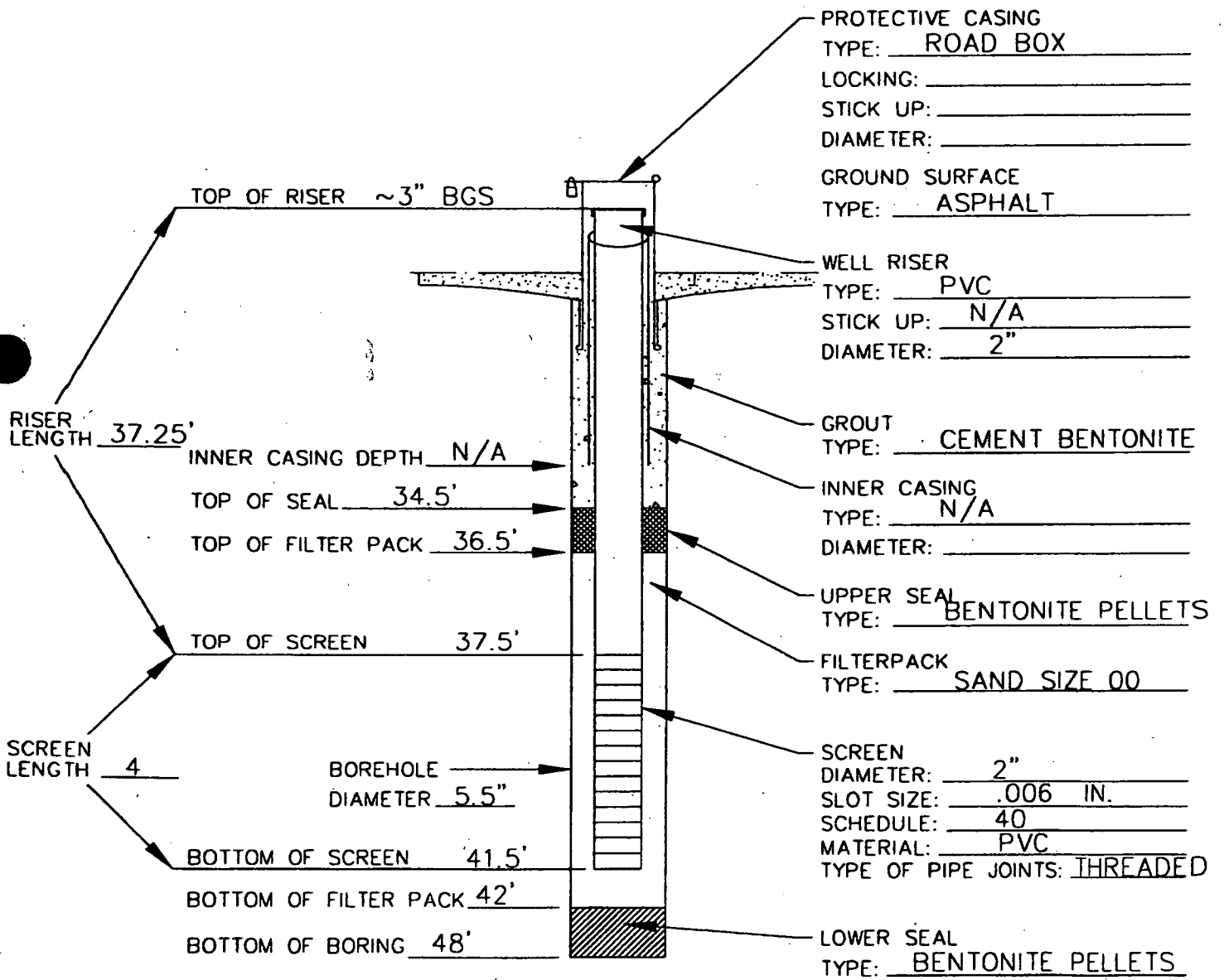


FIGURE 4-8
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

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DWG. FILE No. F:\PROJECTS\29600.32\3993\CADD\MW-01-09D.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE – SITE 01	
DATE INSTALLED: 10/12/95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 24.65 (FAMSL)	COORDINATES: N: 194994.25 E: 521376.12
ELEVATION TOP OF WELL RISER: 25.99 (FAMSL)	EA INSPECTOR: PAUL W. HIGGINS
DEPTH TO WATER: 15.5' B.G. DATE/TIME 10/18/95 @08:00	WELL No. MW01-13S
DRILLING METHOD/DEPTH: HSA– 4.5" I.D./ 7.5" O.D.	

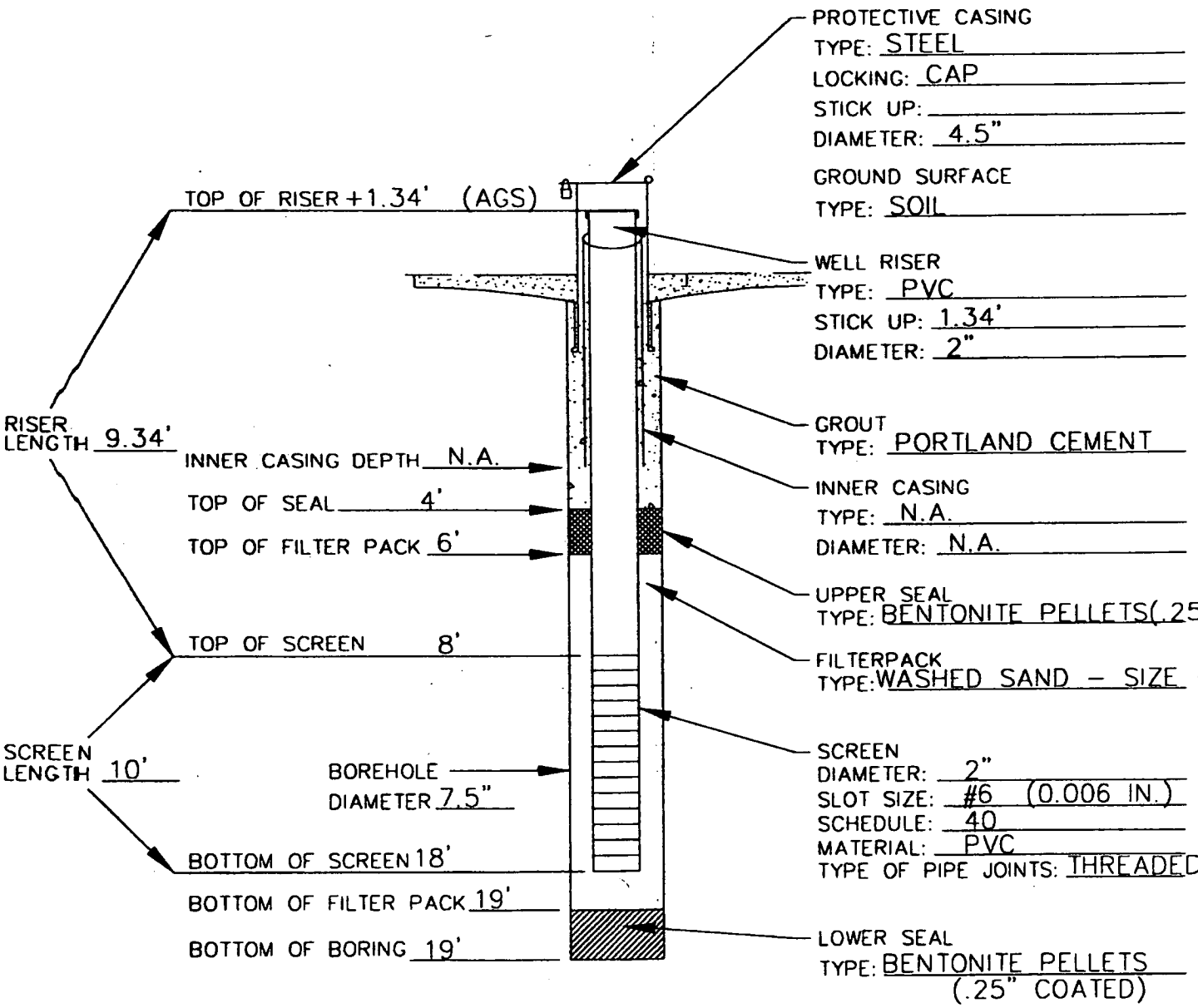

FIGURE 4–8
MONITORING WELL CONSTRUCTION
ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE (BGS)
AGS=ABOVE GROUND SURFACE

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DWG. FILE No. F:\PROJECTS\29600.32\3993\CADD\MW01-13S.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE, SITE 01	
DATE INSTALLED: 10-13-95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 32.79 (FAMSL)	COORDINATES: N: 194858.03 E: 520699.72
ELEVATION TOP OF WELL RISER: 32.39 (FAMSL)	EA INSPECTOR: JUDI SHAPIRO
DEPTH TO WATER: 16.63 DATE/TIME 10-18-95 0800	WELL No. MW01-15D
DRILLING METHOD/DEPTH: 4"/5" FJ CASING, 3 7/8 / 4 7/8" RB TO ROCK, HX CORE	

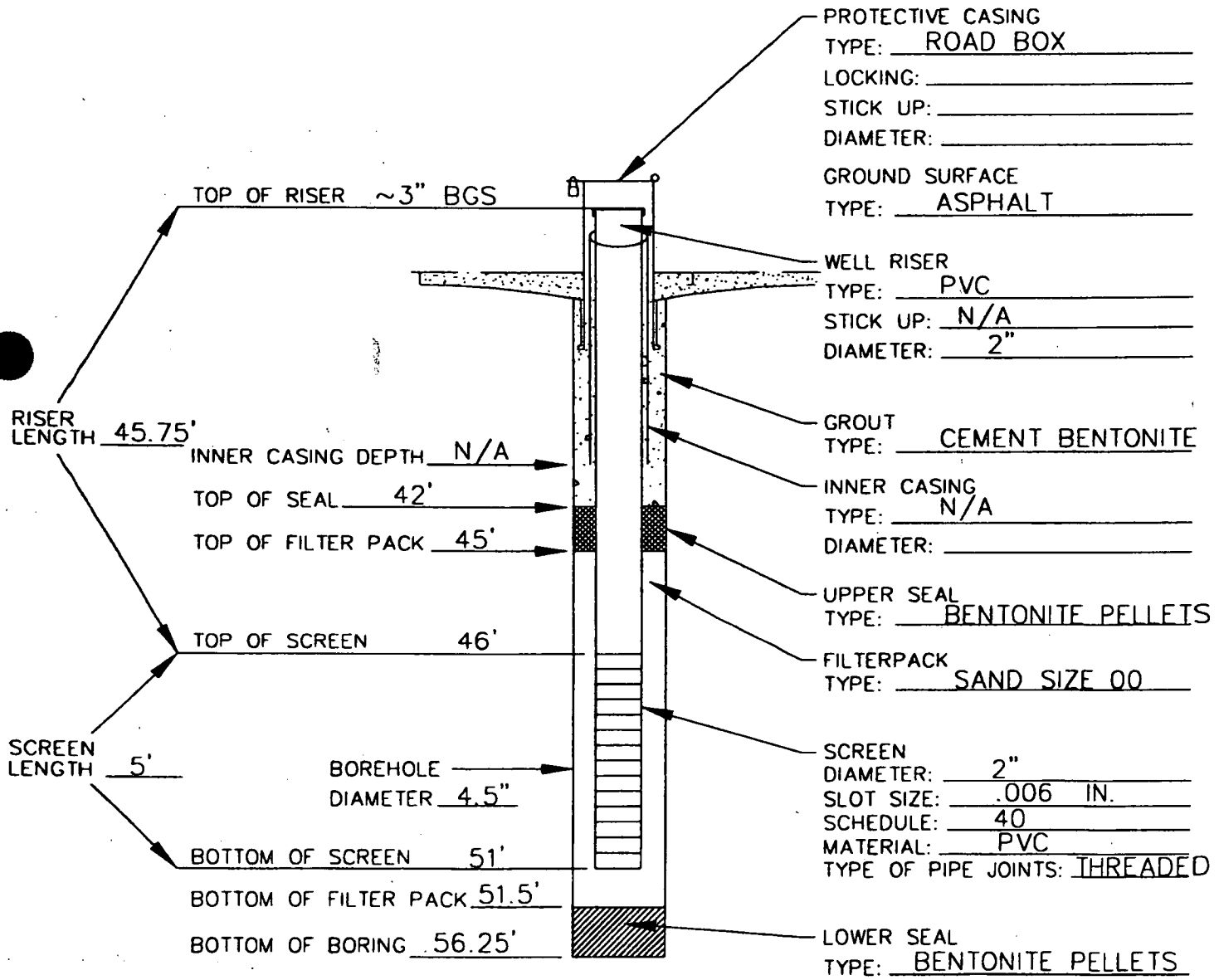

FIGURE 4-8
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. F:\PROJECTS\29600.32\3993\CADD\MW01-15D.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE – SITE 01	
DATE INSTALLED: 10/18/95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 39.25 (FAMSL)	COORDINATES: N: 194629.67 E: 520904.95
ELEVATION TOP OF WELL RISER: 38.98 (FAMSL)	EA INSPECTOR: PAUL W. HIGGINS
DEPTH TO WATER: 23' B.G. DATE/TIME 10/18/95 @07:45	WELL No. MW01-11D
DRILLING METHOD/DEPTH: 4" I.D. FLUSH JOINTED DRIVE & WASH CASING– HX CORING	

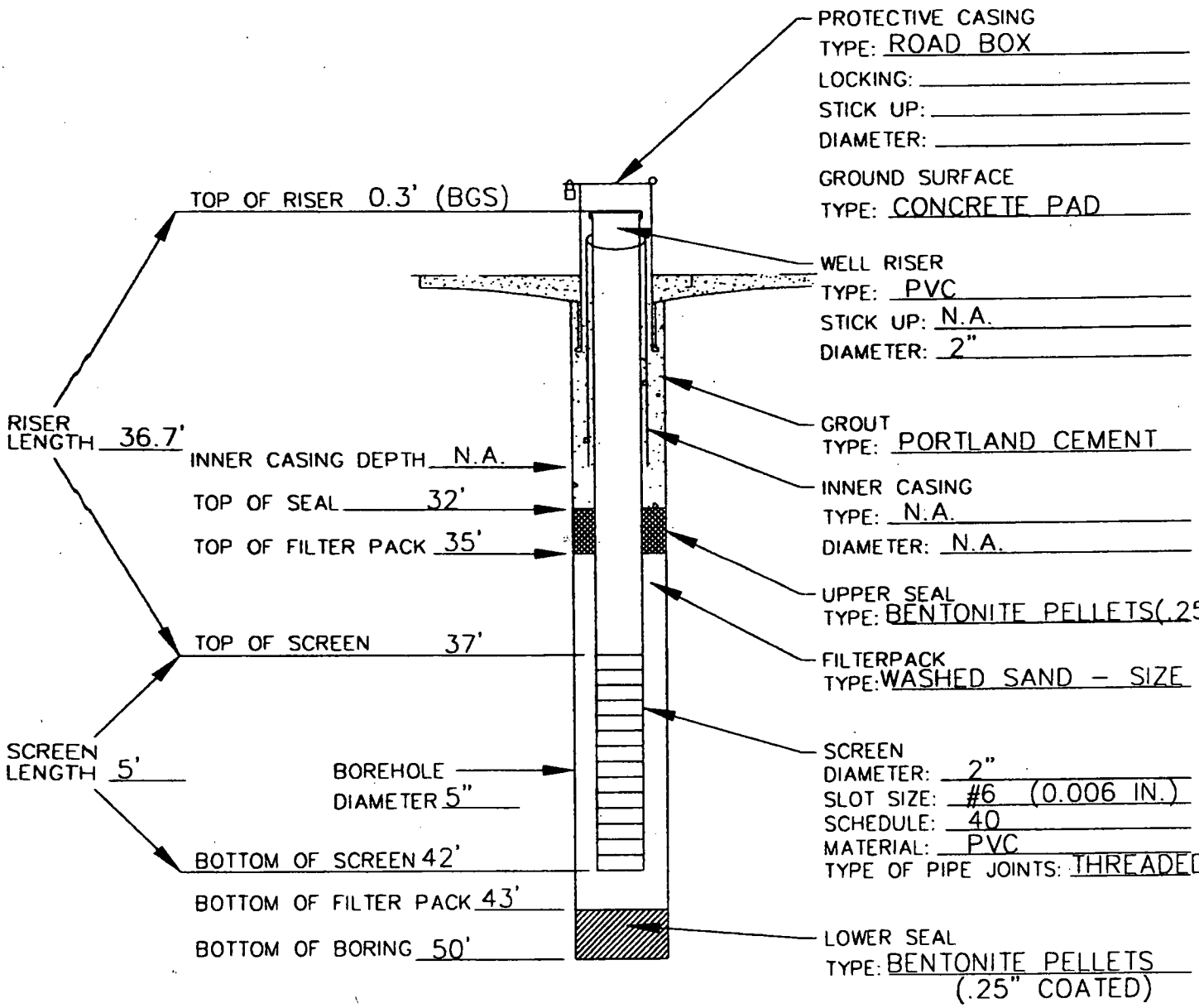

FIGURE 4–8
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. F:\PROJECTS\29600.32\3993\CADD\MW01-11D.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE – SITE 01	
DATE INSTALLED: 10/20/95 10/18/95–10/23/95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 41.56 (FAMSL)	COORDINATES: N: 194868.49 E: 519768.74
ELEVATION TOP OF WELL RISER: 42.88 (FAMSL)	EA INSPECTOR: PAUL W. HIGGINS
DEPTH TO WATER: 22.65' B.G. DATE/TIME 10/25/95 @14:30	WELL No. MW01–10D
DRILLING METHOD/DEPTH: 4" I.D. FLUSH JOINTED DRIVE & WASH CASING – HX CORING	

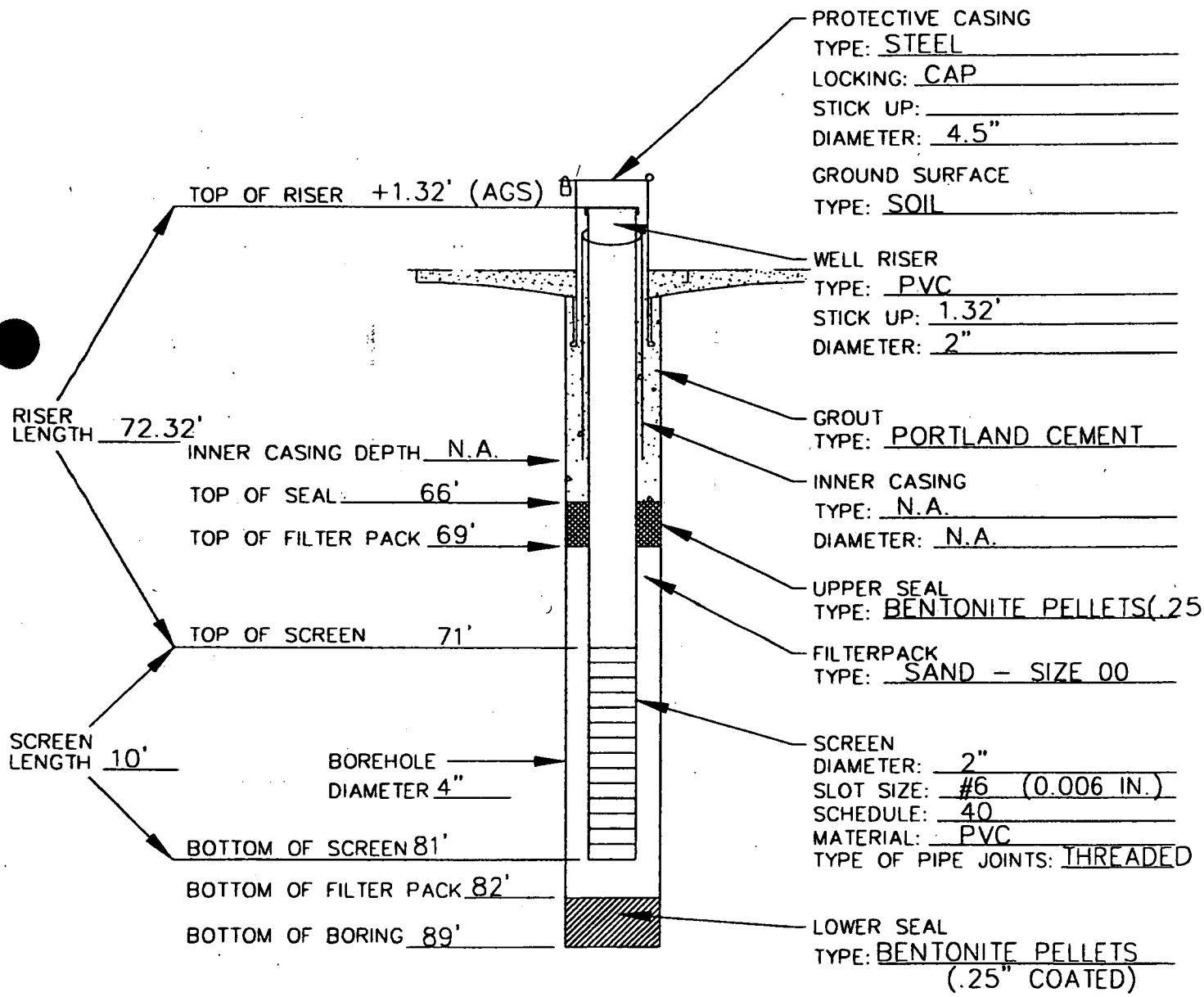

FIGURE 4–8
MONITORING WELL CONSTRUCTION
ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE (BGS)
AGS=ABOVE GROUND SURFACE

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. F:\PROJECTS\29600.32\3993\CADD\MW01-10D.DWG

MONITORING WELL CONSTRUCTION

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE – SITE 01	
DATE INSTALLED: 10/23/95 – 10/24/95	PROJECT No. 29600.32.3243
ELEVATION OF GROUND SURFACE: 41.21 (FAMSL)	COORDINATES: N: 194870.93 E: 519775.54
ELEVATION TOP OF WELL RISER: 42.73 (FAMSL)	EA INSPECTOR: PAUL W. HIGGINS
DEPTH TO WATER: 22.0' B.G. DATE/TIME 10/25/95 @14:30	WELL No. MW01–10S
DRILLING METHOD/DEPTH: HSA– 4.25" I.D./7.5" O.D.	

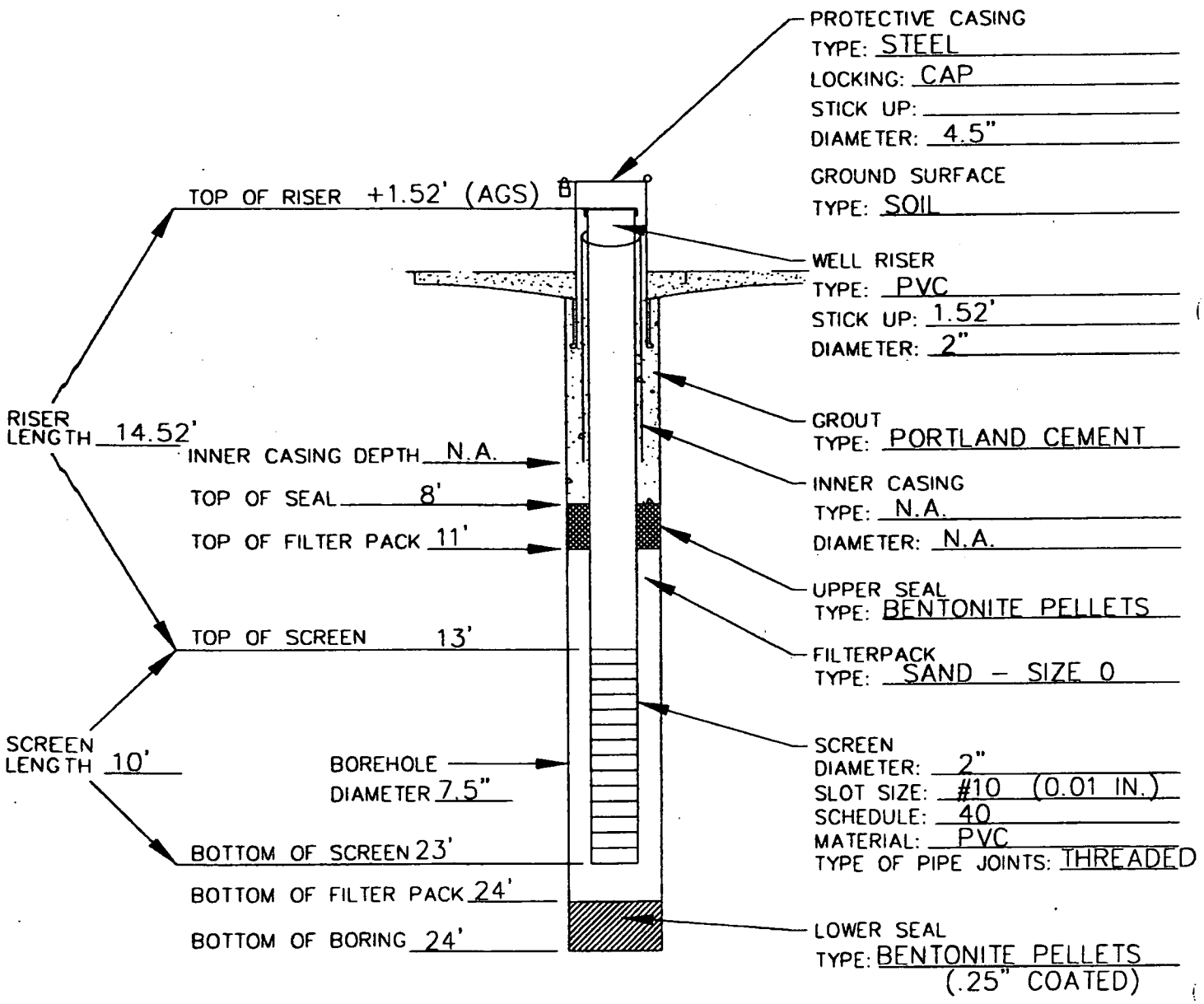

FIGURE 4–8
MONITORING WELL CONSTRUCTION
ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE (BGS)
AGS=ABOVE GROUND SURFACE

EA® EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DWG. FILE No. F:\PROJECTS\29600.32\3993\CADD\MW01-10S.DWG

EA Engineering, Scienc , and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 194899.05 E: 518334.20
Surface Elevation:	31.5 FT MSL
Well Riser Elevation:	33.84 FT MSL

Job. No. 29600.32	Client: NORDIV. NAVFAC NCBC Davisville		Location: SITE 03/Nike
Drilling Method: MobileDrill, Model B-61 Rig; 6 inch FJ casing drive and wash			Boring No. EA-106R
Sampling Method: NA			Sheet 1 of 1
Drilling Water Level			
Date			Start: 12/19/97
Time			Finish: 01/07/98
Surface Conditions: grassy			Drilling Times: 1000 / 900

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						0		see boring log of EA-106D for overburden description.
						1		
						2		set 4 inch permanant casing at 45 ft 2 in.
						3		cored from 45 ft 2 in. to 69 ft 2 in.
						4		BOH = 69 ft 2 in.
						5		
						6		
						7		
						8		
						9		
						0		
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						0		

Logged by: Robin Clark Date: 01/07/98

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	59-69	Sandpack:	69 ft-58 ft	Grout:	44 ft-grade
Bottom of Hole:	69 ft 2 in.	Riser Interval:	59 ft bgs - 2 ft ags	Bentonite:	44 ft- 58 ft	Cover:	6" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194899.05 E: 518334.20
Surface Elevation:	31.5 FT MSL
Well Riser Elevation:	33.84 FT MSL

Job. No. 29600.32.3215	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile Drill, Model B-61		Boring No. EA-106R
Core Barrel used: Hx		Sheet 1 of 2

Packer Test

Tested	yes	
Interval	all	

See packer test log if applicable

Drilling Times	
Start	01/05/98 1130
Finish	01/05/98 1700

Core Run / Run # / REC / RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
Run 1/5 recovery 65% RQD 23%				45		Medium dark gray phyllite with folded quartz filled fractures at 15", 22"-24" and 33" to bottom (39"). Rusted stringers of quartz throughout core. Heavily fractured at top 5-8" and bottom. Horizontal fractures at 1.5", 5", 8", 10"	1	07:20	46.1
				46			1	09:20	47.1
				47		12", 13.5", 16", 21", 22.75", 24.25", 26", and 30.75". Low angle fractures at 30" and 35".	1	05:10	48.1
				48			1	05:50	49.1
				49			1	05:50	50.1
Run 2/5 recovery 99% RQD 35%				50		Medium dark gray phyllite with quartz (light gray) from 0-24 inches. Rusted along partings, broken core from	1	05:00	51.1
				51		44-46" and from 0-6". Horizontal fractures at 6", 9", 12",	1	06:00	52.1
				52		15", 27", 32.5", and 40". Low angle fractures at 19.5", 21", 30.5", 36.5", and 44". Few quartz filled fractures after 24 ":	1	14:00	53.1
				53		at 32", 38", 39.5", and 44".	1	08:45	54.1
				54			1	09:15	55.1
Run 3/5 recovery 100% RQD 88%				55		0-12": phyllite as above.	1	06:30	56.1
				56		12-17": Phyllite, more competent. Horizontal fractures at 3", and 5".	1	06:00	57.1
				57		changes to fine grained med dark gray quartzite at 17". Horizontal fractures at 24.75", 25.75", 33", and 49".	1	04:15	58.1
				58		High angle fractures at 23-25", 43-45", 51-60" (nearly vertical). Black mica visible throughout quartzite, also light gray-white quartz.	1	05:30	59.1
				59					
				60					
						see next page.			

NOTES:

Logged by: Robin Clark

Drilling Contractor: M&R Environmental Drilling

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194899.05 E: 518334.20
Surface Elevation:	31.5 FT MSL
Well Riser Elevation:	33.84 FT MSL

Job. No. 29600.32.3215	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile Drill, Model B-61		Boring No. EA-106R
Core Barrel used: Hx		Sheet 2 of 2

Packer Test

Tested	yes	
Interval	all	

See packer test log if applicable

Drilling Times	Start	Finish
	01/05/98 1130	01/05/98 1700

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
Run 4/5 recovery 100% RQD 83%					60		Medium dark gray quartzite (as above), with fine to medium grained quartz and mica visible (approx 1mm)	1	04:40	61.1
					61		Nearly vertical fractures from 3-10", 16-20", 24-27", 37-43", and 46-50". Low angle fractures at 8.5", 19", 25",	1	04:15	62.1
					62		31", 36", 39", and 46". Broken core from 44-46".	1	06:45	63.1
					63		core barrel jammed at 64.1", pulled 4 ft core, began Run 5.	1	19:15	64.1
Run 5/5 recovery 93% RQD 73%					64		Quartzite as above	1	07:30	65.1
					65		High angle fractures at 1-3", 9", 13", 17", 29-36". Low angle fractures at 23", 29", 32", 36", 43", 47", and 54". Vertical breaks from 29-48"	1	08:45	66.1
					66		from 23-29" unbroken vertical fracture.	1	04:00	67.1
					67			1	04:15	68.1
					68			1	06:00	69.1
					69					
					70					

NOTES:

Logged by: Robin Clark

Drilling Contractor: M&R Environmental Drilling

Driller: Phil Thomsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 193711.81 E: 521033.01
Surface Elevation:	38.1 FT MSL
Well Riser Elevation:	40.15 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville		Location: SITE 03/Nike
Drilling Method: Mobile Drill, Model B-61 Rig; 4 inch FJ casing drive and wash			Boring No. EA-110D
Sampling Method: 2" split spoon			Sheet 1 of 5
Drilling Water Level / Date / Time		Start: 01/08/98 800	Drilling Times	Finish: 01/12/98 1500
Surface Conditions: grassy			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
SPT	24 / 12	0	S1 0-2	2.4	2 / 10	0		0-10 inches: Medium to dark brown fine sand and silt, roots at top, moist.
					26 / 14	1		10-12 inches: gray angular gravel 1/4 - 1 inches (decomposed stone).
						2		
						3		
SPT	24 / 22	0	S2 4-6	0.0	22 / 26	4		Olive gray silt, some fine to coarse sand, some subangular to angular gravel up to 1 inch, dry.
					24 / 22	5		
						6		
						7		
						8		
SPT	24 / 15	8	S3 9-11	0.4	29 / 29	9		Olive gray with rust mottles at top,medium to coarse sand, some subrounded gravel up to 1 inch, little silt, moist.
					24 / 27	10		
						11		
						12		
						13		
SPT	24 / 0	14	S4 14-16	NA	14 / 20	14		2 attempts, no recovery. large gravel in sampler bit.
					20 / 20	15		
						16		
						17		
						18		
SPT	24 / 12	19	S5 19-21	0.4	14 / 18	19		Brown/gray fine to medium sand, trace silt, moist.
					23 / 21	20		

Logged by: Robin Clark Date: 01/12/98

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 inches	Screen Interval:	75-85 ft bgs	Sandpack:	85.3-73 ft bgs	Grout:	69 ft bgs-grade
Bottom of Hole:	93 ft bgs	Riser Interval:	75 ft bgs to ~28 inches ags	Bentonite:	69-73 ft bgs	Cover:	4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 193711.81 E: 521033.01
Surface Elevation: 38.1 FT MSL
Well Riser Elevation: 40.15 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike
Drilling Method: Mobile Drill, Model B-61 Rig; 4 inch FJ casing drive and wash		Boring No. **EA-110D**
Sampling Method: 2" split spoon		Sheet 2 of 5
Drilling Water Level / Date / Time		Start: 01/08/98 800; Drilling Times; Finish: 01/12/98 1500
Surface Conditions: grassy		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						20		
						21		
						22		
						23		
SPT	24 / 21	24	24-26	0.0	23 / 28	24		Light olive gray layered with light brown gray fine sand, trace silt, wet.
					33 / 31	25		
						26		
						27		
						28		
SPT	24 / 12	29	29-31	0	9 / 17 / 20 / 26	29		same as above
						30		
						31		
						32		
						33		
SPT	24 / 12	34	34-36	0.0	8 / 12 / 20 / 29	34		as above with light brown (layered) fine sand from 3-7 inches.
						35		
						36		
						37		
						38		
SPT	24 / 14	39	39-41	0.0	9 / 10 / 16 / 33	39		Light to medium layered olive gray fine sand, trace silt, wet.
						40		

Logged by: Robin Clark
Date: 01/12/98
Drilling Contractor: M & R Environmental Drilling
Driller: Phil Thornsbury

WELL SPECIFICATIONS:
Diam. of Riser: 2 inches
Bottom of Hole: 93 ft bgs
Screen Interval: 75-85 ft bgs
Riser Interval: 75 ft bgs to ~28 inches ags
Sandpack: 85.3-73 ft bgs
Bentonite: 69-73 ft bgs
Grout: 69 ft bgs-grade
Cover: 4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 193711.81 E: 521033.01
Surface Elevation:	38.1 FT MSL
Well Riser Elevation:	40.15 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike
Drilling Method: Mobile Drill, Model B-61 Rig; 4 inch FJ casing drive and wash		Boring No. EA-110D
Sampling Method: 2" split spoon		Sheet 3 of 5
Drilling Water Level / Date / Time	Start: 01/08/98 800	Drilling Times — Finish: 01/12/98 1500
Surface Conditions: grassy		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						40		
						41		
						42		
						43		
SPT	24 / 12	44	44-46	0.4	12 / 15	44		Same as above
					22 / 23	45		
SPT	24 / 14	44	46-48	0.0	10 / 10	46		Same as above
					11 / 13	47		
SPT	24 / 12	48	48-50	0.0	11 / 11	48		Same as above
					11 / 13	49		
SPT	24 / 14	48	50-52	1.6	11 / 17	50		Olive gray fine sand, trace silt, wet.
					26 / 30	51		
SPT	20 / 12	48	52-54	-0.2	32 / 44	52		Same as above
					56 / 36-2	53		
SPT	24 / 14	54	54-56	3.0	18 / 16	54		Same as above
					17 / 17	55		
SPT	24 / 10	54	56-58	2.6	11 / 15	56		Same as above with color banding: light olive gray and medium olive gray.
					21 / 22	57		
						58		
SPT	24 / 15	59	59-61	0.0	11 / 20	59		Olive gray fine sand.
					26 / 29	60		1/2 inch silt lens from 10-10.5 inches Light brown rust color from 0-5 inches

Logged by: Robin Clark — Date: 01/12/98

Drilling Contractor: M & R Environmental Drilling — Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 inches	Screen Interval:	75-85 ft bgs	Sandpack:	85.3-73 ft bgs	Grout:	69 ft bgs-grade
Bottom of Hole:	93 ft bgs	Riser Interval:	75 ft bgs to ~28 inches ags	Bentonite:	69-73 ft bgs	Cover:	4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 193711.81 E: 521033.01
Surface Elevation: 38.1 FT MSL
Well Riser Elevation: 40.15 FT MSL

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	SITE 03/Nike

Drilling Method: Mobile Drill, Model B-61 Rig; 4 inch FJ casing drive and wash

Boring No. **EA-110D**

Sampling Method: 2" split spoon

Sheet 4 of 5

Drilling Water Level			Start	Drilling Times	Finish
Date			01/08/98		01/12/98
Time			800		1500

Surface Conditions: grassy

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						60		
						61		
						62		
						63		
SPT	24 16	64	64-66	2.8	6 / 7	64		Layered light gray fine sand and olive gray very fine sand, wet.
					16 21	65		
						66		
						67		
						68		
SPT	24 8	64	69-71	2	4 9	69		Gray very fine sand, some silt, wet. Little clay in 1/2 inch lens at 6 inches.
					9 8	70		
						71		
						72		
						73		
SPT	24 22	64	74-76	0.0	8 10	74		Dark gray silt with sand stringers at top, clayey silt at bottom. gravel in sampler bit.
					20 43	75		
						76		driller notes change to harder material at 76 ft
						77		
						78		
SPT	24 14	79	79-81	0.0	51 41	79		Dark gray fine to coarse sand, some subangular to angular gravel up to 1 inch little silt, wet.
					46 170	80		

Logged by: Robin Clark Date: 01/12/98

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Dia. of Riser:	2 inches	Screen Interval:	75-85 ft bgs	Sandpack:	85.3-73 ft bgs	Grout:	69 ft bgs-grade
Bottom of Hole:	93 ft bgs	Riser Interval:	75 ft bgs to ~28 inches ags	Bentonite:	69-73 ft bgs	Cover:	4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 193711.81 E: 521033.01
Surface Elevation:	38.1 FT MSL
Well Riser Elevation:	40.15 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike
Drilling Method: Mobile Drill, Model B-61 Rig; 4 inch FJ casing drive and wash		Boring No. EA-110D
Sampling Method: 2" split spoon		Sheet 5 of 5
Drilling Water Level / Date / Time		Start: 01/08/98 800; Drilling Times; Finish: 01/12/98 1500
Surface Conditions: grassy		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						80		
						81		Rollerbit through boulder 81.5-82.5 ft
						82		
						83		
SPT	7	84		0.2	135	84		Dark gray angular to subangular gravel up to 1 inch, some fine to coarse sand,
	7		84-84.5		115/1			little silt, wet. bottom 2 inches look like weathered rock, platy structure.
						85		
						86		rollerbit 85-88 ft
						87		
						88		cored 88-93 ft
						89		
						90		
						91		
						92		
						93		bottom of hole at 93 ft bgs.
						94		
						95		
						96		
						97		
						98		
						99		
						100		

Logged by: Robin Clark Date: 01/12/98

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 inches	Screen Interval:	75-85 ft bgs	Sandpack:	85.3-73 ft bgs	Grout:	69 ft bgs-grade
Bottom of Hole:	93 ft bgs	Riser Interval:	75 ft bgs to ~28 inches ags	Bentonite:	69-73 ft bgs	Cover:	4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 193711.81 E: 521033.01
Surface Elevation:	38.1 FT MSL
Well Riser Elevation:	40.15 FT MSL

Job. No. 29600.32.3215	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile Drill, Model B-61		Boring No. *EA-110D*
Core Barrel used: Hx		Sheet 1 of 1

Packer Test

Tested	NA	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	01/12/98 1200	01/12/98 1500

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
						rollerbit 85-88 ft bgs			
Run 1/1				88		Medium gray at top to light gray at bottom, fine grained	1	05:40	89
recovery 100%						quartzite. Very light gray quartz filled fractures througout			
RQD 74%				89		core. broken from 3-6" and 14-20". Low angle fractures	1	06:05	90
						at 7-9", 17-20", 22-25.5". Quartz on break from 27-30".			
				90		Vertical fracture from 33-50".	1	05:42	91
						Large quartz filled fracture at bottom (0.5" thick), and			
				91		0.25" thick at 23-28".	1	06:55	92
				92			1	04:45	93
				93					

NOTES:

Logged by: Robin Clark

Drilling Contractor: M&R Enviromental Drilling

Driller: Phil Thornsbury

EA Engineering, Science, and Techn logy, Inc.

LOG OF SOIL BORING

Coordinates: N: 193704.08 E: 521028.56
Surface Elevation: 37.5 FT MSL
Well Riser Elevation: 39.71 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike
Drilling Method: MobileDrill, Model B-61 Rig; 6 in. FJ casing drive and wash		Boring No. EA-110R
Sampling Method: NA		Sheet 1 of 1
Drilling Water Level / Date / Time		Start: 01/14/98 800; Drilling Times; Finish: 01/20/98 1600
Surface Conditions: grassy		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						0		
						1		See boring log of EA-110D for overburden description.
						2		
						3		6 inch casing refusal at 82 ft bgs
						4		4 inch casing set at 85 ft bgs
						5		rollerbit from 85-88 ft bgs.
						6		cored from 88-113 ft bgs.
						7		BOH= 113 ft bgs
						8		
						9		
						0		
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						0		

Logged by: Robin Clark Date: 01/20/98

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	88-113 ft bgs	Sandpack:	87.5-113 ft bgs	Grout:	83.5 ft bgs-grade
Bottom of Hole:	113 ft bgs	Riser Interval:	88 ft bgs-28 in. ags	Bentonite:	83.5-87.5 ft bgs	Cover:	6" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Job. No.	29600.32.3215
Client:	NORDIV/NAVFAC NCBC Davisville
Location:	NIKE Site
Drilling Method:	Mobile Drill, Model B-61
Boring No.	EA-110R
Core Barrel used:	Hx
Sheet	1 of 2

Coordinates:	N: 193704.0852 E: 521028.56
Surface Elevation:	37.527 ft MSL
Well Riser Elevation:	39.707 ft MSL

Packer Test

Tested	yes	
Interval	all	

See packer test log if applicable

Drilling Times	Start	Finish
	01/21/98	01/21/98
	900	1600

Core Run / Run # / REC / RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
Run 1/5 (88 to 93 ft bgs) recovery 97% RQD 86%				88		Medium light gray (N6) fine grained quartzite with white mineralization on nearly hoizontal fracture at 2".	1	10:00	89
				89		Core is broken in top 2 inches. Low angle fractures at 6", 14", 24", 25", 25.25", 26", 32.5", 36", 44", and 49"	1	05:24	90
				90		High angle fracture at 26-28". Most of the fractures do not have rust colored surfaces.	1	06:00	91
				91			1	06:30	92
				92			1	06:00	93
Run 2/5 (93 to 98 ft bgs) recovery 100% RQD 62%				93		Quartzite (as above) with calcite or dolomite (white) fillings from 3-6". High angle fractures from 0-6", 53-58", 14-21",	1	05:15	94
				94		Low angle fractures at 3", 21", 24", 26.5", 28", 29", 32", 33", 40", 40.5", 45", 47", 50", and 53". White mineral	1	05:33	95
				95		on fractures at 14-21". Rust on fracture at 52".	1	06:04	96
				96			1	06:15	97
				97			1	05:10	98
Run 3/5 (98 to 103 ft bgs) recovery 100% RQD 92%				98		Quartzite (as above) with white mineralization at 3-4", smal thin white fillings from 0-15". Low angle fractures at 7.5",	1	06:00	99
				99		16", 19", 35", and 53". High angle fractures at 4-13", and 26-31" (rusted). Broken core(fragments	1	05:00	100
				100		up to ~1 1/2") from 16-19".	1	06:00	101
				101			1	07:00	102
				102			1	07:00	103
				103					
						see next page.			

NOTES:

Logged by: Robin Clark

Drilling Contractor: M&R Environmental Drilling

Driller: Phil Thomsbury

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 193704.0852 E: 521028.56
Surface Elevation:	37.527 ft MSL
Well Riser Elevation:	39.707 ft MSL

Job. No. 29600.32.3215	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile Drill, Model B-61		Boring No. EA-110R
Core Barrel used: Hx		Sheet 2 of 2

Packer Test

Tested	yes	
Interval	all	

See packer test log if applicable

Drilling Times	Start	Finish
	01/21/98	01/21/98
	900	1600

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
Run 4/5 (103 to 108 ft bgs) recovery 100% RQD 98%				103		Medium light gray fine grained quartzite. White veins throughout (dolomite). Low angle fractures at 3", 11",	1	06:30	104
				104		15", 25", 27", 33", 44.5", 52", and 58". No high angle fractures.	1	06:00	105
				105			1	05:30	106
				106			1	06:30	107
Run 5/5 (108 to 113 ft bgs) recovery 100% RQD 84%				107			1	05:30	108
				108		Medium light gray quartzite (as above), with more white mineralization at bottom. Low angle fractures at 3", 14",	1	05:00	109
				109		18", 22.5", 28", 33", 46", 48", and 54". High angle fractures at 39-43", and 48-51".	1	05:30	110
				110			1	07:30	111
				111			1	08:00	112
				112			1	09:00	113
				113					

NOTES:

Logged by: Robin Clark

Drilling Contractor: M&R Environmental Drilling

Driller: Phil Thomsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 193585.90 E: 520162.80
Surface Elevation:	33.9 FT MSL
Well Riser Elevation:	35.91 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike
Drilling Method: Mobile Drill, Model B-61 Rig; 4 in. FJ casing drive and wash		Boring No. EA-111D
Sampling Method: 2 in. split spoon		Sheet 1 of 4

Drilling Water Level			Start	Drilling Times	Finish
Date			01/20/98		01/22/98
Time			1400		1600

Surface Conditions: grassy

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						0		
						1		
						2		
						3		
SPT	24 / 11	4	S1 / 4-6	0.0		4		0-9 inches: Dark olive gray fine to medium sand, little subangular gravel up to 1 inch, trace coarse sand.
						5		9-11 inches: Brown subangular to subrounded gravel up to 1 inches, moist.
						6		
						7		
						8		
SPT	24 / 10	9	S2 / 9-11	0.0	9 10 11 7	9 10		Olive gray medium sand, trace coarse sand, trace rounded gravel up to 1 inch, wet.
						11		
						12		
						13		
SPT	24 / 12	14	S3 / 14-16	0.2	6 9 10 10	14 15		Same as above with little coarse sand, wet.
						16		
						17		
						18		
SPT	24 / 10	19	S4 / 19-21	0.2	5 8 8 11	19 20		Light gray fine sand, wet.

Logged by: Robin Clark (pg 1), Kevin Caldwell (pg 2-4). Date: 01/22/98

Drilling Contractor: M & R Environmental Drilling Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	49.5-64.5 ft bgs	Sandpack:	48-65 ft bgs	Grout:	46 ft-grade
Bottom of Hole:	73 ft bgs	Riser Interval:	49.5 ft bgs-2 ft ags	Bentonite:	46-48 ft bgs	Cover:	4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 193585.90 E: 520162.80
Surface Elevation:	33.9 FT MSL
Well Riser Elevation:	35.91 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike
Drilling Method: Mobile Drill, Model B-61 Rig; 4 in. FJ casing drive and wash		Boring No. **EA-111D**
Sampling Method: 2 in. split spoon		Sheet 2 of 4
Drilling Water Level / Date / Time		Start: 01/20/98 1400; Drilling Times; Finish: 01/22/98 1600
Surface Conditions: grassy		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						20		
						21		
						22		
						23		
SPT	24 / 10	24	S5 24-26	0.4	6 / 12 / 16 / 12	24		Light gray fine sand, wet.
						25		
						26		
						27		
						28		
SPT	24 / 14	29	S6 29-31	1.1	5 / 7 / 7 / 7	29		same as above
						30		
						31		
						32		
						33		
SPT	2-4 / 12	34	S7 34-36	0.8	4 / 5 / 5 / 5	34		Light gray fine sand, little clay, slighty plastic, wet
						35		
						36		
						37		
						38		
SPT	2-4 / 15	39	S8 39-41	0.0	4 / 2 / 2 / 2	39		Black silty clay, some fine sand, slightly plastic, wet.
						40		

Logged by: Robin Clark (pg 1), Kevin Caldwell (pg 2-4). Date: 01/22/98

Drilling Contractor: M & R Environmental Drilling Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	49.5-64.5 ft bgs	Sandpack:	48-65 ft bgs	Grout:	46 ft-grade
Bottom of Hole:	73 ft bgs	Riser Interval:	49.5 ft bgs-2 ft ags	Bentonite:	46-48 ft bgs	Cover:	4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 193585.90 E: 520162.80
Surface Elevation:	33.9 FT MSL
Well Riser Elevation:	35.91 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike
Drilling Method: Mobile Drill, Model B-61 Rig; 4 in. FJ casing drive and wash		Boring No. EA-111D
Sampling Method: 2 in. split spoon		Sheet 3 of 4
Drilling Water Level / Date / Time		Start 01/20/98 1400; Drilling Times; Finish 01/22/98 1600
Surface Conditions: grassy		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						40		
						41		
						42		
						43		
SPT	24 / 12	44	S9 44-46	0.0	5, 4, 2, 4	44		Same as 39-41
						45		
						46		
						47		
						48		
SPT	24 / 15	49	S10 49-51	11.6	5, 4, 2, 3	49		Same as 44-46
						50		
						51		
						52		
						53		
SPT	24 / 3	54	S11 54-56	0.0	13, 26, 23, 14	54		Black clayey silt, little angular gravel up to 1.5", wet.
						55		
SPT	24 / 6	54	S12 56-58	0.6	27, 34, 57, 46	56		Black clayey silt with coarse sand and gravel up to 2", (till).
						57		
SPT	24 / 12	58	S13 58-60	0.0	19, 14, 15, 19	58		Same as 56-58
						59		
						60		see next page.

Logged by: Robin Clark (pg 1), Kevin Caldwell (pg 2-4). Date: 01/22/98

Drilling Contractor: M & R Environmental Drilling Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	49.5-64.5 ft bgs	Sandpack:	48-65 ft bgs	Grout:	46 ft-grade
Depth of Hole:	73 ft bgs	Riser Interval:	49.5 ft bgs-2 ft ags	Bentonite:	46-48 ft bgs	Cover:	4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 193585.90 E: 520162.80
Surface Elevation: 33.9 FT MSL
Well Riser Elevation: 35.91 FT MSL

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	SITE 03/Nike

Drilling Method: Mobile Drill, Model B-61 Rig; 4 in. FJ casing drive and wash

Boring No. **EA-111D**

Sampling Method: 2 in. split spoon

Sheet 4 of 4

Drilling Water Level		
Date		
Time		

Surface Conditions: grassy

Start	Drilling Times	Finish
01/20/98 1400		01/22/98 1600

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
SPT	24 / 14	60	S14 60-62	8.3	26 / 24	60		Black clayey silt with coarse sand and subrounded gravel up to 1.5", wet.
					19 / 24	61		
SPT	24 / 10	62	S15 62-64	0.4	14 / 17	62		Same as 60-62
					23 / 25	63		
SPT	21 / 6	64	S16 64-66	0.0	17 / 100/3	64		Same as 62-64
						65		spoon refusal at 64'9".
						66		Roller bit to 68 ft bgs
						67		Cored from 68-73 ft bgs
						68		BOH=73 ft bgs
						69		
						70		
						71		
						72		
						73		
						74		
						75		
						76		
						77		
						78		
						79		
						80		

Logged by: Robin Clark (pg 1), Kevin Caldwell (pg 2-4). Date: 01/22/98

Drilling Contractor: M & R Environmental Drilling Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	49.5-64.5 ft bgs	Sandpack:	48-65 ft bgs	Grout:	46 ft-grade
Bottom of Hole:	73 ft bgs	Riser Interval:	49.5 ft bgs-2 ft ags	Bentonite:	46-48 ft bgs	Cover:	4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 193585.9024 E: 520162.8032
Surface Elevation:	33.929 ft MSL
Well Riser Elevation:	35.909 ft MSL

Job. No. 29600.32.3215	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile Drill, Model B-61		Boring No. EA-111D
Core Barrel used: Hx		Sheet 1 of 1

Packer Test

Tested	NA	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	01/22/98 1000	01/22/98 1230

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
Run 1/1 (68 to 73 ft bgs) recovery = 60% RQD = 18%				68		Medium gray Quartzite, mostly broken, blocky, pieces.	1	05:00	69
						Rust on some fracture surfaces. Mica visible throughout			
				69		Broken core from 0-21 inches.	1	05:00	70
						Competent from 21" to 36" (bottom): Low angle			
				70		fractures at 24", and 29". High angle fractures	1	06:00	71
						at 21-24", 30-34.5". Broken at bottom.			
				71			1	07:00	72
				72			1	19:00	73
				73					

NOTES:

Logged by: Robin Clark

Drilling Contractor: M&R Environmental Drilling

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 193577.94 E: 520156.71
Surface Elevation: 33.9 FT MSL
Well Riser Elevation: 35.71 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike
Drilling Method: Mobile Drill, Model B-61 Rig; 6 in. FJ casing drive and wash		Boring No. EA-111R
Sampling Method: 3 in. split spoon		Sheet 1 of 2
Drilling Water Level / Date / Time		Start: 01/23/98 800; Drilling Times; Finish: 01/28/98 800
Surface Conditions: grassy		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						40		for overburden description from grade to 43 ft bgs, refer to boring log of EA-111D.
						41		
						42		
						43		
SB 3"	24 / 9	44	S1 44-46	NA	12 / 8	44		0-4 inches: Gravel (wash)
					7 / 8	45		4-9 inches: Dark gray very fine sand, trace silt, wet.
						46		
						47		
						48		
SB 3"	24 / 22	49	S2 49-51	0.4	2 / 5 / 4 / 3	49		Dark gray very fine sand, trace silt, wet.
						50		
						51		
						52		
						53		
SB 3"	24 / 8	54	S3 54-56	0.2	20 / 23 / 14 / 13	54		Dark gray fine to coarse sand and subangular to subrounded gravel up to 2 in. some silt, wet.
						55		
						56		
						57		
						58		
						59		
						60		see next page.

Logged by: Robin Clark Date: 01/28/98

Drilling Contractor: M & R Environmental Drilling Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	65-90 ft bgs	Sandpack:	64-90 ft bgs	Grout:	62 ft bgs-grade
Bottom of Hole:	90 ft bgs	Riser Interval:	65 ft bgs –2 ft ags	Bentonite:	62-64 ft bgs	Cover:	6" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 193577.94 E: 520156.71
Surface Elevation:	33.9 FT MSL
Well Riser Elevation:	35.71 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike	
Drilling Method: Mobile Drill, Model B-61 Rig; 6 in. FJ casing drive and wash		Boring No. EA-111R	
Sampling Method: 3 in. split spoon		Sheet 2 of 2	
Drilling Water Level / Date / Time		Start: 01/23/98 800	Finish: 01/28/98 800
Surface Conditions: grassy			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
SB 3"	24 12	60	S4 60-62	0.2	10 34 35 155	60 61		Till - Dark gray angular to subangular gravel up to 2in., and fine to coarse sand, little silt, moist.
						62		spoon refusal at 62 ft bgs
						63		roller bit from 62 to 65 ft bgs
						64		
						65		cored from 65 -90 ft bgs
						66		BOH= 90 ft bgs
						67		
						68		
						69		
						70		
						71		
						72		
						73		
						74		
						75		
						76		
						77		
						78		
						79		
						80		

Logged by: Robin Clark Date: 01/28/98

Drilling Contractor: M & R Environmental Drilling Driller: Brad Haase

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	65-90 ft bgs	Sandpack:	64-90 ft bgs	Grout:	62 ft bgs-grade
Bottom of Hole:	90 ft bgs	Riser Interval:	65 ft bgs -~2 ft ags	Bentonite:	62-64 ft bgs	Cover:	6" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 193577.9428 E: 520156.7106
Surface Elevation:	33.899 ft MSL
Well Riser Elevation:	35.709 ft MSL

Job. No. 29600.32.3215	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile Drill, Model B-61		Boring No. EA-111R
Core Barrel used: Hx		Sheet 1 of 2

Packer Test

Tested	yes	
Interval	all	

See packer test log if applicable

Drilling Times	Start	Finish
	01/29/98 930	01/29/98 1500

Core Run / Run # / REC / RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
Run 1/5 (65 to 70 ft bgs) recovery 80% RQD 13%				65		Medium light gray (N6) fine grained quartzite. Broken blocky pieces mostly, rust on most fractures.	1	03:00	66
				66			1	04:00	67
				67			1	10:00	68
				68			1	22:00	69
				69			1	11:00	70
Run 2/5 (70 to 75 ft bgs) recovery 100% RQD 59%				70		Medium light gray quartzite (as above) with rust on most fractures. Low angle fractures at 6", 12", 17", 38", 52".	1	05:00	71
				71		High angle fractures at 13-15", 20-21", 28-31", 33", 41-43", and 49-53". White mineral at 22" and 30"	1	03:00	72
				72			1	03:00	73
				73			1	03:00	74
				74			1	04:00	75
Run 3/5 (75 to 80 ft bgs) recovery 100% RQD 52%				75		Quartzite (as above) with rust on most fractures. Low angle fractures at 6", 10", 25", 28", 36", 38", 44", 46", 51", 53", and 57". High angle fractures at 12-15", 16-19", 28-34", 41-44", 51-52", and 58-60".	1	03:00	76
				76			1	03:00	77
				77			1	04:00	78
				78			1	04:00	79
				79			1	12:00	80
				80		see next page.			

NOTES:

Logged by: Robin Clark

Drilling Contractor: M&R Environmental Drilling

Driller: Brad Haase

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 193577.9428 E: 520156.7106
Surface Elevation:	33.899 ft MSL
Well Riser Elevation:	35.709 ft MSL

Job. No. 29600.32.3215	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile Drill, Model B-61		Boring No. EA-111R
Core Barrel used: Hx		Sheet 2 of 2

Packer Test

Tested	yes	
Interval	all	

See packer test log if applicable

Drilling Times	Start	Finish
	01/29/98 930	01/29/98 1500

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
Run 4/5 (80 to 85 ft bgs) recovery 100% RQD 53%				80		0-38 inches: Quartzite as above, lighter gray and coarser at bottom. Mica visible throughout. A porous zone is present at 12-20 inches. Fewer rust covered fractures. Low angle fractures at 6", 14", 18", 25", and 28". High angle fractures at 7-10", 12-15", and 25-26".	1	03:00	81
				81			1	03:00	82
				82			1	03:00	83
				83		38-60 inches: Medium dark gray (N4) Phyllite Low angle fractures at 40", 41", 50", 52", 54", and 56". High angle fractures at 41-45".	1	05:00	84
Run 5/5 (85 to 90 ft bgs) recovery 100% RQD 47%				84		Dark gray phyllite, with bands of quartzite at 43-47" and 34". Low angle fractures at 2", 3", 4", 5", 5.5", 11.5", 14",	1	04:00	85
				85		14.5", 19", 19.5", 21", 22", 24", 25.5", 26", 29.5", 32",	1	05:00	86
				86		37", 38.5", 43", 52", 53", 54", 55", 57", and 59.5" Vertical angle fracture at 37-38". Rust on fractures at 3", 19-22", 55" and bottom 5".	1	05:00	87
				87		White mineral at 16" on fracture.	1	10:00	88
				88			1	08:00	89
				89			1	06:00	90
				90					
				91					
				92					
				93					
				94					
				95					

NOTES:

Logged by: Robin Clark

Drilling Contractor: M&R Environmental Drilling

Driller: Brad Haase

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 195321.62 E: 519176.54
Surface Elevation: 45.9 FT MSL
Well Riser Elevation: 48.06 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike
Drilling Method: Mobile Drill Model B-61; 5 inch FJ casing drive and wash		Boring No. EA-112D
Sampling Method: 2 inch split spoon		Sheet 1 of 5
Drilling Water Level / Date / Time		Start 1200 01/23/98; Drilling Times; Finish 1630 01/29/98
Surface Conditions: wooded		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
SPT	24 / 11	0	S1 0-2	20.4*	1, 2, 2, 2	0, 1, 2		Brown fine sand and silt (top soil), top 1/2 inch hemic organics, dry. * PID reading elevated due to organics in sample.
SPT	24 / 18	3	S2 3-5	3.0	18, 35, 44, 38	3, 4, 5, 6, 7, 8		0-6 inches: Light gray fine sand, some silt, dry. 6-18 inches: Olive gray fine sand, some silt, little gravel (SA) up to 1 inch, trace coarse sand, dry.
SPT	24 / 11	9	S3 9-11	0.4	15, 21, 70, 45	9, 10, 11, 12, 13		Olive gray fine to coarse sand, and gravel (SA-SR), up to 1 inch, little silt, wet.
SPT	24 / 13	14	S4 14-16	0.4	10, 13, 13, 20	14, 15, 16, 17, 18		Olive gray medium sand, trace silt, trace coarse sand, trace SR-R gravel up to 3/4 inch, wet.
SPT	24 / 10	19	S5 19-21	0.4	14, 19, 24, 32	19, 20		Dark Olive gray fine to coarse sand and gravel (A-SA) up to 1 inch, wet.

Logged by: Robin Clark Date: 01/29/98

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 inches	Screen Interval:	86 to 96 ft bgs	Sandpack:	85 to 96.2 ft bgs	Grout:	81 ft bgs to grade
Bottom of Hole:	102 ft bgs	Riser Interval:	86 ft bgs to 28 in. ags	Bentonite:	81 to 85 ft bgs	Cover:	4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville
Location:	SITE 03/Nike
Drilling Method:	Mobile Drill Model B-61, 5 inch FJ casing drive and wash
Boring No.	EA-112D
Sampling Method:	2 inch split spoon
Sheet	2 of 5
Coordinates:	N: 195321.62 E: 519176.54
Surface Elevation:	45.9 FT MSL
Well Riser Elevation:	48.06 FT MSL
Drilling Water Level / Date / Time	
Start / Drilling Times / Finish	1200 01/23/98 — 1630 01/29/98
Surface Conditions:	wooded

Sample Type	Inchds Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
SPT	24 / 16	24	S6 / 24-26	0.0	14 / 16 / 17 / 23	24		Dark brown fine to medium sand, little silt, trace coarse sand, wet.
SPT	24 / 10	29	S7 / 29-31	0.4	7 / 8 / 8 / 9	29		Olive gray as above with trace rounded gravel up to 1/2 inch.
SPT	24 / 7	34	S8 / 34-36	0.0	7 / 7 / 6 / 7	34		Same as above.
SPT	24 / 10	39	S9 / 39-41	0.2	5 / 6 / 5 / 7	39		Olive gray medium sand, some rounded gravel up to 1/2 inch, trace silt, wet.

Logged by: Robin Clark — Date: 01/29/98

Drilling Contractor: M & R Environmental Drilling — Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 inches	Screen Interval:	86 to 96 ft bgs	Sandpack:	85 to 96.2 ft bgs	Grout:	81 ft bgs to grade
Bottom of Hole:	102 ft bgs	Riser Interval:	86 ft bgs to 28 in. ags	Bentonite:	81 to 85 ft bgs	Cover:	4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 195321.62 E: 519176.54
Surface Elevation:	45.9 FT MSL
Well Riser Elevation:	48.06 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike
Drilling Method: Mobile Drill Model B-61; 5 inch FJ casing drive and wash		Boring No. EA-112D
Sampling Method: 2 inch split spoon		Sheet 3 of 5
Drilling Water Level / Date / Time		Start 1200 01/23/98; Drilling Times; Finish 1630 01/29/98
Surface Conditions: wooded		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						40		
						41		
						42		
						43		
SPT	24 / 7	44	S10 44-46	0.4	8 10 12 13	44 45 46 47 48		Same as above, trace gravel
SPT	24 / 8	49	S11 49-51	0.6	10 12 13 15	49 50 51 52 53		Olive gray fine to coarse sand and SR-R gravel up to 3/4 inch, trace silt, wet.
SPT	24 / 17	54	S12 54-56	0.4	7 8 9 10	54 55 56 57 58		Olive gray medium sand, trace coarse sand, trace silt, wet.
SPT	24 / 15	59	S13 59-61	0.2	7 14 12 9	59 60		0-5 inches: Olive gray fine sand 5-15 inches: olive gray fine to coarse sand, trace gravel up to 1 inch (SA) rusted lens at 7 to 8 inches. Very fine sand in spoon tip, wet.

Logged by: Robin Clark Date: 01/29/98

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 inches	Screen Interval:	86 to 96 ft bgs	Sandpack:	85 to 96.2 ft bgs	Grout:	81 ft bgs to grade
Bottom of Hole:	102 ft bgs	Riser Interval:	86 ft bgs to 28 in. ags	Bentonite:	81 to 85 ft bgs	Cover:	4" Locking

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 195321.62 E: 519176.54
Surface Elevation:	45.9 FT MSL
Well Riser Elevation:	48.06 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville		Location: SITE 03/Nike
Drilling Method: Mobile Drill Model B-61; 5 inch FJ casing drive and wash			Boring No. **EA-112D**
Sampling Method: 2 inch split spoon			Sheet 4 of 5
Drilling Water Level			Start 1200 01/23/98
Date			Drilling Times
Time			Finish 1630 01/29/98
Surface Conditions: wooded			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						60		
						61		
						62		
						63		
SPT	24 / 12	64	S14 64-66	0.0	7 / 14	64		0-4 inches: Dark gray clayey silt 4-12 inches: Same as bottom of 59-61', wet.
					13 / 13	65		
						66		
						67		
						68		
SPT	24 / 0	69	69-71	NA	14 / 12	69		Second attempt: Dark gray gravel (SA-SR) up to 1/2 inch and fine to medium sand, some silt, wet.
SPT	24 / 4	69	S15 69-71	0.2	15 / 11	70		
						71		
						72		
						73		
SPT	24 / 13	74	S16 74-76	0.0	9 / 7	74		Dark gray very fine sand, trace to little silt, wet.
					11 / 12	75		
						76		
						77		
						78		rollerbit through stone from 79-79.5
SPT	24 / 11	79	S17 79.5-81.5	0.2	20 / 14	79		Dark gray fine to coarse sand and angular gravel to 1 inch, some silt, wet. (till)
					5 / 43	80		

Logged by: Robin Clark Date: 01/29/98

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 inches	Screen Interval:	86 to 96 ft bgs	Sandpack:	85 to 96.2 ft bgs	Grout:	81 ft bgs to grade
Depth of Hole:	102 ft bgs	Riser Interval:	86 ft bgs to 28 in. ags	Bentonite:	81 to 85 ft bgs	Cover:	4" Locking

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 195321.62 E: 519176.54
Surface Elevation:	45.9 FT MSL
Well Riser Elevation:	48.06 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike
Drilling Method: Mobile Drill Model B-61; 5 inch FJ casing drive and wash		Boring No. **EA-112D**
Sampling Method: 2 inch split spoon		Sheet 5 of 5
Drilling Water Level / Date / Time		Start 1200 01/23/98; Drilling Times; Finish 1630 01/29/98
Surface Conditions: wooded		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						80		
						81		
						82		
						83		
SPT	13 / 7	84	S18 84-85	0.0	79 / 57 / 100/1	84		0-3 inches: gray angular gravel up to 1 inch 3-7 inches: till as above.
						85		
						86		
						87		
						88		
SPT	1 / 0	84	89-89.1	NA	100/1	89		2 inches of wash gravel
						90		Driller reports shale cuttings at 90 ft.
						91		
						92		
						93		
SPT	4 / 4	84	S19 94-94.3	0.0	200/4	94		Dark gray to black shale with clay and silt partings, shale is very brittle and platy
						95		
						96		Driller reports change at 96 to harder rock, lighter cuttings.
						97		rollerbit to 97 ft
						98		cored from 97 to 102 ft. Bottom of boring at 102 ft bgs.
						99		
						100		

Logged by: Robin Clark Date: 01/29/98

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 inches	Screen Interval:	86 to 96 ft bgs	Sandpack:	85 to 96.2 ft bgs	Grout:	81 ft bgs to grade
Bottom of Hole:	102 ft bgs	Riser Interval:	86 ft bgs to 28 in. ags	Bentonite:	81 to 85 ft bgs	Cover:	4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Job. No. 29600.32.3215	Client: NORDIV/NAVFAC NCBC Davisville
Location: NIKE Site	
Drilling Method: Mobile Drill, Model B-61	
Boring No. *EA-112D*	
Coordinates: N: 195321.62 E: 519176.54	
Surface Elevation: 45.9 FT MSL	
Well Riser Elevation: 48.06 FT MSL	
Core Barrel used: Hx	
Sheet 1 of 1	

Packer Test

Tested	NA	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	01/29/98 1500	01/29/98 1630

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
Run 1/1 recovery = 80% RQD = 17%				97		0-20 inches: Med light gray quartzite. Blocky broken pieces from 8-20 inches. dolomite filled fractures throughout.	1	08:00	98
				98		20-60 inches: medium gray interbedded shale and phyllite. Broken blocky pieces from 26-30" and 43-44".	1	05:45	99
				99			1	07:30	100
				100			1	09:50	101
				101			1	09:30	102
				102					

NOTES:

Logged by: Robin Clark

Drilling Contractor: M&R Environmental Drilling

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 195326.33 E: 519191.48
Surface Elevation: 46.0 FT MSL
Well Riser Elevation: 48.52 FT MSL

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	SITE 03/Nike

Drilling Method: Mobile Drill, Model B-61 Rig; 6 in. FJ casing drive and wash

Boring No. EA-112R

Sampling Method: NA

Sheet 1 of 1

Drilling Water Level			Start	Drilling Times	Finish
Date			02/02/98		02/10/98
Time			1530		1400
Surface Conditions:	woodland, leaves				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						0		Refer to boring log of EA-112D for overburden description.
						1		Roller bit from 81-85 ft bgs.
						2		cored from 85-126'4"
						3		BOH= 126.3 ft bgs
						4		
						5		
						6		
						7		
						8		
						9		
						0		
						1		
						2		
						3		
						4		
						5		
						6		
						7		
						8		
						9		
						0		

Logged by: Robin Clark Date: 02/10/98

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	1.5 in.	Screen Interval:	96.5-121.5 ft bgs	Sandpack:	121.5-95.5 ft bgs	Grout:	85 ft bgs-grade
Bottom of Hole:	126.3 ft bgs	Riser Interval:	96.5 ft bgs--28 in. ags	Bentonite:	85-95.5 ft bgs	Cover:	6" Locking Steel

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EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 195326.3272 E: 519191.4841
Surface Elevation:	45.989 ft MSL
Well Riser Elevation:	48.519 ft MSL

Job. No. 29600.32.3215	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile Drill, Model B-61		Boring No. EA-112R
Core Barrel used: Hx from 85-95 ft bgs, Nx from 96-126.3 ft bgs.		Sheet 2 of 3
Packer Test: Tested yes; Interval Runs 4-8		Drilling Times: Start 01/21/98 900; Finish 01/21/98 1600
See packer test log if applicable		

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
Run 4/8 (100 to 105 ft bgs) recovery 100% RQD 57%				101		0-57 inches: Medium light gray fine grained quartzite. Highly fractured from 0-23", after 23": High angle	1	06:45	102.3
				102		fractures at 23-27", and 47-49". Low angle fractures at 30.5", 46.5", and 53".	1	03:45	103.3
				103		57-60 inches: Medium dark gray Phyllite	1	04:00	104.3
				104			1	03:45	105.3
				105			1	04:15	106.3
Run 5/8 (105 to 110 ft bgs) recovery 100% RQD 68%				106		0-14 inches: Dark gray phyllite, one fracture at 8-10".	1	04:30	107.3
				107		14-31 inches: Dark gray phyllite with polished slickensided surface, very soft. broken platy	1	05:30	108.3
				108		pieces throughout this interval. White mineralization from 20-43". 31-43 inches: Dark gray phyllite with	1	04:30	109.3
				109		convoluted white mineralization throughout. Low angle fractures at 35", 39",and 43".	1	04:30	110.3
				110		43-60 inches: Dark gray phyllite as 0-14 inches. Low angle fractures at 53.25" and 57.5".	1	05:15	111.3
Run 6/8 (110 to 115 ft bgs) recovery 100% RQD 73%				111		0-32 inches: Medium dark gray phyllite/very fine grained	1	08:00	112.3
				112		quartzite. Low angle fractures at 9.5", 17", 29", 37", 42", and 43". One vertical fracture from 9.5-16".	1	07:00	113.3
				113		32-60 inches: Dark gray phyllite, broken platy pieces from 32-37", white mineralization throughout.	1	05:00	114.3
				114			1	05:00	115.3
				115			1	05:20	116.3
				116					
						see next page			

NOTES:

Logged by: Robin Clark

Drilling Contractor: M&R Environmental Drilling

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 195326.3272 E: 519191.4841
Surface Elevation:	45.989 ft MSL
Well Riser Elevation:	48.519 ft MSL

Job. No. 29600.32.3215	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile Drill, Model B-61		Boring No. EA-112R
Core Barrel used: Hx from 85-95 ft bgs, Nx from 96-126.3 ft bgs.		Sheet 1 of 3

Packer Test

Tested	yes	
Interval	Runs 4-8	

See packer test log if applicable

Drilling Times	Start	Finish
	01/21/98	01/21/98
	900	1600

Core Run / Run # / REC / RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
Run 1/8 (85 to 90 ft bgs) recovery 100% RQD 37%				85		0-37 inches: Med gray fine grained quartzite. Broken blocky pieces throughout. Mica visible in top 8 inches.	1	06:50	86
				86		Few rusted fractures.	1	09:30	87
				87		37-60 inches: grades to dark gray Phyllite. Broken to 45 inches, then low angle fractures at 45", 49.5", and 58.25". High angle fracture from 54-58".	1	10:00	88
				88			1	10:45	89
				89			1	20:00	90
Run 2/8 (90 to 95 ft bgs) recovery 100% RQD 74%				90		Fine grained medium light gray Quartzite. Broken pieces from 0 to 13". Low angle fractures at 28" and 34". At 45"	1	04:30	91
				91		broken again to bottom. Lighter gray on bottom 2 inches. Dolomite on fracture at bottom, muscovite mica on	1	05:00	92
				92		bottom portion also.	1	07:00	93
				93			0.5	13:30	93.5
				94					
				95					
Run 3/8 (95 to 100 ft bgs) recovery 100% RQD 90%				96		0-30 inches: Medium dark gray phyllite with hairline white filled fractures throughout. Low angle fractures at 10", 12",	1	05:00	97.3
				97		15", and 26".	1	08:00	98.3
				98		30-60 inches: grades to medium light gray quartzite with thin beds of dark gray phyllite throughout. Low angle	1	04:00	99.3
				99		fractures at 33", 40", 43", and 52". High angle fractures at 45-47", and 50-54". Broken blocky core from 40-43.	1	03:00	100.3
				100			1	03:00	101.3
				101		see next page.			

NOTES:

Logged by: Robin Clark

Drilling Contractor: M&R Environmental Drilling

Driller: Phil Thornsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 195128.88 E: 518645.89
Surface Elevation:	28.7 FT MSL
Well Riser Elevation:	31.42 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike	
Drilling Method: Mobile Drill, Model B-61 Rig 5" and 4" FJ casing drive and wash 3 7/8" rollerbit		Boring No. **EA-113D**	
Sampling Method: 2" split spoon		Sheet 1 of 3	
Drilling Water Level		Start: 800 02/17/98	Finish: 1200 02/19/98
Date			
Time			
Surface Conditions: woodland			

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						0		
						1		
						2		
						3		
SPT	24 / 18	4	S1 4-6	0.2	4, 6, 7, 8	4		Yellow orange fine sand, trace to little silt, wet.
						5		
						6		
						7		
						8		
SPT	24 / 17	9	S2 9-11	0	4, 5, 4, 6	9		Yellow orange on top, light gray at bottom, fine sand, trace silt, wet.
						10		
						11		
						12		
						13		
SPT	24 / 16	14	S3 14-16	0.2	5, 6, 5, 4	14		Light and olive gray with yellow-orange 1/4" color bands throughout very fine to fine sand, trace silt, wet.
						15		
						16		
						17		
						18		
SPT	24 / 15	19	S4 19-21	0	7, 7, 8, 10	19		Olive gray (except 6-8", which is yellow orange): 0-4 inches: very fine sand
						20		4-15 inches: fine to medium sand, trace silt, wet.

Logged by: Robin Clark Date: 02/19/98

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 "	Screen Interval:	42.5'-52.5'	Sandpack:	53'-41.5'	Grout:	38' bgs-grade
Bottom of Hole:	55'	Riser Interval:	42.5 ' bgs-~3"ags	Bentonite:	41.5'-38'	Cover:	4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 195326.3272 E: 519191.4841
Surface Elevation:	45.989 ft MSL
Well Riser Elevation:	48.519 ft MSL

Job. No. 29600.32.3215	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile Drill, Model B-61		Boring No. EA-112R
Core Barrel used: Hx from 85-95 ft bgs, Nx from 96-126.3 ft bgs.		Sheet 3 of 3

Packer Test

Tested	yes	
Interval	Runs 4-8	

See packer test log if applicable

Drilling Times	Start	Finish
	01/21/98 900	01/21/98 1600

Core Run / Run # / REC / RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
Run 7/8 (115 to 120 ft bgs) recovery 100% RQD 100%				116		Medium light gray quartzite banded with phyllite. Quartz filled veins at 32 and 28 inches.	1	04:45	117.3
				117			1	04:30	118.3
				118			1	04:00	119.3
				119			1	04:00	120.3
				120			1	04:30	121.3
Run 8/8 (120 to 125 ft bgs) recovery 100% RQD 92%				121		Medium light gray quartzite banded with phyllite as above	1	08:30	122.3
				122		Horizontal fractures at 3", 9", 36.25", 45", 50.5", and 55.5". White mineral filled fractures (quartz or calcite) at 41-46" and 55-60".	1	05:00	123.3
				123			1	04:30	124.3
				124			1	05:15	125.3
				125			1	04:40	126.3
				126					

NOTES:

Logged by: Robin Clark

Drilling Contractor: M&R Environmental Drilling

Driller: Phil Thomsbury

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 195128.88 E: 518645.89
Surface Elevation:	28.7 FT MSL
Well Riser Elevation:	31.42 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike
Drilling Method: Mobile Drill, Model B-61 Rig; 5" and 4" FJ casing drive and wash; 3 7/8" rollerbit		Boring No. EA-113D
Sampling Method: 2" split spoon		Sheet 3 of 3
Drilling Water Level / Date / Time		Start 800 02/17/98; Drilling Times; Finish 1200 02/19/98
Surface Conditions: woodland		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						40		
SPT	24 / 3	41	S9 41-43	0.2	23 / 26	41		Dark olive gray silt, some coarse sand, dry
					44 / 103	42		
SPT	6 / 5	41	S10 43-43	0.8	103	43		Olive gray with fine brown layers, silt with clay aggregates up to 1/4 inches, dry.
						44		
SPT	4 / 4	41	S11 45-45	0.6	200/4	45		weathered rock- dark gray angular gravel up to 1 inch, little silt, wet.
						46		
SPT	3 / 3	41	S12 47-47	1.6	200/3	47		dark gray clayey silt with medium to coarse sand and rounded gravel up to 1/2 inches, wet.
						48		
SPT	5 / 4	41	S13 49-49	0.8	200/5	49		light gray angular to subangular gravel up to 1 inch, little silt, wet.
						50		rollerbit to 50 ft.
						51		cored 50-55 ft bgs.
						52		
						53		
						54		
						55		Bottom of hole = 55 ft bgs
						56		
						57		
						58		
						59		
						60		

Logged by: Robin Clark Date: 02/19/98

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 "	Screen Interval:	42.5'-52.5'	Sandpack:	53'-41.5'	Grout:	38' bgs-grade
Bottom of Hole:	55'	Riser Interval:	42.5 ' bgs-~3"ags	Bentonite:	41.5'-38'	Cover:	4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 195128.88 E: 518645.89
Surface Elevation:	28.7 FT MSL
Well Riser Elevation:	31.42 FT MSL

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville	Location: SITE 03/Nike
Drilling Method: Mobile Drill, Model B-61 Rig 5" and 4" FJ casing drive and wash 3 7/8" rollerbit		Boring No. **EA-113D**
Sampling Method: 2" split spoon		Sheet 2 of 3
Drilling Water Level Date Time		Start 800 02/17/98 / Drilling Times / Finish 1200 02/19/98
Surface Conditions: woodland		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION
						20		
						21		
						22		
						23		
SPT	24 13	24	S5 24-26	0	17 17	24		Olive gray, fine to coarse sand and rounded to subangular gravel up to 1 inch, trace silt, wet.
					13 10	25		
						26		
						27		
						28		
SPT	24 10	29	S6 29-31	0	4 7	29		same as above except gravel subangular to subrounded.
					5 6	30		
						31		
						32		
						33		
SPT	24 0	34			4 6	34		no recovery on first attempt. second attempt: same as above.
SPT	24 7	34	S7 34-36	0	14 16	35		
						36		22 inch boulder at 36 ft.
						37		
						38		
SPT	24 15	38	S8 39-41	-4.0	21 39	39		0-3 inches: dark gray silt 3-15 inches: alternate layers of light brown gray and olive gray silt with
					40 50	40		decomposed rock, little coarse sand, damp.

Logged by: Robin Clark Date: 02/19/98

Drilling Contractor: M & R Environmental Drilling Driller: Phil Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 "	Screen Interval:	42.5'-52.5'	Sandpack:	53'-41.5'	Grout:	38' bgs-grade
Bottom of Hole:	55'	Riser Interval:	42.5 ' bgs--3"ags	Bentonite:	41.5'-38'	Cover:	4" Locking Steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 195128.88 E: 518645.89
Surface Elevation:	28.7 FT MSL
Well Riser Elevation:	31.42 FT MSL

Job. No. 29600.32.3215	Client: NORDIV/NAVFAC NCBC Davisville	Location: NIKE Site
Drilling Method: Mobile Drill, Model B-61		Boring No. *EA-113D*
Core Barrel used: Nx		Sheet 1 of 1

Packer Test

Tested	NA	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	02/18/98 1100	02/18/98 1320

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
Run 1/1 recovery = 100% RQD = 50%				50		0-24 inches:Dark gray phyllite, horizontal breaks through-	1	12	51
						out with no pieces larger than 3 inches. Glitters in			
				51		sunlight, very small mica grains visible.	1	16	52
						24-60 inches: Medium light gray banded gneiss. Quartz			
				52		filled veins throughout, horizontal breaks from 24-30", as	1	6	53
						above. From 30 inches to bottom: low angle fractures at			
				53		42", 47", 50" and 55". Vertical fracture from 42-47".	1	5	54
				54			1	5	55
				55					

NOTES:

top 30 inches of core very broken. RQD in this zone is 0%
competent rock is in bottom 30 inches.

Logged by: Robin Clark

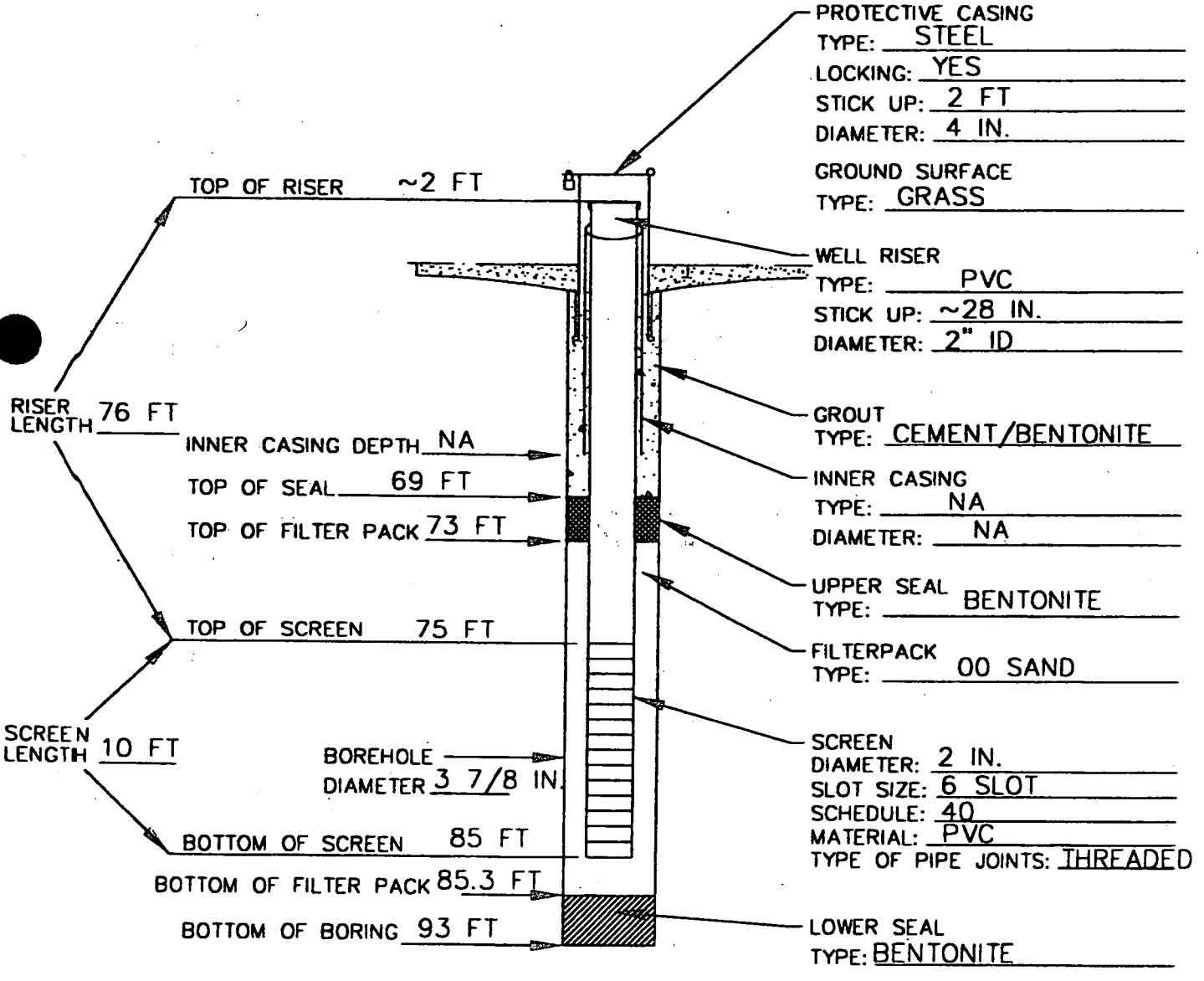
Drilling Contractor: M&R Environmental Drilling

Driller: Phil Thornsbury

MONITORING WELL CONSTRUCTION

EA-110D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE	
DATE INSTALLED: 1/12/98	PROJECT No. 29600.32.3215
ELEVATION OF GROUND SURFACE: 38.1 MSL ELEVATION TOP OF WELL RISER: 40.15 MSL	COORDINATES: N: 193711.81 E: 521033.01
DEPTH TO WATER: (BELOW TOP OF RISER) DATE/TIME	EA INSPECTOR: ROBIN CLARK
DRILLING METHOD & DEPTH: 4 IN. FLUSH JOINT CASING TO 84 FT 3 7/8 ROLLERBIT TO 88 FT HX CORE TO 93 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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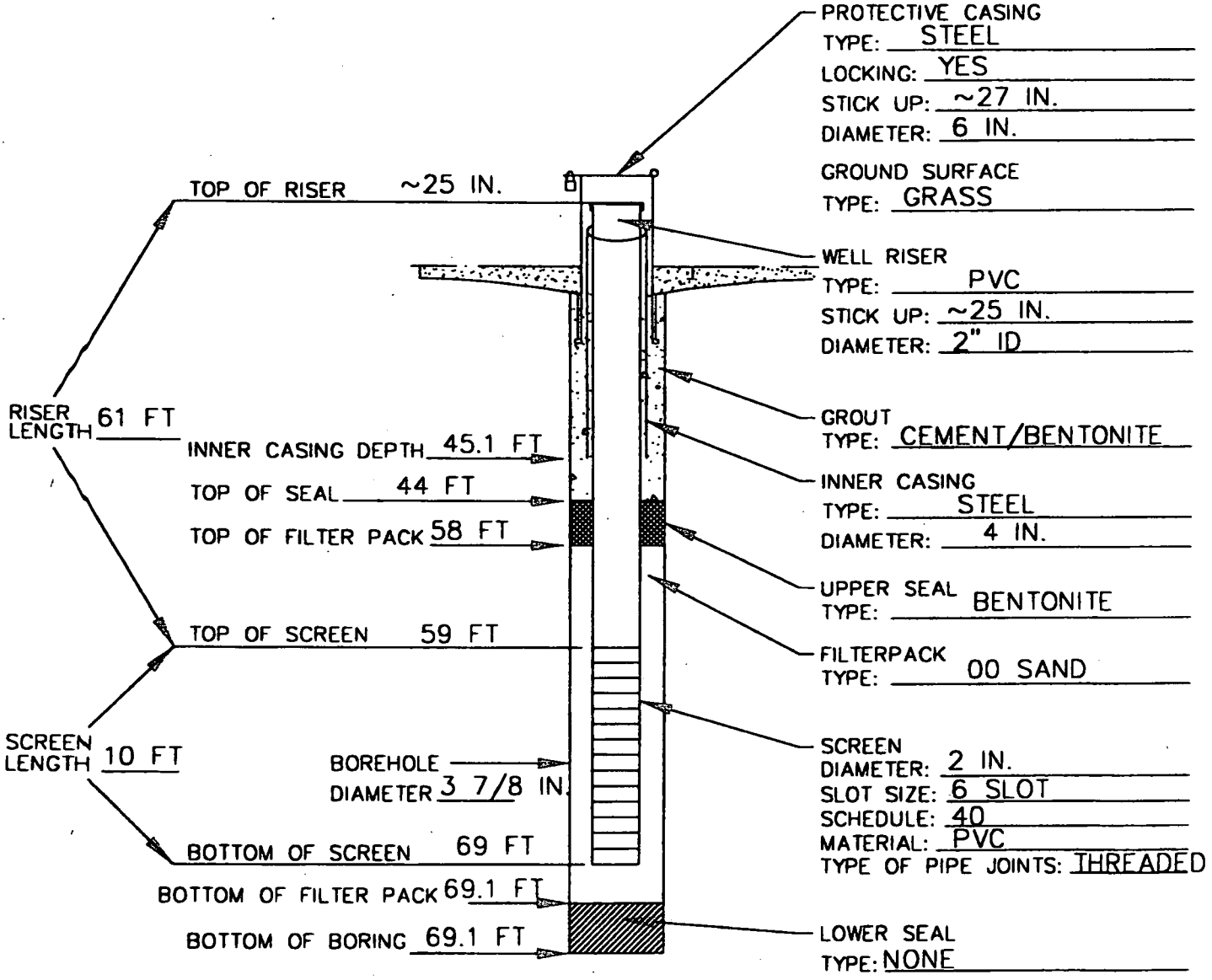
MONITORING WELL CONSTRUCTION

EA-106R

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE	
DATE INSTALLED: 1/7/98	PROJECT No. 29600.32.3215
ELEVATION OF GROUND SURFACE: 31.5 MSL ELEVATION TOP OF WELL RISER: 33.84 MSL	COORDINATES: N: 194899.05 E: 518334.20
DEPTH TO WATER: (BELOW TOP OF RISER) DATE/TIME	EA INSPECTOR: ROBIN CLARK
DRILLING METHOD & DEPTH: 6 IN. FLUSH JOINT CASING TO 38.5 FT, 4 IN. TO 45.1 FT 3 7/8 ROLLERBIT TO 45.1 FT HX CORE 45.1-69.1 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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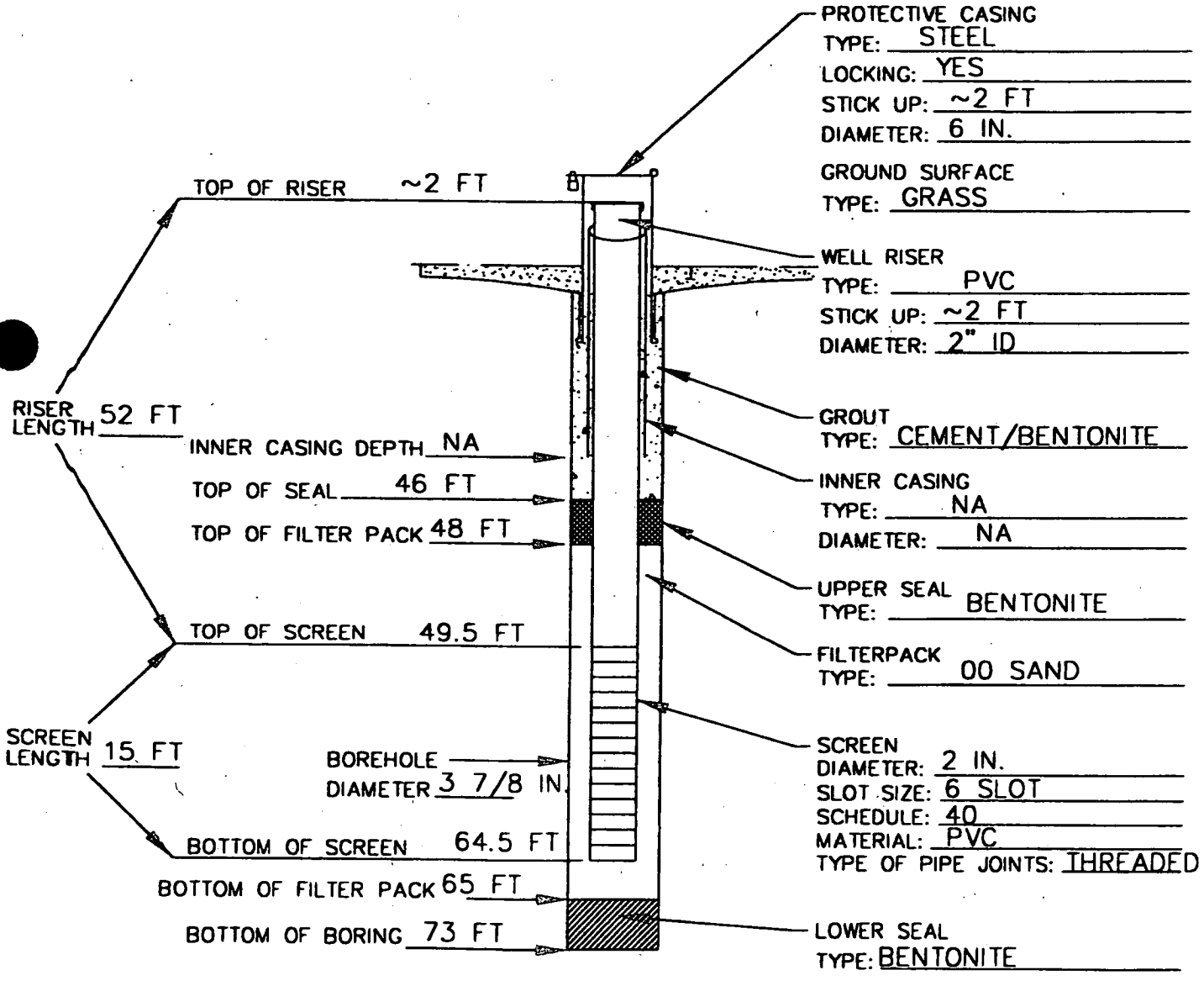
MONITORING WELL CONSTRUCTION

EA-111D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE	
DATE INSTALLED: 1/23/98	PROJECT No. 29600.32.3215
ELEVATION OF GROUND SURFACE: 33.9 MSL ELEVATION TOP OF WELL RISER: 35.91 MSL	COORDINATES: N: 193585.90 E: 520162.80
DEPTH TO WATER: (BELOW TOP OF RISER) DATE/TIME	EA INSPECTOR: KEVIN CALDWELL
DRILLING METHOD & DEPTH: 4 IN. FLUSH JOINT CASING HX CORE TO 73 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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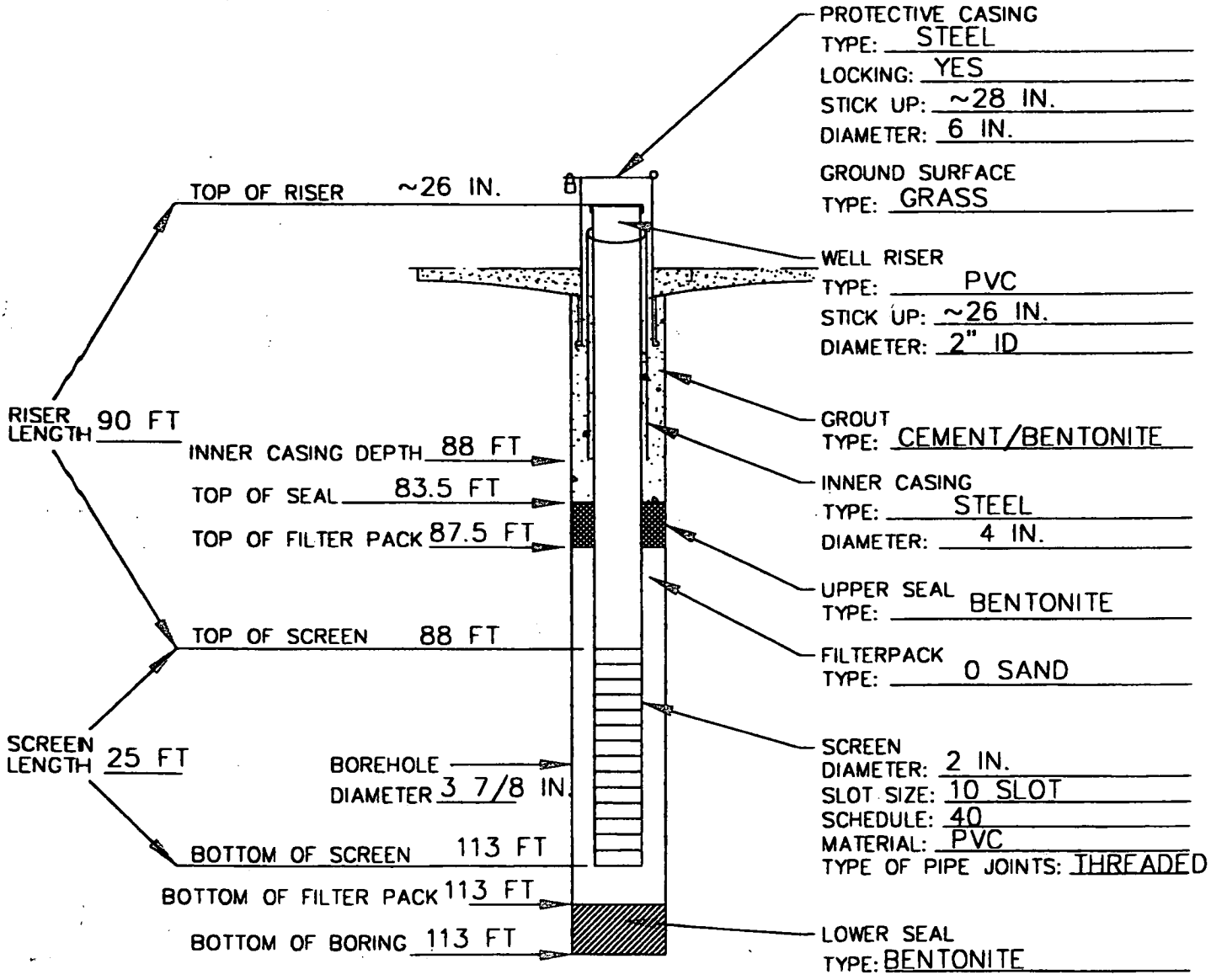
MONITORING WELL CONSTRUCTION

EA-110R

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE	
DATE INSTALLED: 1/22/98	PROJECT No. 29600.32.3215
ELEVATION OF GROUND SURFACE: 37.5 MSL ELEVATION TOP OF WELL RISER: 39.71 MSL	COORDINATES: N: 193704.08 E: 521028.56
DEPTH TO WATER: (BELOW TOP OF RISER) DATE/TIME	EA INSPECTOR: ROBIN CLARK
DRILLING METHOD & DEPTH: 6 IN. FLUSH JOINT CASING TO 77.5 FT, 4 IN. TO 88 FT 3 7/8 ROLLERBIT TO 88 FT HX CORE 88-113 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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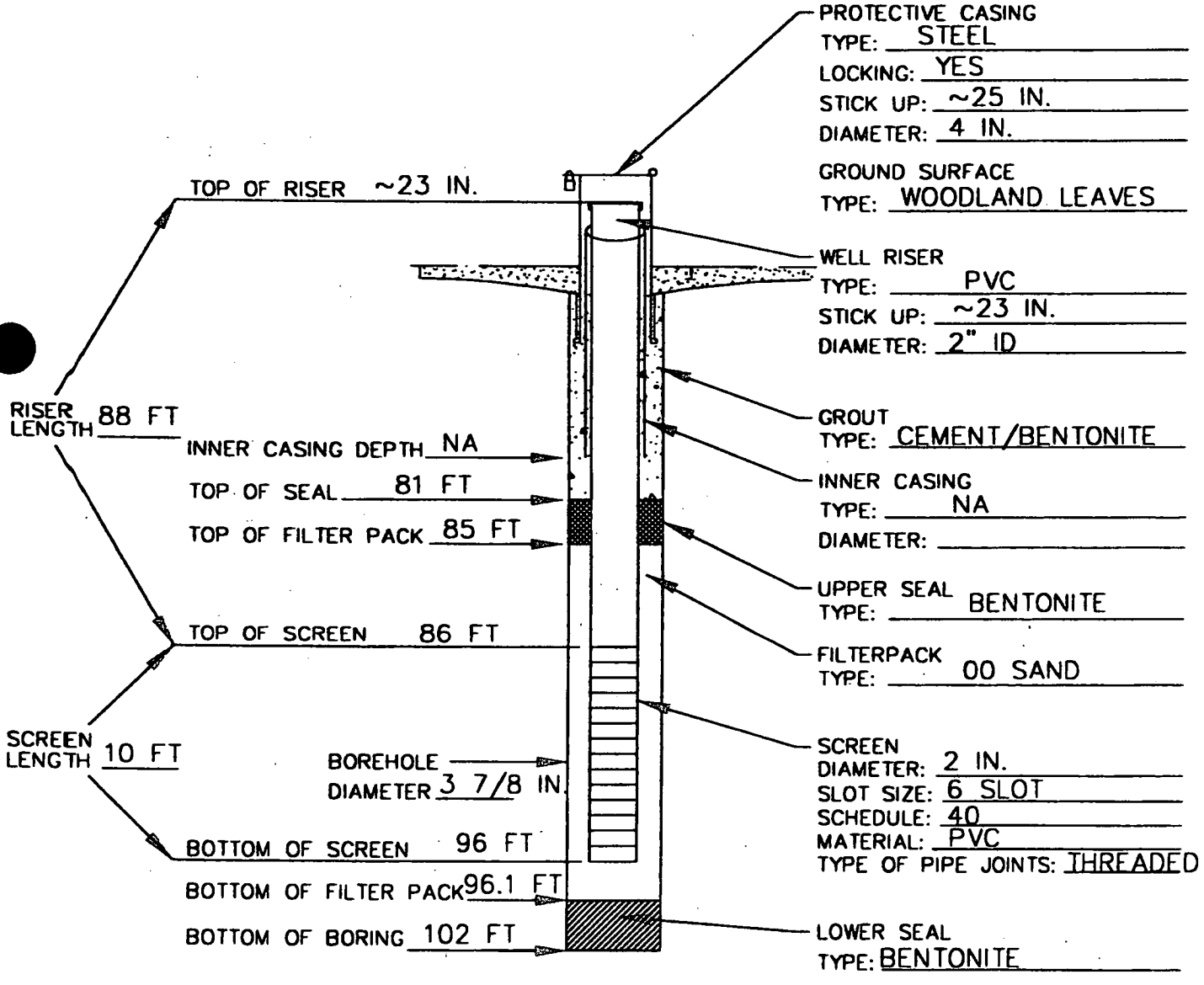
MONITORING WELL CONSTRUCTION

EA-112D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE	
DATE INSTALLED: 1/30/98	PROJECT No. 29600.32.3215
ELEVATION OF GROUND SURFACE: 45.9 MSL ELEVATION TOP OF WELL RISER: 48.06 MSL	COORDINATES: N: 195321.62 E: 519176.54
DEPTH TO WATER: (BELOW TOP OF RISER) DATE/TIME	EA INSPECTOR: ROBIN CLARK
DRILLING METHOD & DEPTH: 5 IN. FLUSH JOINT CASING TO 84 FT 4 IN. FLUSH JOINT CASING TO 94 FT HX COREBIT 97 TO 102 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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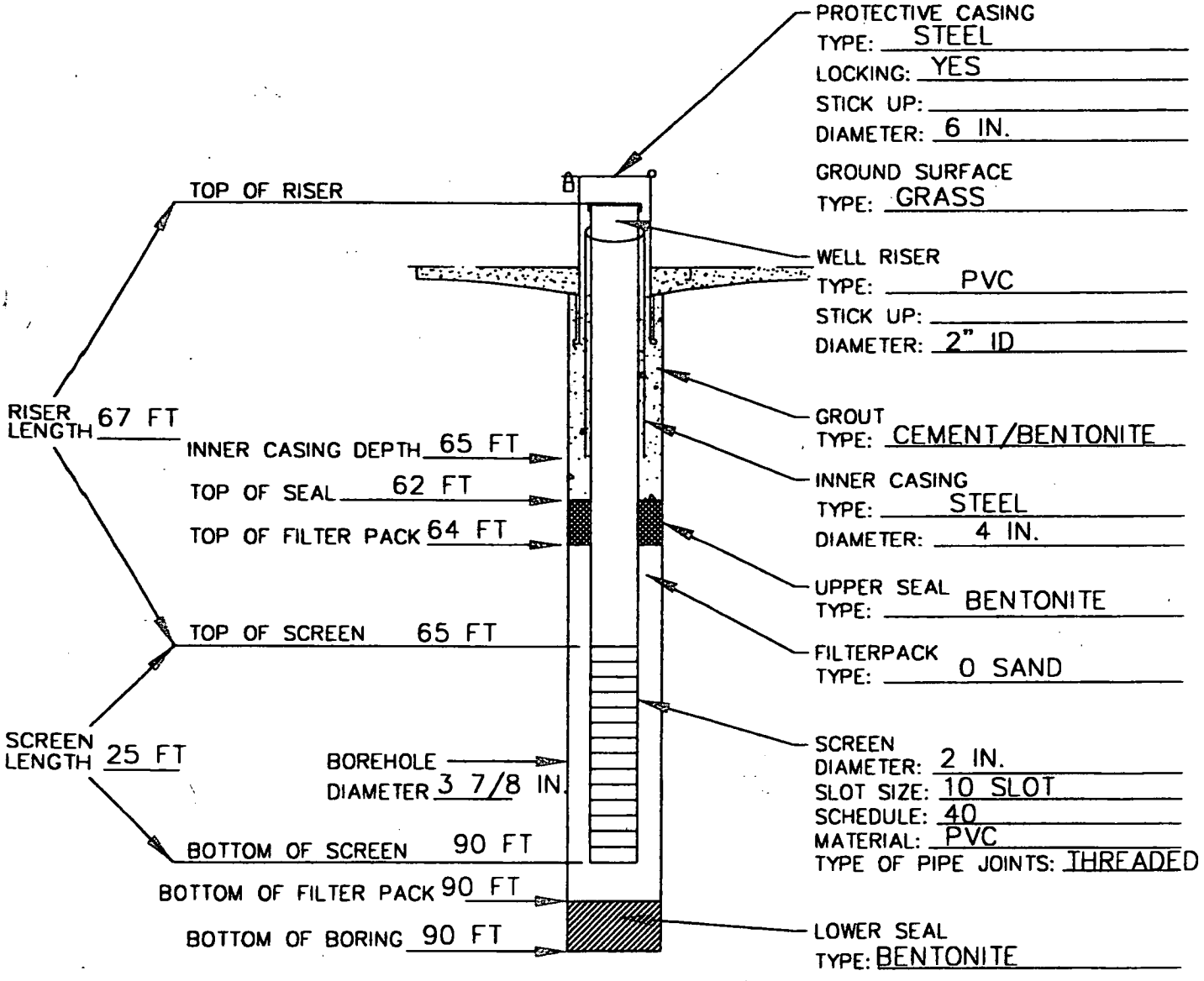
MONITORING WELL CONSTRUCTION

EA-111R

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE	
DATE INSTALLED: 1/30/98	PROJECT No. 29600.32.3215
ELEVATION OF GROUND SURFACE: 33.9 MSL ELEVATION TOP OF WELL RISER: 35.71 MSL	COORDINATES: N: 193577.94 E: 520156.71
DEPTH TO WATER: (BELOW TOP OF RISER) DATE/TIME	EA INSPECTOR: ROBIN CLARK
DRILLING METHOD & DEPTH: 6 IN. FLUSH JOINT CASING TO 62 FT 4 IN. FLUSH JOINT CASING TO 65 FT HX CORE TO 90 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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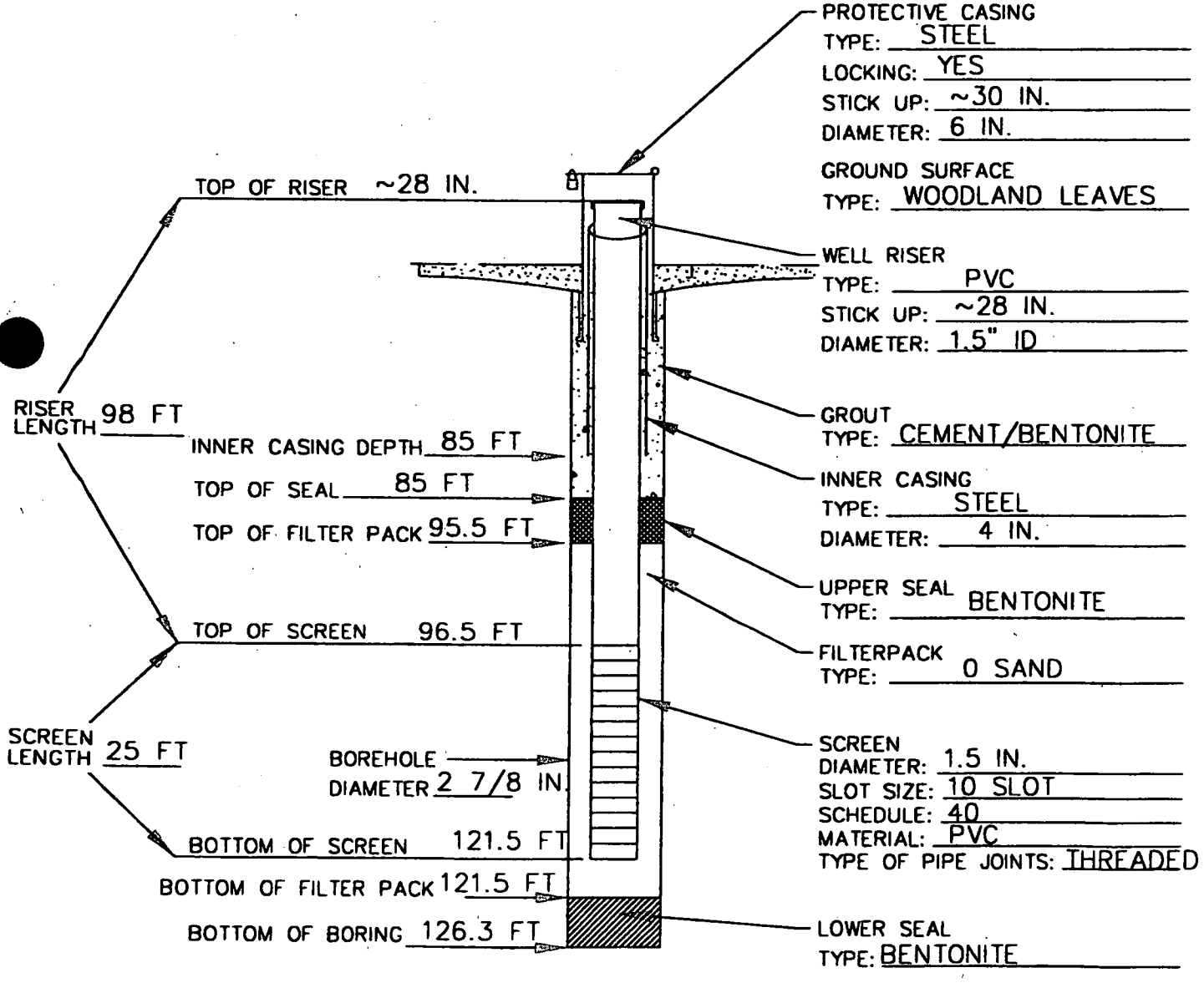
MONITORING WELL CONSTRUCTION

EA-112R

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE	
DATE INSTALLED: 2/13/98	PROJECT No. 29600.32.3215
ELEVATION OF GROUND SURFACE: 46.0 MSL ELEVATION TOP OF WELL RISER: 48.52 MSL	COORDINATES: N: 195326.33 E: 519191.48
DEPTH TO WATER: (BELOW TOP OF RISER) DATE/TIME	EA INSPECTOR: ROBIN CLARK
DRILLING METHOD & DEPTH: 6 IN. FLUSH JOINT CASING TO 82 FT 4 IN. FLUSH JOINT CASING TO 85 FT 3 IN. FLUSH JOINT CASING TO 96.3 FT, NX CORE TO 126.3 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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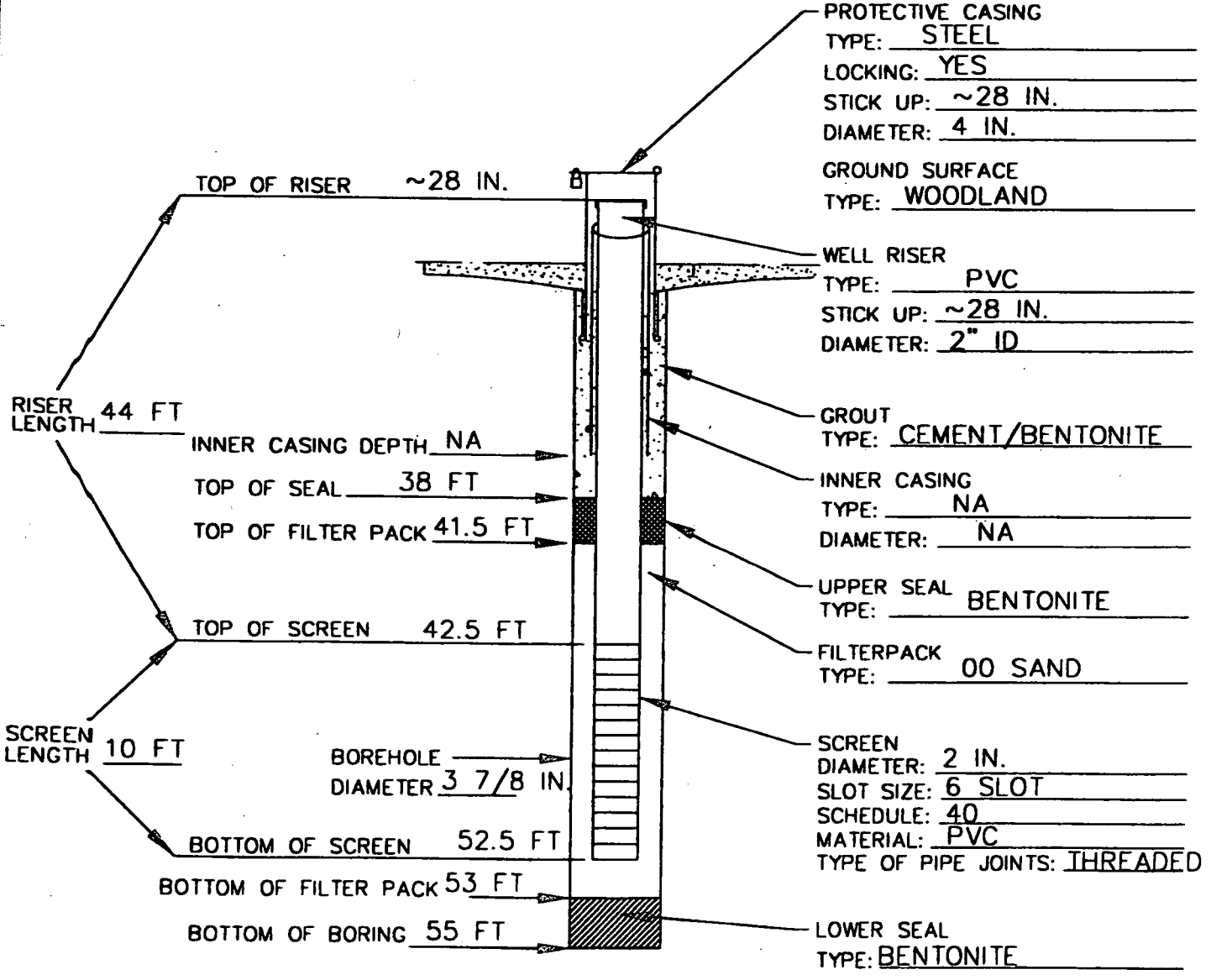
MONITORING WELL CONSTRUCTION

EA-113D

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE	
DATE INSTALLED: 2/18/98	PROJECT No. 29600.32.3215
ELEVATION OF GROUND SURFACE: 28.7 MSL ELEVATION TOP OF WELL RISER: 31.42 MSL	COORDINATES: N: 195128.88 E: 518645.89
DEPTH TO WATER: (BELOW TOP OF RISER) DATE/TIME	EA INSPECTOR: ROBIN CLARK
DRILLING METHOD & DEPTH: 6 IN. FLUSH JOINT CASING TO 36 FT, 4 IN. TO 41 FT 3 7/8 ROLLERBIT TO 50 FT NX CORE 50-55 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	41.56 ft
Riser Elevation:	42.88 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194868 E: 519768

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville				Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - 4 in. flush jointed casing/rollerbit - drive & wash - NX coring					Boring No. MW01-10D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)				Sheet 1 of 4
					Drilling
Water Level:	20.1	22.65			Start: 10/18/95 11:20
Time:	1130	1410			Finish: 10/23/95 10:45
Date:	10/19/95	10/25/95			
Reference:	at grade	at grade			

Sample Type	Inches Driven/In. Recvrd	Depth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Soil / Vegetated
2 in. S.S.	24 / 10		S - 1 / 0 - 2	0	10 / 12		SM	0 - 6" Fine sand and silt w/ trace medium sand to coarse gravel dk. brown, dry
					16 / 23	1	SP	6 - 10" Very fine to fine sand, lt. brown, dry, dense
						2		
						3		
2 in. S.S.	24 / 16		S - 2 / 4 - 6	0	8 / 11	4	SP	0 - 9" Very fine sand, dk. brown, wet
					12 / 16	5		9 - 16" Very fine sand, dk. brown, moist, medium dense
						6		
						7		
						8		
2 in. S.S.	24 / 14		S - 3 / 9 - 11	0	47 / 37	9	SM	0 - 14" Silt to coarse sand w/ some fine to coarse gravel, dk. brown to tan, moist many small iron oxide colored mottles, dense
					30 / 35	10		
						11		
						12		
						13		
2 in. S.S.	24 / 11		S - 4 / 14 - 16	0	15 / 15	14	SW	0 - 9" Coarse sand w/ some medium sand, trace fine gravel, brown to gray, wet "washed" appearance
					20 / 18	15		9 - 11" Medium to coarse sand, trace silt to very fine sand, trace fine gravel, dk. gray, wet, dense
						16		
						17		
						18		
2 in. S.S.	24 / 10		S - 5 / 19 - 21	0	12 / 14	19		0 - 1" coarse sand (wash)
					14 / 11	20	SW	1 - 4" Medium to coarse sand, trace fine sand, trace fine gravel, dk. brown to gray
								4 - 10" Fine to medium sand, trace coarse sand, dk. gray to brown, moist to wet medium dense

Logged by: Paul W. Higgins Date: 11/16/95

Drilling Contractor: M & R Environmental Drilling Driller: Brad Haase / Bob Barbery

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	71 - 81 ft.	Sandpack:	69 - 82 ft.	Grout:	0 - 66 ft.
Bottom of Hole:	89 ft.	Riser Interval:	+1.5 - 7 ft.	Bentonite:	66 - 69 & 82 - 89ft.	Cover:	Steel casin

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation: _____
Riser Elevation: _____
Reference Elevation: _____
Coordinates: _____

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	IR Program Site 01
Drilling Method: See Page # 1		Boring No. MW01-10D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)	Sheet 2 of 4

					Drilling	
					Start	Finish
Water Level:						
Time:						
Date:						
Reference:						

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions:
						21		
						22		
						23		
2 in. S.S.	24 10		S - 6 24 - 26	0	6 8 12 15	24 25	SP	0 - 4" Very fine sand, gray, moist to wet - two thin lenses of medium sand 4 - 6" Medium to coarse sand, brown to dk. brown, moist - small distinctive lenses of rust colored to tan to brown layers of sand 6 - 10" Medium to coarse sand, w/ trace fine gravel, brown to dk. brown, moist medium dense
						26		
						27		
						28		
2 in. S.S.	24 14		S - 7 29 - 31	0	8 9 9 12	29 30	SW	0 - 5" Medium to coarse sand w/ trace fine gravel, dk. gray, moist 1/4 " coarse sand lense at 3 ", rust colored, moist 5 - 12" Fine to medium sand, dk. gray, moist 12 - 12.5" Very fine sand, dk. gray, moist 12.5 - 14" Coarse sand w/ little fine to medium sand, dk. gray, moist, medium dense
						31		
						32		
						33		
2 in. S.S.	24 10		S - 8 34 - 36	0	8 11 11 11	34 35	SP	0 - 10" Fine to medium sand, dk gray to brown, moist trace very small rust colored mottles (?) relic(?), medium dense
						36		
						37		
						38		
2 in. S.S.	24 13		S - 9 39 - 41	0	9 10 12 20	39 40	SP SM	0 - 9" Medium sand, dk gray, moist 9 - 13" Silt w/ some very fine sand, dk. gray, moist to wet, dense
						41		

Logged by: Paul W. Higgins Date: 11/16/95

Drilling Contractor: _____ Driller: _____

WELL SPECIFICATIONS:

Diam. of Riser: _____ Screen Interval: _____ Sandpack: _____ Grout: _____

Bottom of Hole: _____ Riser Interval: _____ Bentonite: _____ Cover: _____

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville		Location: IR Program Site 01
Drilling Method: See Page # 1			Boring No. MW01-10D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)		Sheet 3 of 4
			Drilling: Start / Finish

Surface Elevation:
Riser Elevation:
Reference Elevation:
Coordinates:

Water Level:					Start	Finish
Time:						
Date:						
Reference:						

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft		USCS Log	Surface Conditions:
						42			
						43			
2 in. S.S.	24 / 12		S - 10 / 44 - 46	0	13 / 13	44		SP	0 - 4" Fine sand, dk. brown to gray, moist 4 - 12" Very fine sand, dk. gray, moist to wet, medium dense
					14 / 14	45			
						46			
						47			
						48			
2 in. S.S.	24 / 13		S - 11 / 49 - 51	0	6 / 7	49		SP	0 - 13" Very fine sand, dk. gray, moist to wet, medium dense
					6 / 9	50			
						51			
						52			
						53			
2 in. S.S.	24 / 13		S - 12 / 54 - 56	0	12 / 16	54		SP	0 - 1" Fine sand, gray, moist, (wash) 1 - 12" Fine sand, gray, moist, dense
					14 / 20	55		SM	12 - 13" Very fine sand and silt, dk. gray ,moist 1/4" lense of silt at 12.5"
						56			
						57			
						58			
2 in. S.S.	24 / 16		S -13 / 59 - 61	0	6 / 10	59		ML	0 - 16" Silt, dk. gray, wet, dense
					15 / 20	60			
						61			
						62			

Logged by: Paul W. Higgins Date: 11/16/95

Drilling Contractor: Driller:

WELL SPECIFICATIONS:

Diam. of Riser: Screen Interval: Sandpack: Grout:

Bottom of Hole: Riser Interval: Bentonite: Cover:

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation: _____
Riser Elevation: _____
Reference Elevation: _____
Coordinates: _____

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	IR Program Site 01
Drilling Method: See Page # 1		Boring No. MW01-10D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)	Sheet 4 of 4

					Drilling	
Water Level:					Start	Finish
Time:						
Date:						
Reference:						

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions:
						63		
					9	64	ML	0 - 18" Silt, dk. gray, wet, dense
2 in. S.S.	24 18		S - 14 64 - 66	0	12 17 29	65		
						66		
						67		
						68		
					20	69	GM	0 - 14" Silt and fine to coarse gravel, dk. gray, moist, very dense (till ?)
2 in. S.S.	24 14		S - 15 69 - 71	0	60 28 80	70		
						71		
						72		
						73		
					38	74	GM	0 - 14" Fine to coarse gravel and silt, dk. gray, moist, dense (till)
2 in. S.S.	24 15		S - 16 74 - 76	0	20 25 25	75		14 - 15" Coarse sand w/ trace fine gravel , dk. gray, moist.
						76		
						77		
						78		
					50	79	GM	0 - 16" Silt and fine to coarse gravel. dk. gray, moist, very dense (till)
2 in. S.S.	24 16		S - 17 79 - 81	0	52 62 128	80		
						81		
						82		Refusal @ 82', Rollerbit to 84' , Cored bedrock to 89'
								See Log of Core Boring for bedrock discription - Bottom of hole @ 89'

Logged by: Paul W. Higgins Date: 11/16/95

Drilling Contractor: _____ Driller: _____

WELL SPECIFICATIONS:

Diam. of Riser: _____ Screen Interval: _____ Sandpack: _____ Grout: _____

Bottom of Hole: _____ Riser Interval: _____ Bentonite: _____ Cover: _____

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194868 E: 519768
Surface Elevation:	41.56 ft
PVC Riser Elevation:	42.88 ft
Reference Elevation:	mean sea level

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville				Location: IR Program Site 01
Drilling Method: Mobil B-61 Rig - using 4" I.D. FJ					Boring No. MW01-10D
Casing and 4 7/8" Rollerbit.					Sheet 1 of 1
					Drilling
Core Bit Size:	HX Core bit (2.4")				Start: 10/20/95 8:05 / Finish: 10/20/95 9:50
Water Level:	22.65				
Time:	1410				
Date:	10/25/95				
Reference:	Ground				

Core Run RQD % / Run #	REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	Surface Conditions: LITHOLOGIC LOG	DRILLING LOG: Core Footage	Time (min)	Core Depth
—					83					
Run # 1					84		0-15"- Gray, fine grained quartzite w/ a vague linear fabric oriented @ 80 deg. to CA	0 - 1	6:00	84 - 85
RQD = 37% (20" for 54")			Frac @ 45 - 65 deg to CA	qtz & qtz w/ chlorite	85		fractures @ 3.5, 6 & 9", few qtz healed fractures also within this interval	1 - 2	3:30	85 - 86
Rec. = 90% (54" for 60")					86		15-54"- dark gray phyllite/schist - highly fractured w/ pieces from 2 to 4", some qtz healed fractures	2 - 3	3:00	86 - 87
					87		becoming softer & more broken up with depth @ 30 & 42"- rust stained fractures @ 45 deg to CA	3 - 4	3:30	87 - 88
					88		@ 51"- rust stained fracture @ 65 deg. to CA	4 - 5	3:00	88 - 89
—					89					
—					90					
—					91					
—					92					
—					93					
—					94					
—					95					
—					96					
—					97					
—					98					
—					99					
—					100					
—					101					
—					102					
—					103					

Logged by: Paul W. Higgins — Date: 20 October, 1995

Drilling Contractor: M & R Environmental Drilling — Driller: Brad Haase / Bob Barbery

Core Run Interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	39.25 ft
Riser Elevation:	39.18 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194629 E: 52094

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville				Location: Site 03 - Study Area 01
Drilling Method: Mobile B-61 Rig - 4 in. flush jointed casing/rollerbit - drive & wash - NX coring					Boring No. MW01 - 11D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)				Sheet 1 of 3
Water Level:					Drilling Start: 10/13/95 13:00 Finish: 10/18/95 09:30
Time:					
Date:					
Reference:					

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: 6" concrete pad over a graveled area. Augered through with 7.5" auger
2 in. S.S.	24 14		S - 1 1 - 3	1	20 30	1		0 - 2" Medium sand, brown, dry 2 - 6" Fine to medium sand w/ some rock frags (<1"), lt. gray, dry
					39 35	2	SP	6 - 14" Medium sand w/ trace fine gravel, brown, dry, very dense
						3		
2 in. S.S.	24 17		S - 2 4 - 6	0	16 26	4	SW	0 - 14" Medium to coarse sand w/ little fine gravel, lt. brown to tan, dry, dense 14 - 17" Fine to medium sand, dk. brown, dry
					22 22	5		
						6		
						7		
						8		
2 in. S.S.	24 11		S - 3 9 - 11	1	22 30	9	SW	0 - 1" Fine sand and silt w/ trace fine gravel, gray to brown, moist 1 - 11" Medium to coarse sand w/ some fine gravel, lt. brown to dk. gray, moist
					22 23	10		dense
						11		
						12		
						13		
2 in. S.S.	24 11		S - 4 14 - 16	0.25	25 16	14	SW	0 - 3" Coarse sand and fine gravel, dk. brown to dk. gray, wet (wash) 3 - 11 " Medium to coarse sand w/ trace fine gravel, brown to dk. gray, moist,
					16 18	15		dense
						16		
						17		
						18		
2 in. S.S.	24 15		S - 5 19 - 21	1.5	16 10	19		0 - 2" Very fine sand,dk. gray, wet (wash) 2 - 9" As above, moist
					16 16	20	SP	9 - 14 Fine sand, dk gray to brown, moist w/ thin (1/16 to 1/4 ") lenses of medium sand,rust to brown colored, medium dense

Logged by: Paul W. Higgins Date: 11/16/95

Drilling Contractor: M & R Environmental Drilling Driller: Brad Haase / Bob Barbery

WELL SPECIFICATIONS:

Diam. of Riser:	2 in.	Screen Interval:	37 - 42 ft.	Sandpack:	35 - 43 ft.	Grout:	0 - 32 ft.
Bottom of Hole:	50 ft.	Riser Interval:	+1.5 - 37 ft.	Bentonite:	32 - 35 & 43 - 50 ft.	Cover:	Road Box

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Techn logy, Inc.

LOG OF SOIL BORING

Surface Elevation: _____
Riser Elevation: _____
Reference Elevation: _____
Coordinates: _____

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	Site 03, Study Area 01
Drilling Method: See Page # 1		Boring No. MW01-11D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)	Sheet 2 of 3

Water Level:					Drilling Start	Drilling Finish
Time:						
Date:						
Reference:						

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft		USCS Log	Surface Conditions:
						21			14 - 15" Medium sand w/ some fine sand, brown, moist
						22			
						23			
2 in. S.S.	24 / 10		S - 6 / 24 - 26	0	24 / 23	24		SP	0 - 1" Fine sand, gray, wet (wash) / 1 - 6" Fine sand, lt. brown to gray, moist , dense
					23 / 23	25			6 - 10" Very fine sand, dk. gray, moist , dense
						26			
						27			
						28			
2 in. S.S.	24 / 5		S - 7 / 29 - 31	0	10 / 14 / 20 / 22	29 / 30		SP	0 - 5" Very fine sand, dk. gray, moist, dense
						31			
						32			
						33			
2 in. S.S.	24 / 9		S - 8 / 34 - 36	0	20 / 58 / 18 / 15	34 / 35		SP	0 - 4" Very fine sand, gray, moist / 4 - 5" Fine sand lense, gray, moist / 5 - 9" Very fine sand, w/ trace fine gravel , gray, moist , dense
						36			
						37			
						38			
2 in. S.S.	24 / 8		S - 9 / 39 - 41	1	37 / 22 / 10 / 15	39 / 40		SM	0 - 2" Fine to coarse gravel, gray, moist (wash) / 2 - 8" Silt w/ trace coarse sand and fine gravel, dk. gray, moist, medium dense
						41			

Logged by: Paul W. Higgins Date: 11/16/95

Drilling Contractor: _____ Driller: _____

WELL SPECIFICATIONS:

Diam. of Riser: _____ Screen Interval: _____ Sandpack: _____ Grout: _____

Bottom of Hole: _____ Riser Interval: _____ Bentonite: _____ Cover: _____

Sample interval

Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation: _____
Riser Elevation: _____
Reference Elevation: _____
Coordinates: _____

Job. No.	Client:	Location:
29600.32	NORDIV, NAVFAC NCBC Davisville	Site 03, Study Area 01
Drilling Method: See Page # 1		Boring No. MW01-11D
Sampling Method: "Standard"	2" diameter split-barrel sampler driven 24" by 140-lb hammer falling 30" (SS)	Sheet 3 of 3

					Drilling Start	Drilling Finish
Water Level:						
Time:						
Date:						
Reference:						

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft		USCS Log
						42		
						43		
						44		
						45		
						46		
						47		
						48		
						49		
						50		

Surface Conditions:

Refusal at 43', rollerbit to 45', NX coring to 50'
See Log of Core Boring for bedrock description

See Monitoring Well Construction form for well installation description

Bottom of hole @ 50"

Logged by: Paul W. Higgins Date: 11/17/95

Drilling Contractor: _____ Driller: _____

WELL SPECIFICATIONS:

Diam. of Riser: _____ Screen Interval: _____ Sandpack: _____ Grout: _____
Bottom of Hole: _____ Riser Interval: _____ Bentonite: _____ Cover: _____

Sample interval
Sample interval submitted for laboratory analysis

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194629 E: 520904
Surface Elevation:	39.25 ft
Riser Elevation:	39.18 ft
Reference Elevation:	mean sea level

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC-Davisville				Location: IR Program Site 01
Drilling Method: Mobil B-61 Rig - using 4" I.D. FJ Casing and 4 7/8" Rollerbit.					Boring No. MW01-11D
					Sheet 1 of 1
Core Bit Size:	HX Core bit (2.4")				Drilling
Water Level:					Start: 10/16/95 1400
Time:					Finish: 10/16/95 1600
Date:					
Reference:	T.O.R.				

Core Run RQD % / Run #	Core Run REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core Footage	Time (min)	Core Depth
					42		Surface Conditions:			
					43					
					44			Core Footage	Time (min)	Core Depth
Run # 1 RFQ = 97% (58" for 60") Rec = 100% (60" for 60")			Frac @ 45-60 deg to CA	Qtz w/ chlorite	45		0-10" - Dark gray, massive phyllite grading into..	0 - 1	3:45	45 - 46
							10-60" - gray fine to medium grained quartzite - linear			
					46		fabric oriented ~ 10 deg. few larger (.5") qtz grains	1 - 2	2:40	46 - 47
							@ 13" a few small qtz filled fractures			
					47		@ 36-38" two fractures partially healed by qtz- rust	2 - 3	2:45	47 - 48
							staining noted			
					48			3 - 4	3:00	48 - 49
					49			4 - 5	3:40	49 - 50
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					
					60					
					61					
					62					

Logged by: Paul W. Higgins

Date: 16 October 1995

Drilling Contractor: M & R Environmental Drilling

Driller: Brad Haase / Bob Barbery

Core Run Interval

EA Engineering, Science, and Technol gy, Inc.

LOG OF SOIL BORING

Surface Elevation:	36.37 ft
Riser Elevation:	35.96
Reference Elevation:	mean sea level
Coordinates:	N: 194730 E: 520602

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville				Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 4 in. and 5 in. ID FJ casing with 3 7/8 in and 4 7/8 rollerbit.					Boring No. MW01-12D
Sampling Method: 2" diam 2" diameter split-barrel sampler driven 24" by a 140-lb hammer (300-lb from 34 to 51 ft) falling 30 in.					Sheet 1 of 4
					Drilling
Water Level:	19.34				Start: 10/09/95 10:00 AM
Time:	11/09/95				Finish: 10/10/95 09:00 AM
Date:					
Reference:	TOR				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Pavement (rollerbitted through pavement prior to sampling)
SS	24 / 18	0	S-1 / 0-2	2	7, 12, 17, 21	0-1	SM	Dk. brown silty fine sand, some coarse sand to gravel, up to 1", blocky sub-angular to sub-round (SA-SR), dry.
						2-3		
SS	24 / 6	4	S-2 / 4-6	bkwds.	20, 24, 21, 7	4-5	SM	Dk. gray and olive gray silty fine sand, little medium sand, trace gravel to 1.5", SA-SR, dry.
						6-8		
SS	24 / 9	4	S-3 / 9-11	1.0	7, 6, 18, 11	9-10	SM	0-3" Lt. brown silt to medium sand, little coarse sand and gravel up to 1", blocky, SR-SA, wet. 3-9" Lt. brown silty fine sand, trace medium sand to gravel, up to 1", blocky, SA-SR, dry.
						11-13		
SS	24 / 9	4	S-4 / 14-16	2.0	12, 21, 20, 16	14-15	ML	Dk. gray silt, little medium sand to fine gravel, SA, one 2" blocky piece, dry to moist.
						16-18		5" FJ casing to 19 ft; 4" FJ casing from 19 ft to rock.
SS	24 / 8	19	S-5 / 19-21	0.2	12, 16, 17, 18	19-20	SM	0-3" Dk. gray silt with some medium sand to gravel, up to 1", blocky, SA, dry to moist. 3-8" Lt. brown silt to fine gravel, trace coarse gravel up to 1.5", blocky, SA, wet.

Logged by: J. Shapiro Date: 10/09/95

Drilling Contractor: M & R Environmental Driller: P. Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in. PVC	Screen Interval:	48 ft - 53 ft bgs	Sandpack:	47 ft - 53.5 ft bgs	Grout:	0 - 44 ft bgs
Bottom of Hole:	59 ft bgs	Riser Interval:	Grade - 48 ft bgs	Bentonite:	44 ft - 47 ft bgs 53.5 ft - 59 ft bgs	Cover:	Road box

Sample interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	36.37 ft
Riser Elevation:	35.96 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194730 E: 520602

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville			Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 4 in. and 5 in. ID FJ casing with 3 7/8 in and 4 7/8 rollerbit.				Boring No. MW01-12D
Sampling Method: 2" diam 2" diameter split-barrel sampler driven 24" by a 140-lb hammer (300-lb from 34 to 51 ft) falling 30 in.				Sheet 2 of 4
				Drilling
Water Level:				Start:
Time:				
Date:				10/09/95 10:00 AM
Reference:				Finish: 10/10/95 09:00 AM

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft		USCS Log	Surface Conditions: Pavement (rollerbitted through pavement prior to sampling)
						20			
						21			
						22			
						23			
SS	24 3	24	24-26	NA	17 18	24		SM	Olive gray silt to medium sand, trace to little fine gravel (up to 0.75"), wet.
					19 18	25			
						26			
						27			
						28			
SS	24 15	24	S-6 29-31	0.6	10 15 17 18	29 30		SM/SP	0-1" Lt. brown silt to medium sand, wet. 1-10" Dk. gray very fine to fine sand, moist. 10-15" Olive gray fine sand, trace medium to coarse sand, wet.
						31			
						32			
						33			
SS	24 17	24	S-7 34-36	0.2	3 4	34		ML	Olive gray silty very fine sand, wet. @13-14" Olive gray silty fine sand, wet.
					3 5	35			
						36			
						37			
						38			
SS	24 13	24	S-8 39-41	0.2	3 4	39		ML	Olive gray silty very fine sand, wet.
					5 5	40			

Logged by: J. Shapiro Date: 10/09/95

Drilling Contractor: M & R Environmental Driller: P. Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in. PVC	Screen Interval:	48 ft - 53 ft bgs	Sandpack:	47 ft - 53.5 ft bgs	Grout:	0 - 44 ft bgs
Bottom of Hole:	59 ft bgs	Riser Interval:	Grade - 48 ft bgs	Bentonite:	44 ft - 47 ft bgs 53.5 ft - 59 ft bgs	Cover:	Road box

Sample interval

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Surface Elevation:	36.37 ft
Riser Elevation:	35.96 ft
Reference Elevation:	mean sea level
Coordinates:	N: 194730 E: 520602

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville		Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 4 in. and 5 in. ID FJ casing with 3 7/8 in and 4 7/8 rollerbit.			Boring No. MW01-12D
Sampling Method: 2" diam 2" diameter split-barrel sampler driven 24" by a 140-lb hammer (300-lb from 34 to 51 ft) falling 30 in.			Sheet 3 of 4
		Start	Finish
Water Level:			
Time:			
Date:		10/09/95	10/10/95
Reference:		10:00 AM	09:00 AM

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bkgd.	Blows per 6 in.	Depth in Ft	USCS Log	Surface Conditions: Pavement (rollerbitted through pavement prior to sampling)
						40		
						41		
						42		
						43		
	24		S-9		3	44	ML	Olive gray silty very fine sand, wet.
SS	14	24	44-46	0.2	3			@10.5-11.5", light gray fine sand, wet.
					2	45		
					3			
						46		
						47		
						48		
	24		S-10		6	49	GM	Olive gray silt to coarse gravel, up to 1", flat, SA, wet (TILL?)
SS	14	49	49-51	0.4	7			
					9	50		
					10			
						51		
						52		
						53		Driller noted rock at 53.5 ft, rollerbitted to 54 ft, cored 54 to 59 ft
						54		
						55		
						56		
						57		
						58		
						59		
						60		

Logged by: J. Shapiro Date: 10/09/95

Drilling Contractor: M & R Environmental Driller: P. Thornsbury

WELL SPECIFICATIONS:

Diam. of Riser:	2 in. PVC	Screen Interval:	48 ft - 53 ft bgs	Sandpack:	47 ft - 53.5 ft bgs	Grout:	0 - 44 ft bgs
Bottom of Hole:	59 ft bgs	Riser Interval:	Grade - 48 ft bgs	Bentonite:	44 ft - 47 ft bgs 53.5 ft - 59 ft bgs	Cover:	Road box

▒ Sample interval

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	36.37 ft
Surface Elevation:	35.96 ft
Casing Above Surface:	mean sea level
Reference Elevation:	N: 194730 E: 520602

Job. No. 29600.32	Client: NORDIV, NAVFAC NCBC Davisville		Location: IR Program Site 01
Drilling Method: Mobile B-61 Rig - using 5 in. ID FJ casing 4 7/8" RB.			Boring No: MW01-12D
			Sheet 4 of 4
Core Bit Size: HX Core bit (2.4")		Drilling Start	Drilling Finish
Water Level:			
Time:		07:50 AM	08:40 AM
Date:		10/10/95	10/10/95
Reference:			

Core Run RQD % / Run #	REC % / ft	Strat-igraphy	Bedding / Fractures (dip & angl)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core Footage	Time (mins)	Core Depth (ft)
					40		Surface Conditions:			
					41					
					42					
					43					
					44					
					45					
					46					
					47					
					48					
					49					
					50					
					51					
					52					
					53					
Run #1 RQD = 81% 3.2'/3.9' REC = 78% 3.9'5.0'					54		Light gray, massive, quartzite. Grains visible to naked ey	0-1	7:00	54-55
					55		Predominantly quartz with muscovite, black mineral (pyroxene?), biotite, minor (?) feldspar. Weak foliation	1-2	7:00	55-56
					56		of minerals perpendicular to core axis. Minor healed fracture towards bottom foot of core.	2-3	6:10	56-57
					57		Three fractures from 57 to 58.5 ft Weathering of fractures apparent.	3-4	5:20	57-58
					58			4-5	4:40	58-59
					59					
					60					

Logged by: J. Shapiro

Date: 10/10/95

Drilling Contractor: M & R Environmental Drilling

Driller: Phil Thornsbury

Core Run Interval

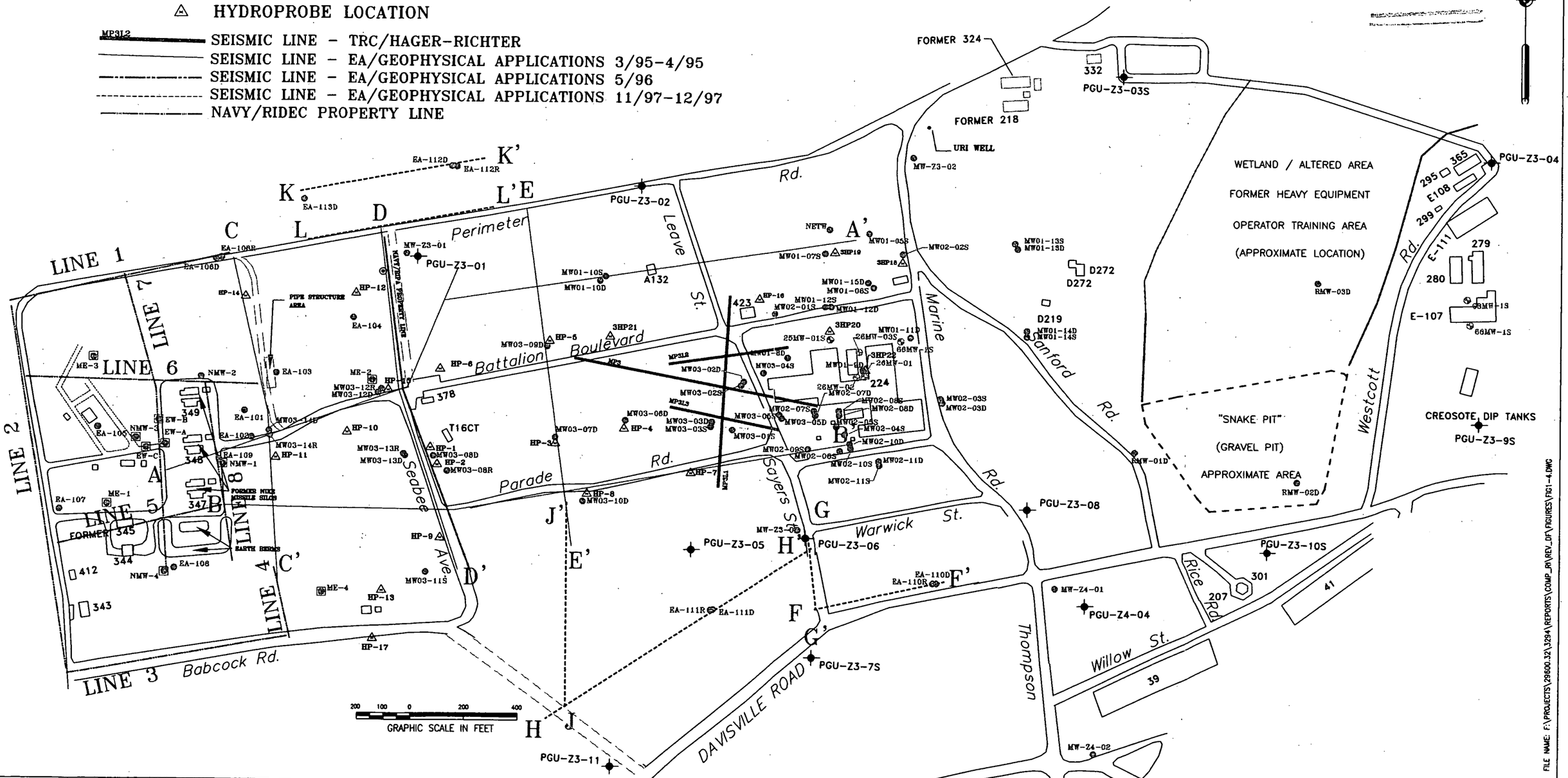
LEGEND

- REMEDIAL INVESTIGATION MONITORING WELL
- GROUND-WATER STUDY PIEZOMETER
- NIKE SITE MONITORING WELL
- UST AREA MONITORING WELL
- HYDROPROBE LOCATION
- MP3L2 — SEISMIC LINE - TRC/HAGER-RICHTER
- SEISMIC LINE - EA/GEOPHYSICAL APPLICATIONS 3/95-4/95
- SEISMIC LINE - EA/GEOPHYSICAL APPLICATIONS 5/96
- SEISMIC LINE - EA/GEOPHYSICAL APPLICATIONS 11/97-12/97
- NAVY/RIDEC PROPERTY LINE

NOTES:
LOCATIONS ARE APPROXIMATE
BASE MAP DIGITIZED FROM: NCBC CENTER DAVISVILLE RI STATION MAP SEPT 1992
ADDITIONAL ROADS ADDED FROM AERIAL PHOTO DATED 4/95

DRAFT

N



EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.	DESIGNED BY: JAS	DRAWN BY: RWC/JDR	DATE: 12/21/98	PROJECT NO.: 29600.32
	CHECKED BY: JAS	PROJECT MGR.: JAS	SCALE: AS SHOWN	FILE NAME: FIG1-4.DWG

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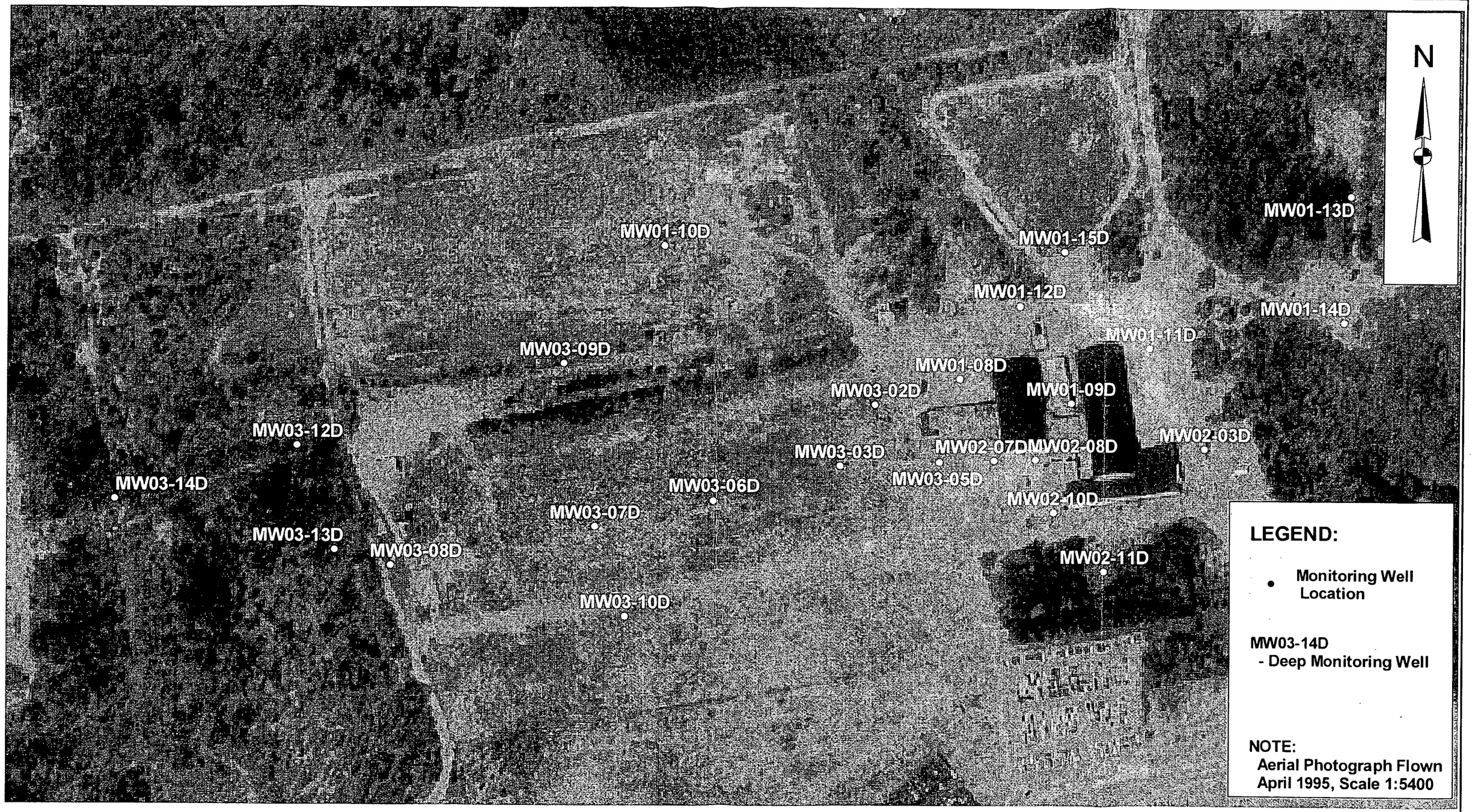
STUDY AREAS 01 AND 04 AND SITES 02 AND 03
NCBC DAVISVILLE, RHODE ISLAND

PREVIOUS STUDY AND PHASE III REMEDIAL INVESTIGATION, GEOPHYSICAL SURVEY, HYDROPROBE, SOIL BORING AND MONITORING WELL LOCATIONS
FIGURE 1-4

FILE NAME: F:\PROJECTS\29600.32\3294\REPORTS\COMP_RI\REV_DF\FIGURES\FIG1-4.DWG



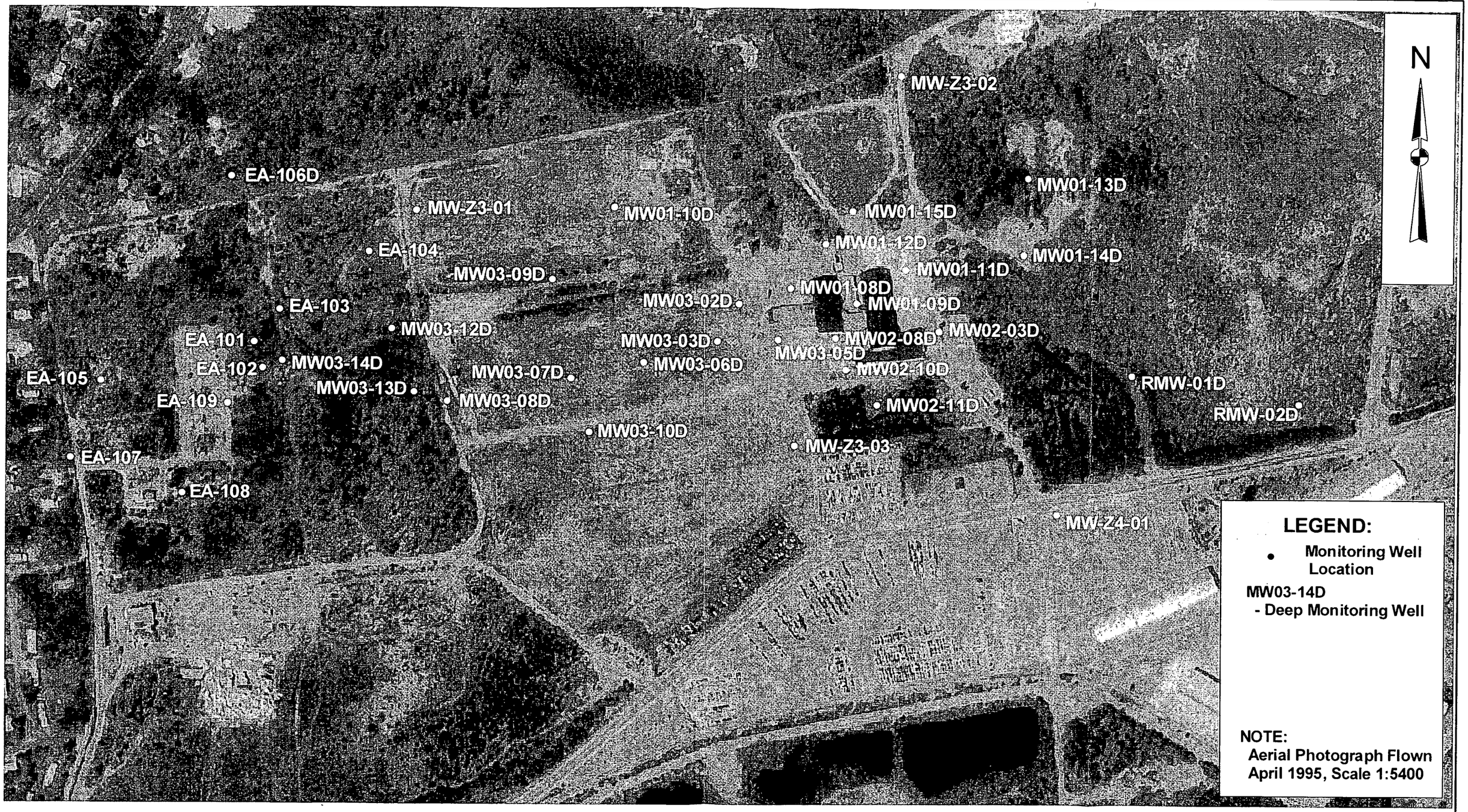
EA ENGINEERING, SCIENCE, AND TECHNOLOGY

300 0 300 Feet

NORTHERN DIVISION
PHASE III COMPREHENSIVE RI REPORT
STUDY AREAS 01 AND 04 AND SITES 02 AND 03
NCBC DAVISVILLE, RHODE ISLAND

1995 SAMPLED WELL LOCATIONS

FIGURE 2-4



EA ENGINEERING, SCIENCE, AND TECHNOLOGY

500 0 500 Feet

NORTHERN DIVISION
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NCBC DAVISVILLE, RHODE ISLAND

1996 SAMPLED WELL LOCATIONS

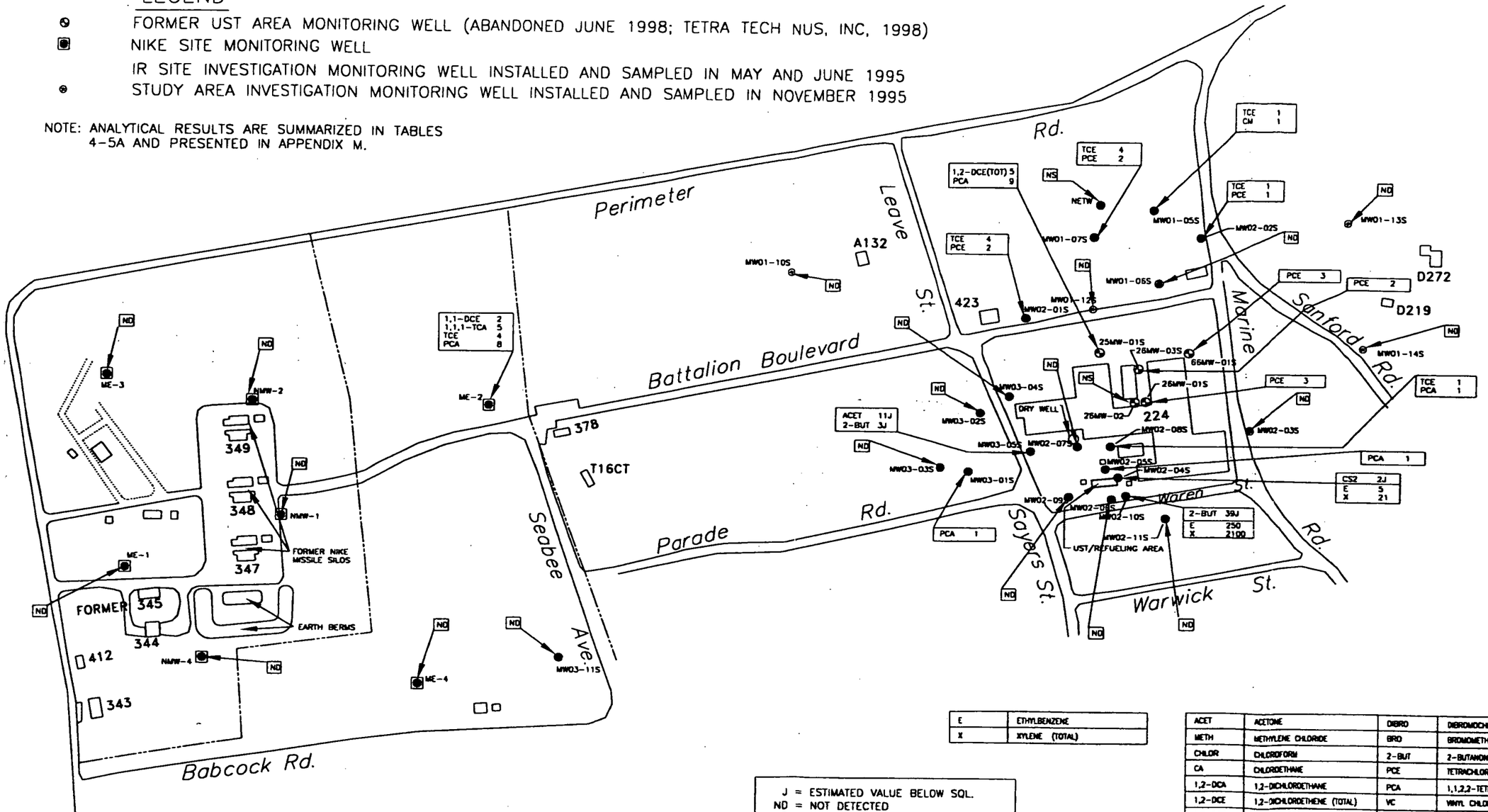
FIGURE 2-5

LEGEND

- ⊗ FORMER UST AREA MONITORING WELL (ABANDONED JUNE 1998; TETRA TECH NUS, INC, 1998)
- ▣ NIKE SITE MONITORING WELL
- IR SITE INVESTIGATION MONITORING WELL INSTALLED AND SAMPLED IN MAY AND JUNE 1995
- ⊛ STUDY AREA INVESTIGATION MONITORING WELL INSTALLED AND SAMPLED IN NOVEMBER 1995

NOTE: ANALYTICAL RESULTS ARE SUMMARIZED IN TABLES 4-5A AND PRESENTED IN APPENDIX M.

N



E	ETHYLBENZENE
X	XYLENE (TOTAL)

J = ESTIMATED VALUE BELOW SQL.
ND = NOT DETECTED
NS = NOT SAMPLED

ACET	ACETONE	DIBRO	DIBROMODICHLOROMETHANE
METH	METHYLENE CHLORIDE	BRO	BROMOMETHANE
CHLOR	CHLOROFORM	2-BUT	2-BUTANONE
CA	CHLORDETHANE	PCE	TETRACHLOROETHENE
1,2-DCA	1,2-DICHLOROETHANE	PCA	1,1,2,2-TETRACHLOROETHANE
1,2-DCE	1,2-DICHLOROETHENE (TOTAL)	VC	VINYL CHLORIDE
1,2-DCP	1,2-DICHLOROPROPANE	2-HEX	2-HEXANONE
1,1,2-TCA	1,1,2-TRICHLOROETHANE	CM	CHLOROMETHANE
1,1-DCA	1,1-DICHLOROETHANE	CS2	CARBONDISULFIDE
1,1-DCE	1,1-DICHLOROETHENE	TCE	TRICHLOROETHENE
1,1,1-TCA	1,1,1-TRICHLOROETHANE	4M2P	4-METHYL-2-PENTANONE

200 100 0 200 400
GRAPHIC SCALE IN FEET

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NAL	JMF	12/16/98	29600.32	FIG4-3.DWG
CHECKED BY	PROJECT MGR.	SCALE	DRAWING NO.	FIG NO.
CSD	NAL	AS SHOWN	–	4-3

NORTHERN DIVISION
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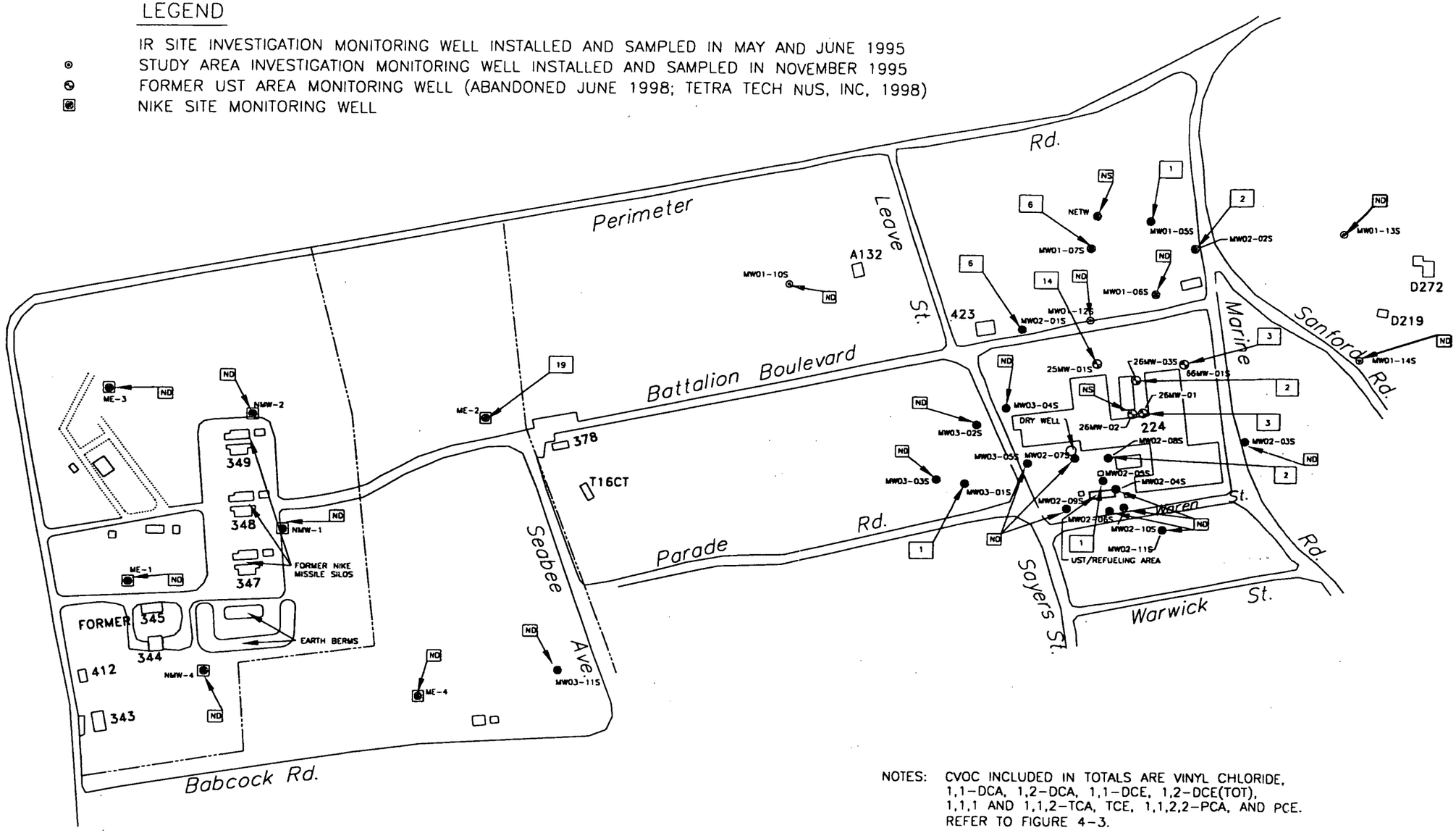
VOC DETECTED IN GROUND-WATER SAMPLES (ug/L) FROM SHALLOW WELLS MAY/JUNE AND NOVEMBER 1995
FIGURE 4-3

FILE NAME:F:\PROJECTS\29600.32\3294\REPORTS\COMP_RI\REV_DFT\FIGURES\FIG4-3.DWG

LEGEND

- IR SITE INVESTIGATION MONITORING WELL INSTALLED AND SAMPLED IN MAY AND JUNE 1995
- STUDY AREA INVESTIGATION MONITORING WELL INSTALLED AND SAMPLED IN NOVEMBER 1995
- FORMER UST AREA MONITORING WELL (ABANDONED JUNE 1998; TETRA TECH NUS, INC, 1998)
- NIKE SITE MONITORING WELL



NOTES: CVOC INCLUDED IN TOTALS ARE VINYL CHLORIDE, 1,1-DCA, 1,2-DCA, 1,1-DCE, 1,2-DCE(TOT), 1,1,1 AND 1,1,2-TCA, TCE, 1,1,2,2-PCA, AND PCE. REFER TO FIGURE 4-3.

TOTAL CHLORINATED VOC IS THE SUM OF THE HIGHEST REPORTED CONCENTRATION OF EACH ANALYTE, FROM UNDILUTED, DILUTED AND DUPLICATE SAMPLES.

ND-NOT DETECTED
NS-NOT SAMPLED

FILE NAME:F:\PROJECTS\29600.32\3294\REPORTS\COMP_RI\REV_DF\FIGURES\FIG4-4.DWG

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NAL	JMF	12/18/98	29600.32	FIG4-4.DWG
CHECKED BY	PROJECT MGR.	SCALE	DRAWING NO.	FIG NO.
CSD	NAL	AS SHOWN	-	4-4

NORTHERN DIVISION
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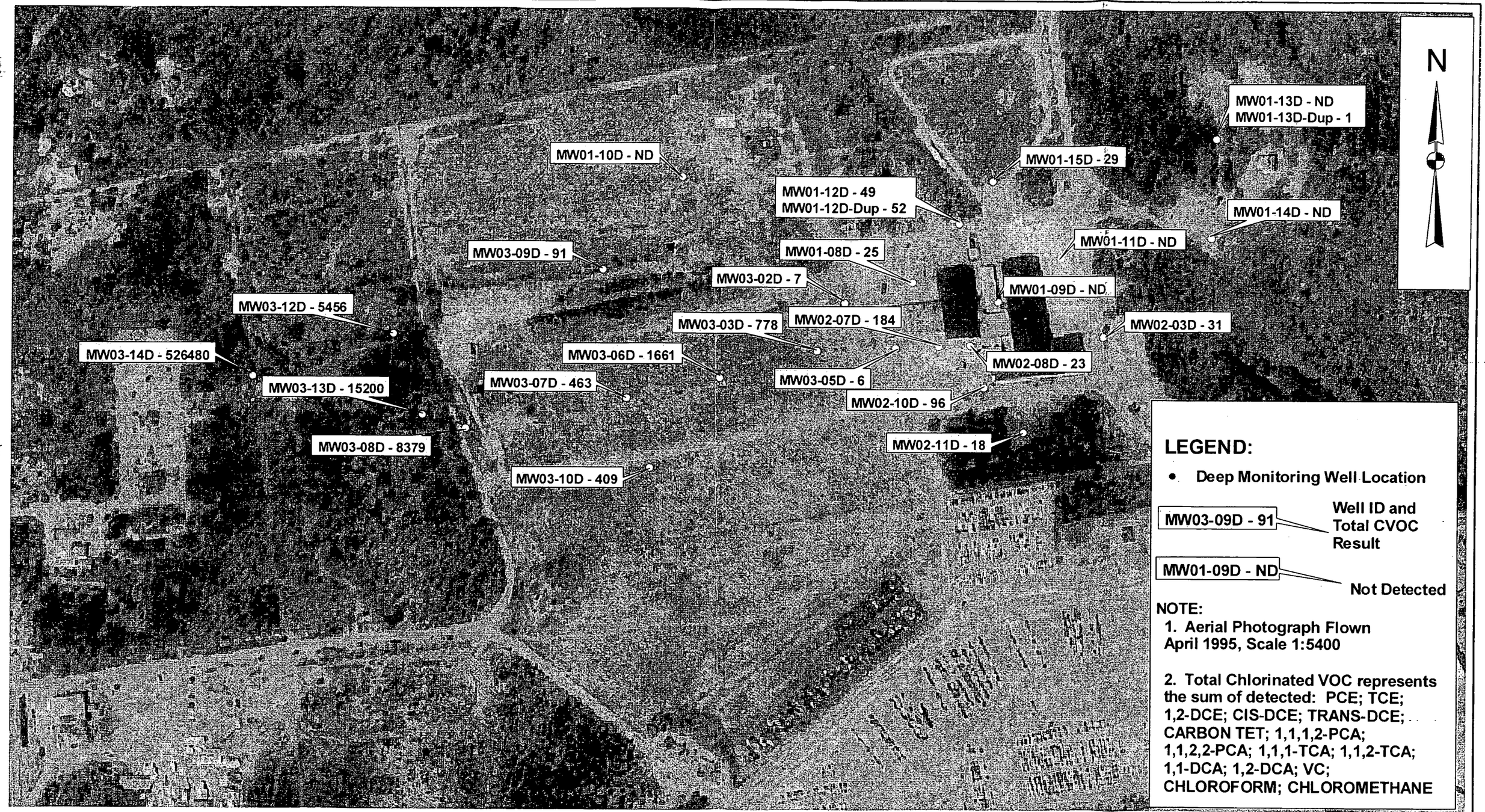
STUDY AREAS 01 AND 04 AND SITES 02 AND 03
NCBC DAVISVILLE, RHODE ISLAND

TOTAL CVOC DETECTED IN GROUND-WATER SAMPLES (ug/L) FROM SHALLOW WELLS
MAY/JUNE AND NOVEMBER 1995

FIGURE 4-4



EA ENGINEERING, SCIENCE, AND TECHNOLOGY

300 0 300 Feet

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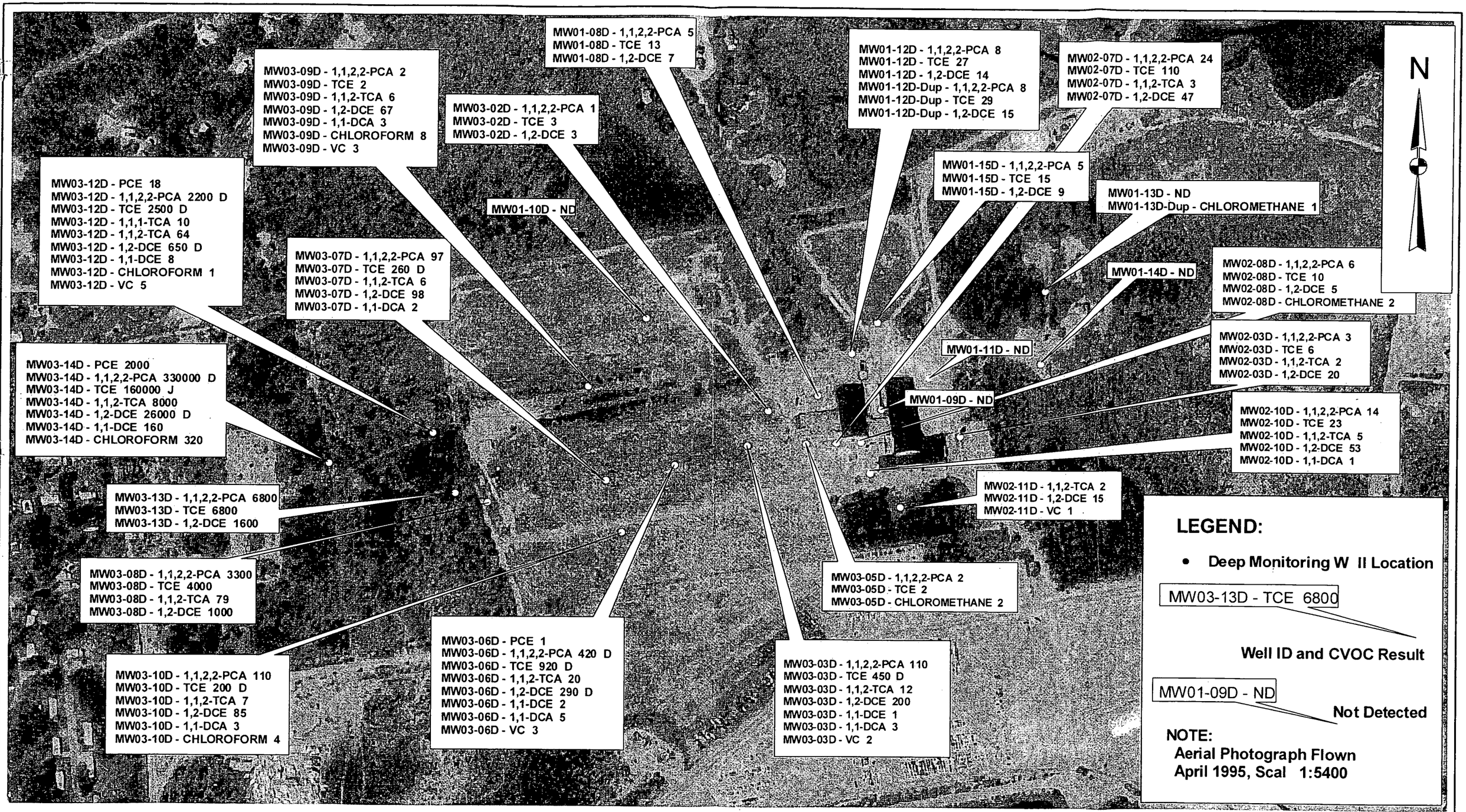
1995 TOTAL CHLORINATED VOLATILEORGANIC COMPOUNDS (ug/L) DETECTED IN GROUND-WATER SAMPLES FROM DEEP WELLS

FIGURE 4-5



EA ENGINEERING, SCIENCE, AND TECHNOLOGY

300 0 300 600 Feet

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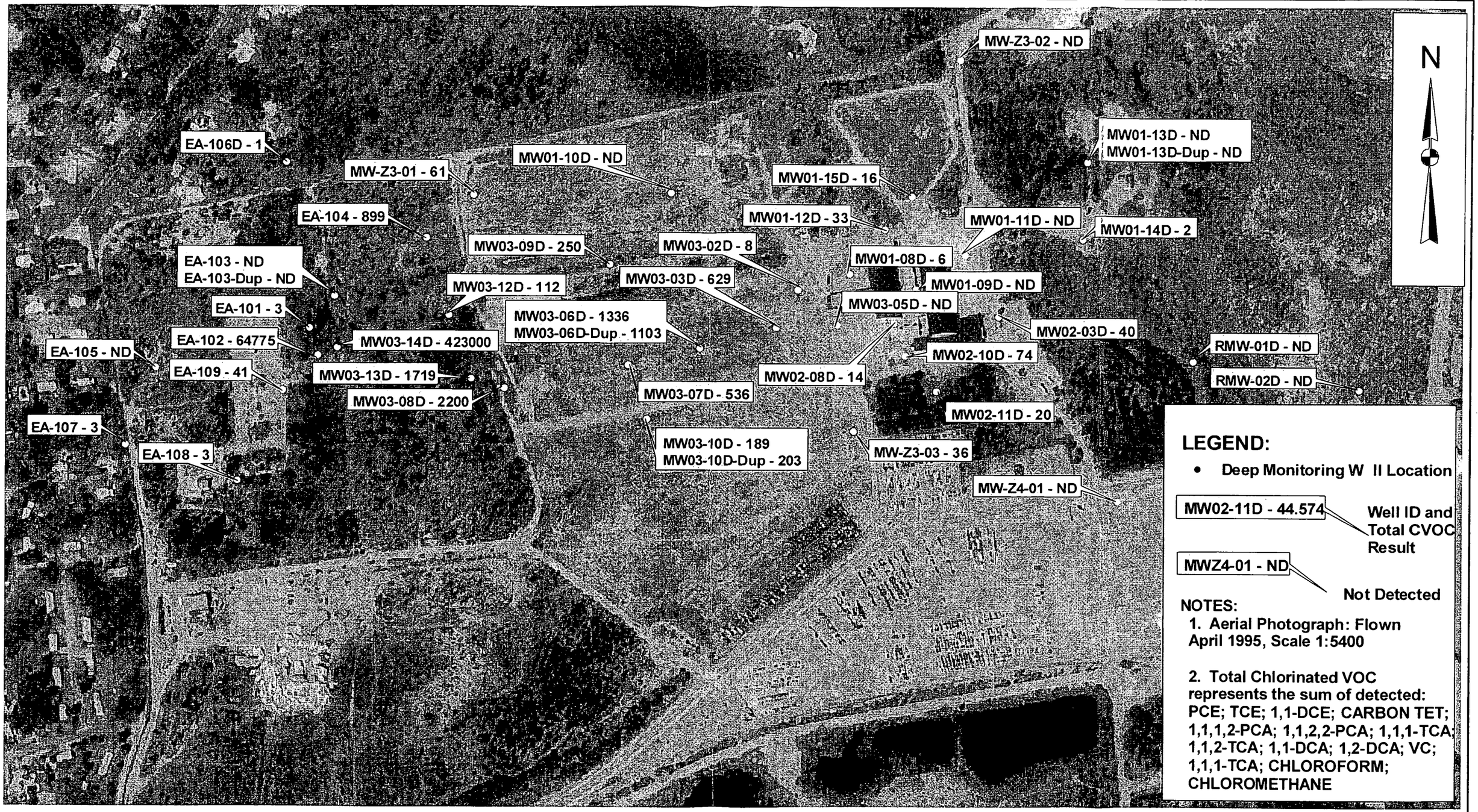
1995 CHLORINATED VOLATILE ORGANIC COMPOUNDS (ug/L) DETECTED IN GROUND-WATER SAMPLES FROM DEEP WELLS

FIGURE 4-6



EA ENGINEERING, SCIENCE, AND TECHNOLOGY

400 0 400 Feet

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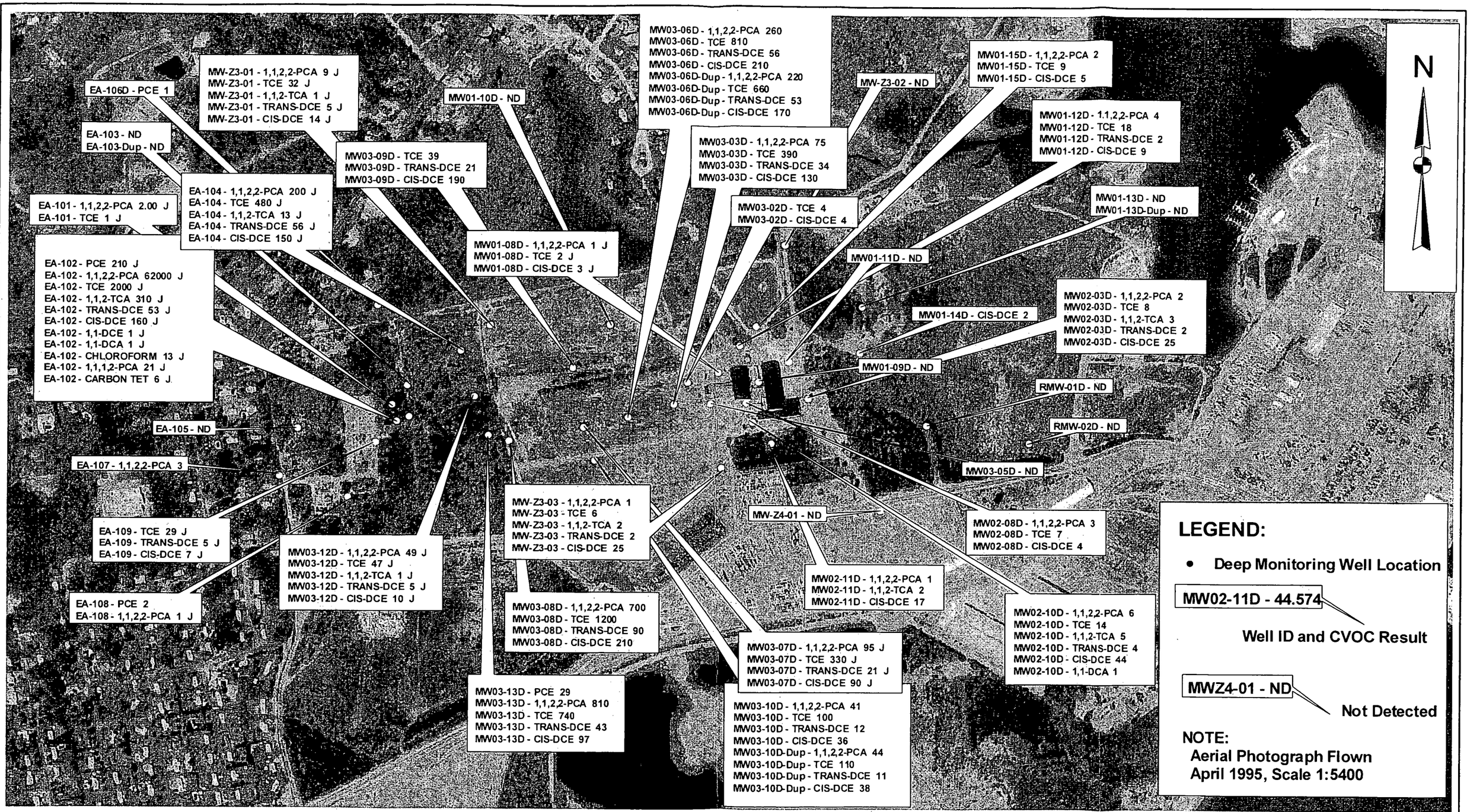
STUDY AREAS 01 AND 04 AND SITES 02 AND 03
NCBC DAVISVILLE, RHODE ISLAND

1996 TOTAL CHLORINATED VOLATILE ORGANIC COMPOUNDS (ug/L) DETECTED IN GROUND-WATER SAMPLES FROM DEEP WELLS

FIGURE 4-7



EA ENGINEERING, SCIENCE, AND TECHNOLOGY

400 0 400 800 Feet

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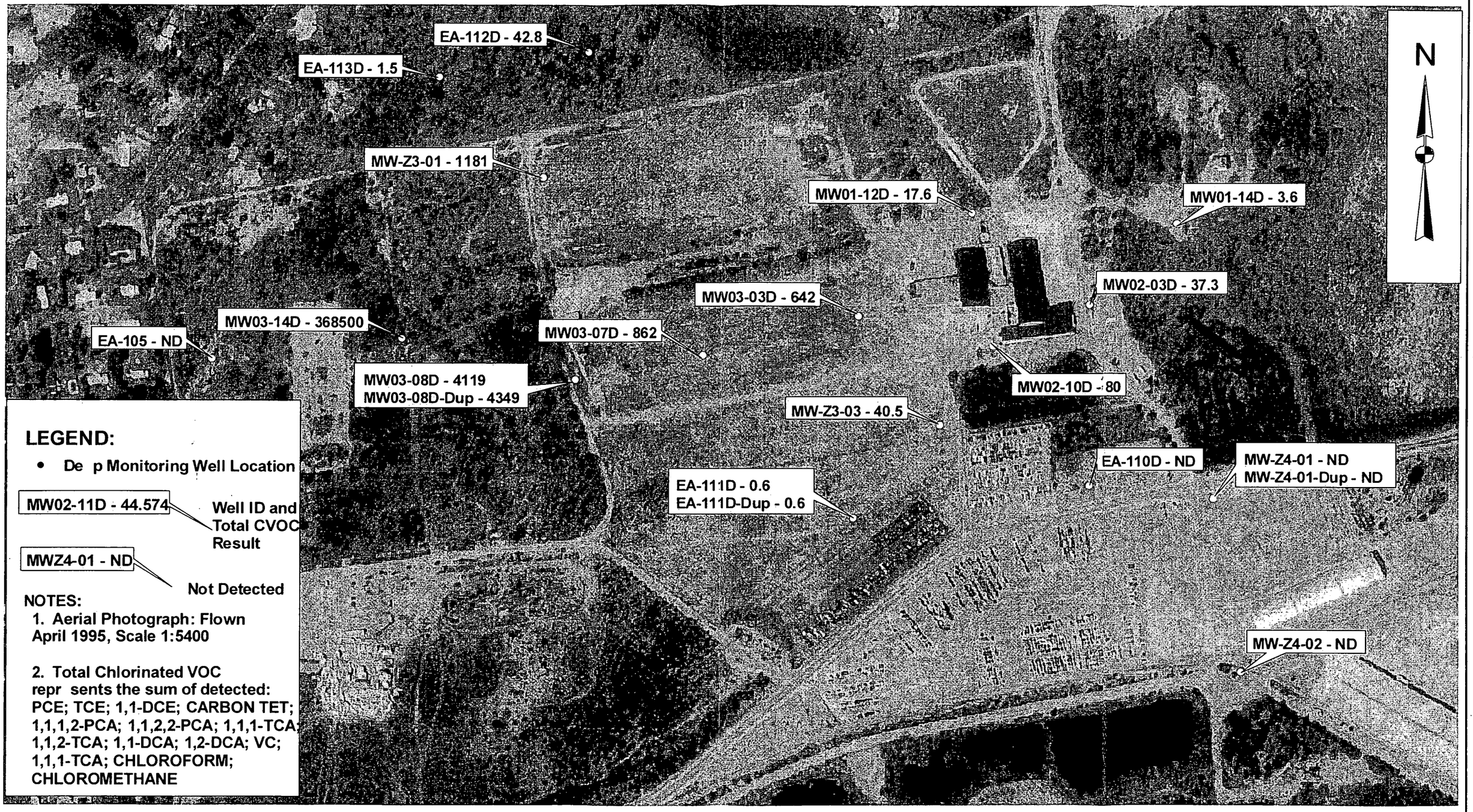
STUDY AREAS 01 AND 04 AND SITES 02 AND 03
NCBC DAVISVILLE, RHODE ISLAND

1996 CHLORINATED VOLATILE ORGANIC COMPOUNDS (ug/L) DETECTED IN GROUND-WATER SAMPLES FROM DEEP WELLS

FIGURE 4-8



LEGEND:

- De p Monitoring Well Location

MW02-11D - 44.574 — Well ID and Total CVOC Result

MWZ4-01 - ND — Not Detected

NOTES:

1. Aerial Photograph: Flown April 1995, Scale 1:5400

2. Total Chlorinated VOC repr sents the sum of detected: PCE; TCE; 1,1-DCE; CARBON TET; 1,1,1,2-PCA; 1,1,2,2-PCA; 1,1,1-TCA; 1,1,2-TCA; 1,1-DCA; 1,2-DCA; VC; 1,1,1-TCA; CHLOROFORM; CHLOROMETHANE

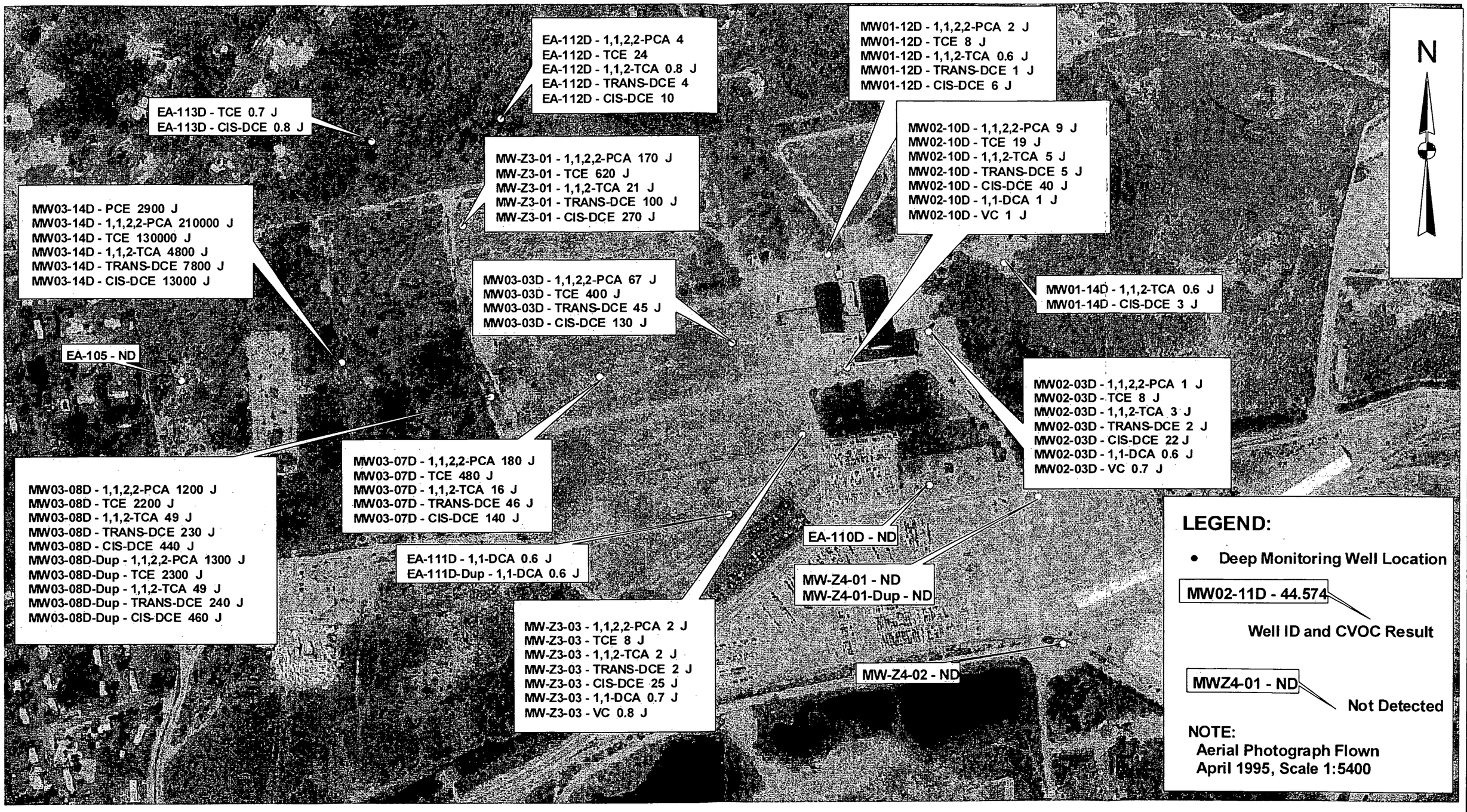
EA ENGINEERING, SCIENCE, AND TECHNOLOGY

300 0 300 Feet

NORTHERN DIVISION
PHASE III COMPREHENSIVE RI REPORT
STUDY AREAS 01 AND 04 AND SITES 02 AND 03
NCBC DAVISVILLE, RHODE ISLAND

1998 TOTAL CHLORINATED VOLATILE ORGANIC COMPOUNDS (ug/L) DETECTED IN GROUND-WATER SAMPLES FROM DEEP WELLS

FIGURE 4-9



EA ENGINEERING, SCIENCE, AND TECHNOLOGY

200 0 200 400 Feet

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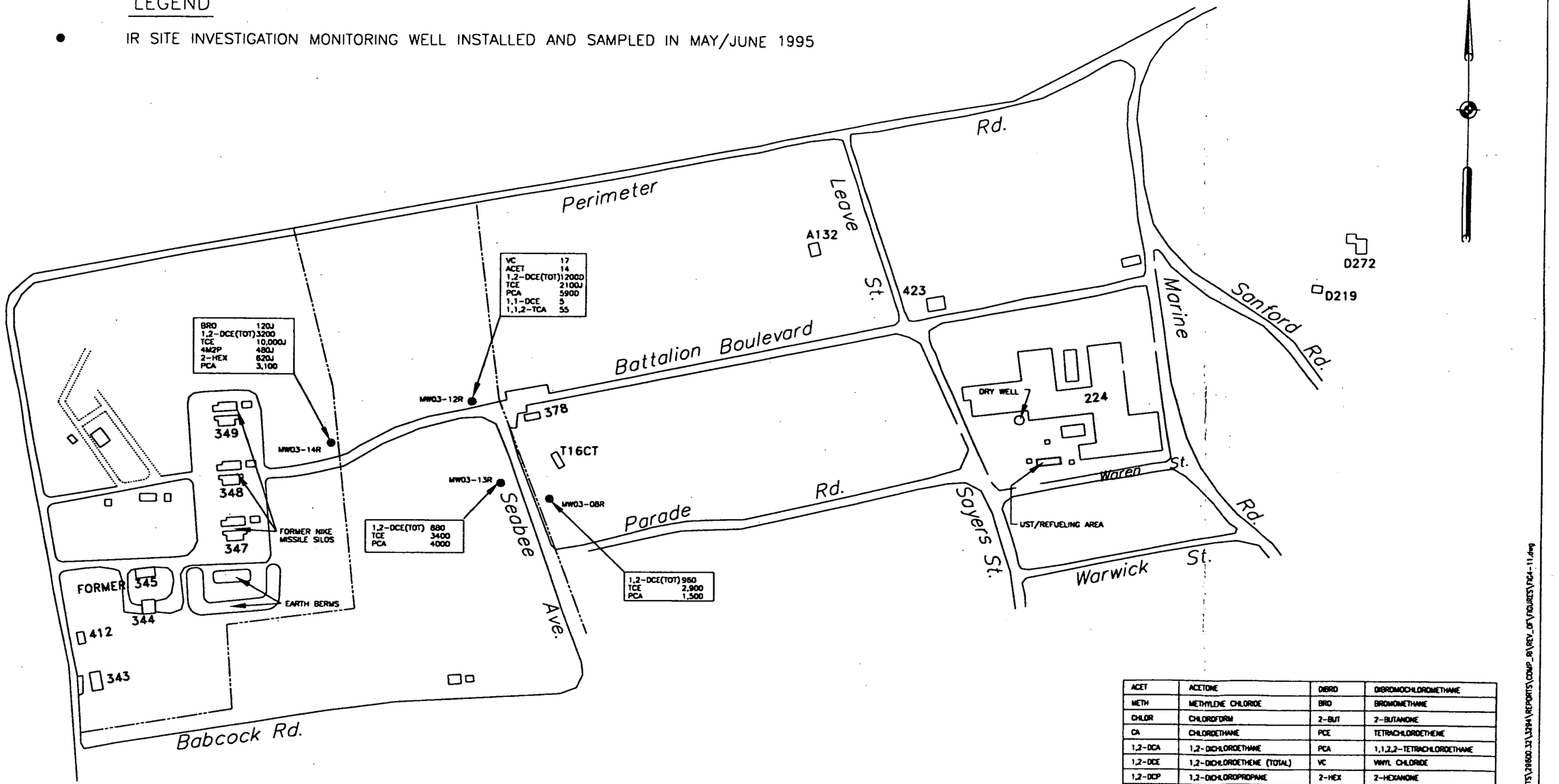
NCBC DAVISVILLE, RHODE ISLAND

1998 CHLORINATED VOLATILE ORGANIC COMPOUNDS (ug/L) DETECTED IN GROUND-WATER SAMPLES FROM DEEP WELLS

FIGURE 4-10

LEGEND

● IR SITE INVESTIGATION MONITORING WELL INSTALLED AND SAMPLED IN MAY/JUNE 1995



J = ESTIMATED VALUE BELOW SQL.
D = DILUTED SAMPLE

ACET	ACETONE	DIBRD	DIBROMOCHLOROMETHANE
METH	METHYLENE CHLORIDE	BRO	BROMOMETHANE
CHLOR	CHLOROFORM	2-BUT	2-BUTANONE
CA	CHLOROETHANE	PCE	TETRACHLOROETHENE
1,2-DCA	1,2-DICHLOROETHANE	PCA	1,1,2,2-TETRACHLOROETHANE
1,2-DCE	1,2-DICHLOROETHENE (TOTAL)	VC	VINYL CHLORIDE
1,2-DCP	1,2-DICHLOROPROPANE	2-HEX	2-HEXANONE
1,1,2-TCA	1,1,2-TRICHLOROETHANE	CM	CHLOROMETHANE
1,1-DCA	1,1-DICHLOROETHANE	CS2	CARBONDISULFIDE
1,1-DCE	1,1-DICHLOROETHENE	TCE	TRICHLOROETHENE
1,1,1-TCA	1,1,1-TRICHLOROETHANE	4M2P	4-METHYL-2-PENTANONE

FILE NAME:F:\PROJECTS\29600.32\3294\REPORTS\COMP_RI\REV_DF\FIGURES\FIG4-11.dwg

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DESIGNED BY:	DRAWN BY	DATE	PROJECT NO.	FILE NAME
NAL	JMF	12/16/98	29600.32	FIG4-11.dwg
CHECKED BY	PROJECT MGR.	SCALE	DRAWING NO.	FIG NO.
CSD	NAL	AS SHOWN	–	4-11

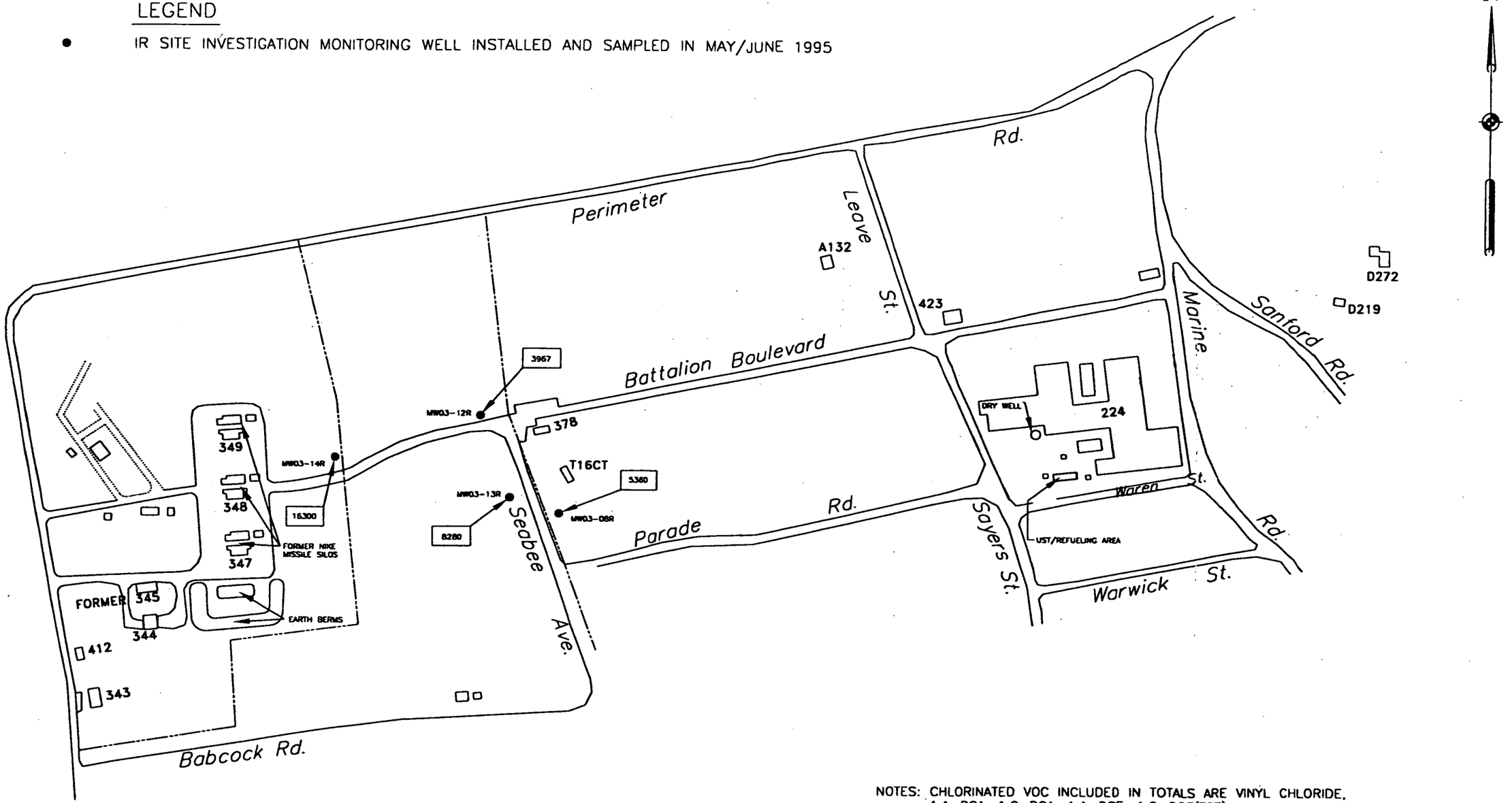
NORTHERN DIVISION
PHASE III COMPREHENSIVE RI REPORT
STUDY AREAS 01 AND 04 AND SITES 02 AND 03
NCBC DAVISVILLE, RHODE ISLAND

VOC DETECTED IN GROUND-WATER SAMPLES (ug/L) FROM BEDROCK WELLS MAY/JUNE 1995

FIGURE 4-11

LEGEND

● IR SITE INVESTIGATION MONITORING WELL INSTALLED AND SAMPLED IN MAY/JUNE 1995



NOTES: CHLORINATED VOC INCLUDED IN TOTALS ARE VINYL CHLORIDE, 1,1-DCA, 1,2-DCA, 1,1-DCE, 1,2-DCE(TOT), 1,1,1 AND 1,1,2-TCA, TCE, 1,1,2,2-PCA, AND PCE.

TOTAL CHLORINATED VOC IS THE SUM OF THE HIGHEST REPORTED CONCENTRATION OF EACH ANALYTE, FROM UNDILUTED, DILUTED AND DUPLICATE SAMPLES.

FILE NAME:F:\PROJECTS\29600.32\3294\REPORTS\COMP_RI\REV_DFT\FIGURES\FIG4-12.dwg

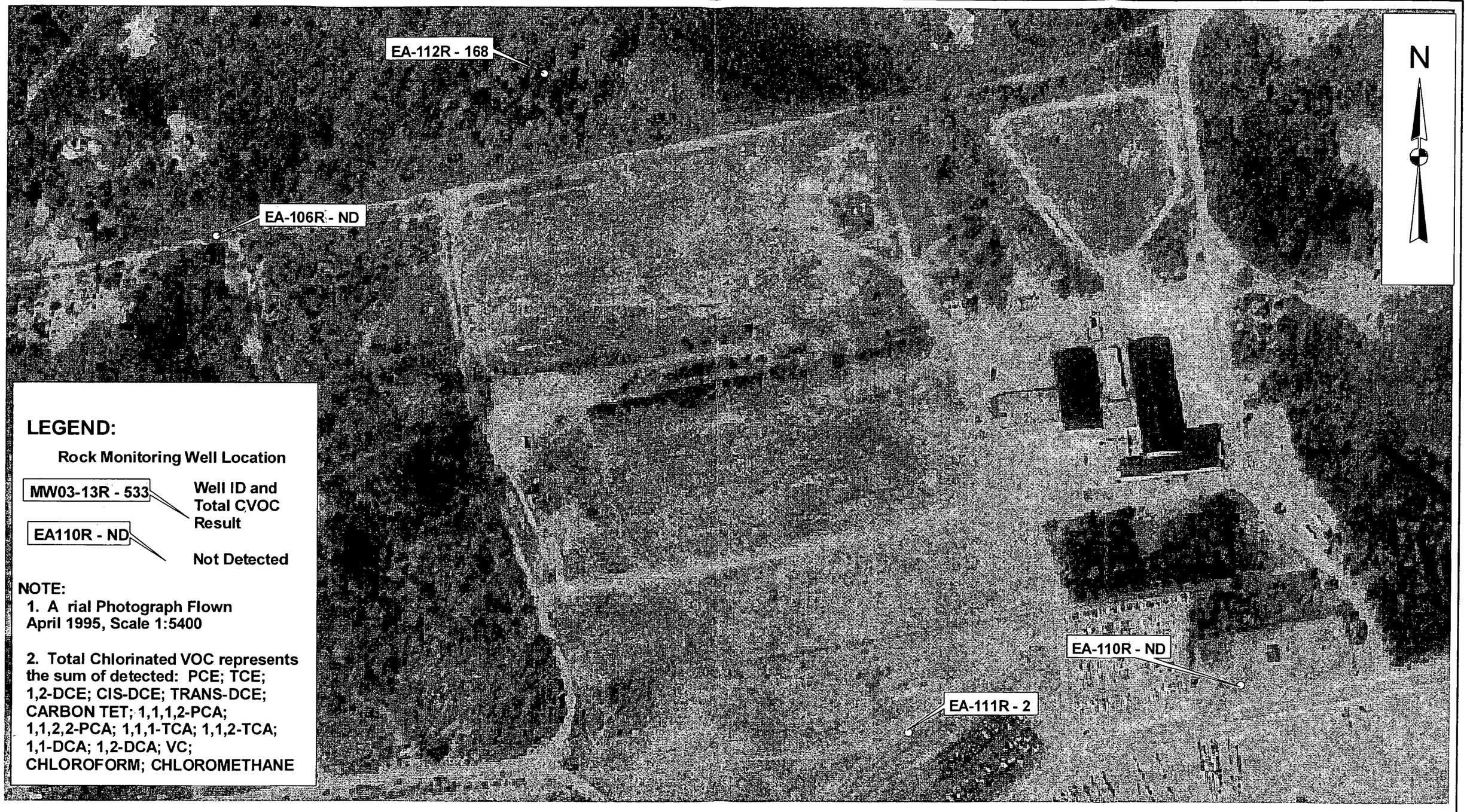
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

DESIGNED BY	DRAWN BY	DATE	PROJECT NO.	FILE NAME
RC	JMF	12/16/98	29600.32	FIG4-12.dwg
CHECKED BY	PROJECT MGR.	SCALE	DRAWING NO.	FIG NO.
CSD	NAL	AS SHOWN	-	4-12

NORTHERN DIVISION
PHASE III COMPREHENSIVE RI REPORT
STUDY AREAS 01 AND 04 AND SITES 02 AND 03
NCBC DAVISVILLE, RHODE ISLAND

TOTAL CHLORINATED VOC DETECTED IN GROUND-WATER SAMPLES (ug/L) FROM BEDROCK WELLS MAY/JUNE 1995

FIGURE 4-12



LEGEND:

Rock Monitoring Well Location

MW03-13R - 533 — Well ID and Total CVOC Result

EA110R - ND — Not Detected

NOTE:

1. A rial Photograph Flown April 1995, Scale 1:5400

2. Total Chlorinated VOC represents the sum of detected: PCE; TCE; 1,2-DCE; CIS-DCE; TRANS-DCE; CARBON TET; 1,1,1,2-PCA; 1,1,2,2-PCA; 1,1,1-TCA; 1,1,2-TCA; 1,1-DCA; 1,2-DCA; VC; CHLOROFORM; CHLOROMETHANE

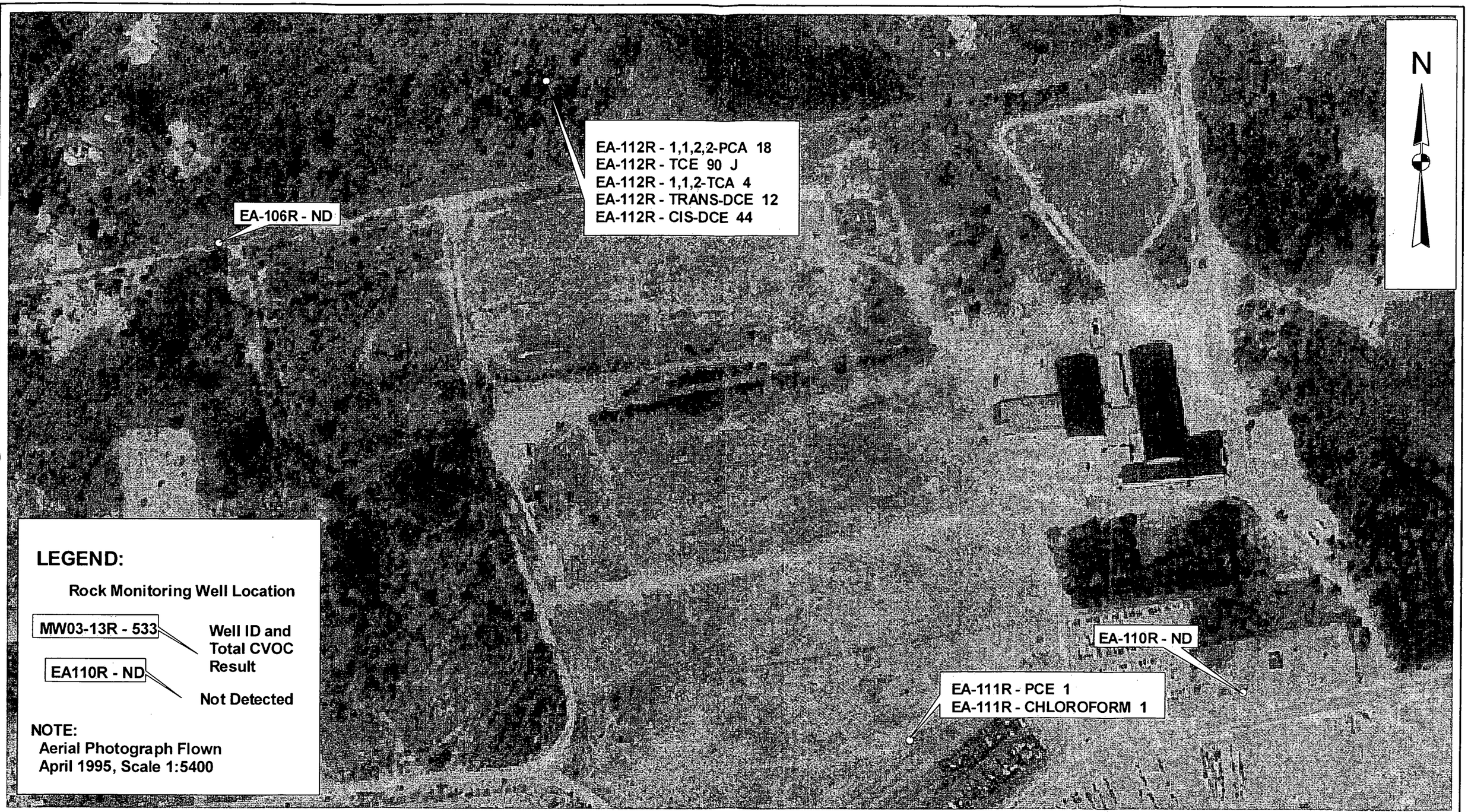
EA ENGINEERING, SCIENCE, AND TECHNOLOGY

300 0 300 Feet

NORTHERN DIVISION
PHASE III COMPREHENSIVE RI REPORT
STUDY AREAS 01 AND 04 AND SITES 02 AND 03
NCBC DAVISVILLE, RHODE ISLAND

1998 TOTAL CHLORINATED VOLATILEORGANIC COMPOUNDS (ug/L) DETECTED IN GROUND-WATER SAMPLES FROM ROCK WELLS

FIGURE 4-13



EA ENGINEERING, SCIENCE, AND TECHNOLOGY

200 0 200 400 Feet

NORTHERN DIVISION
PHASE III COMPREHENSIVE RI REPORT
STUDY AREAS 01 AND 04 AND SITES 02 AND 03
NCBC DAVISVILLE, RHODE ISLAND

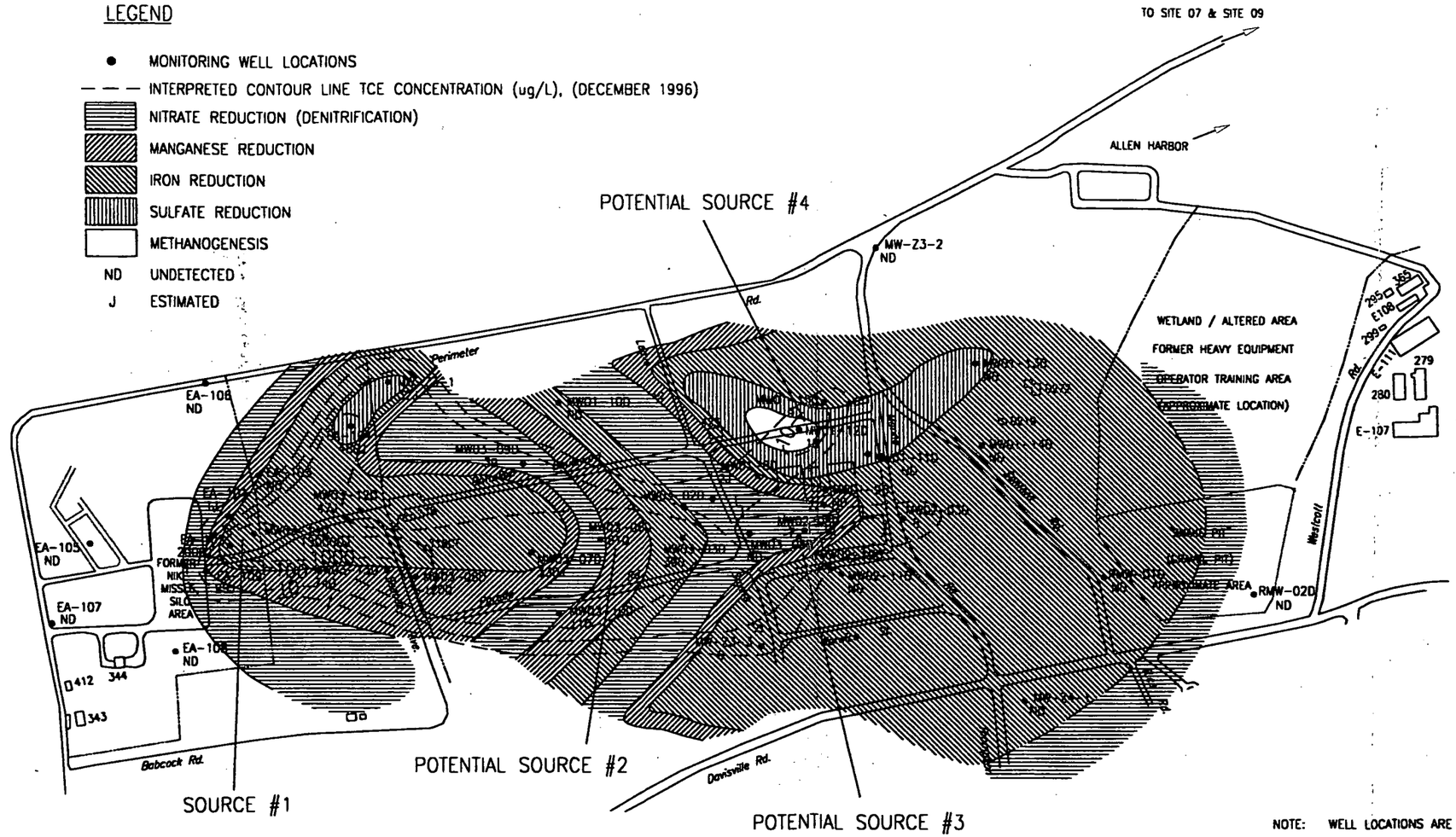
1998 CHLORINATED VOLATILE ORGANIC COMPOUNDS (ug/L) DETECTED IN GROUND-WATER SAMPLES FROM ROCK WELLS

FIGURE 4-14

N

LEGEND

- MONITORING WELL LOCATIONS
- INTERPRETED CONTOUR LINE TCE CONCENTRATION (ug/L), (DECEMBER 1996)
- NITRATE REDUCTION (DENITRIFICATION)
- MANGANESE REDUCTION
- IRON REDUCTION
- SULFATE REDUCTION
- METHANOGENESIS
- ND UNDETECTED
- J ESTIMATED



400 200 0 400

GRAPHIC SCALE IN FEET

NOTE: WELL LOCATIONS ARE APPROXIMATE

CONTOURS SHOWN REPRESENT OUR EVALUATION OF THE MOST PROBABLE CONDITIONS BASED UPON INTERPRETATION OF PRESENTLY AVAILABLE DATA. SOME VARIATION FROM THESE CONDITIONS MUST BE EXPECTED.

BASE MAP DIGITIZED FROM: NCBC CENTER DAVISVILLE RI STATION MAP, SEPT 1992.

FILE: F:\PROJECTS\29600.32\3294\REPORTS\COMP_RI\REV_DFT\FIGURES\FIG5-1.DWG

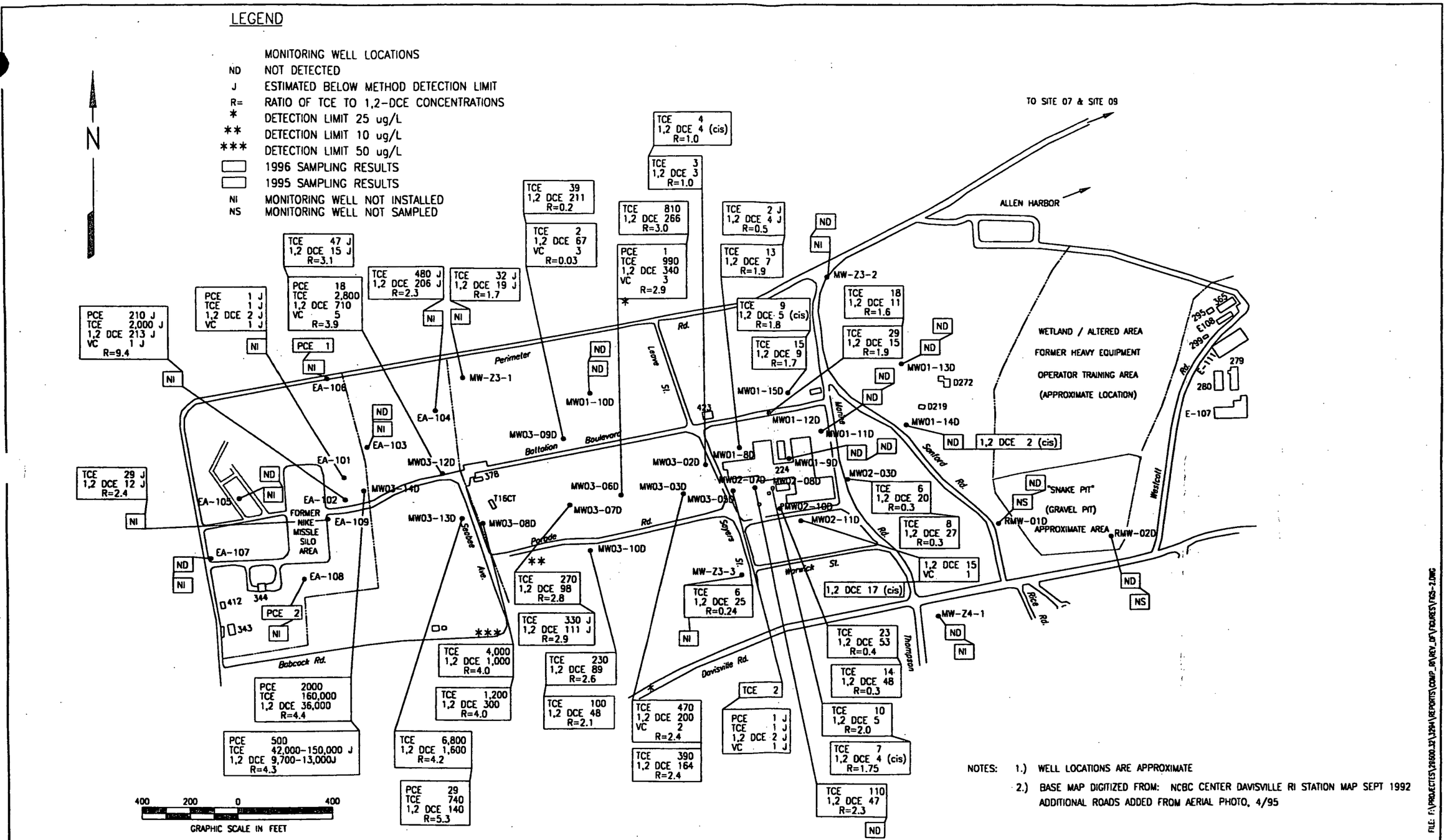
EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DESIGNED BY	DRAWN BY	DATE	PROJECT NO.	FILE NAME
ARB	JFW/PMH	12/18/98	29600.32	FIG5-1.DWG
CHECKED BY	PROJECT MGR.	SCALE	DRAWING NO.	FIGURE
ARB	JAS	AS SHOWN	-	5-1

NORTHERN DIVISION
PHASE III COMPREHENSIVE RI REPORT
STUDY AREAS 01 AND 04 AND SITES 02 AND 03
NCBC DAVISVILLE, RHODE ISLAND

CVOC SOURCE AREA AND NATURAL ATTENUATION CHARACTERIZATION WITH THE DECEMBER 1996 TRICHLOROETHENE (TCE) VALUES (ug/L)

FIGURE 5-1



NOTES: 1.) WELL LOCATIONS ARE APPROXIMATE

2.) BASE MAP DIGITIZED FROM: NCBC CENTER DAVISVILLE RI STATION MAP SEPT 1992
ADDITIONAL ROADS ADDED FROM AERIAL PHOTO, 4/95

FILE: F:\PROJECTES\29600.32\3294\REPORTS\COMP_RI\REV_DF\FIGURES\FIG5-2.DWG

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DESIGNED BY	DRAWN BY	DATE	PROJECT NO.	FILE NAME
JEL	JFW/PMH	12/18/98	29600.32	FIG5-2.DWG
CHECKED BY	PROJECT MGR.	SCALE	DRAWING NO.	FIGURE
ARB	JAS	AS SHOWN	-	5-2

NORTHERN DIVISION
PHASE III COMPREHENSIVE RI REPORT
STUDY AREAS 01 AND 04 AND SITES 02 AND 03
NCBC DAVISVILLE, RHODE ISLAND

DISTRIBUTION OF PCE, TCE, 1,2-DCE (TOTAL), AND VINYL CHLORIDE DETECTED IN DEEP GROUND WATER (ug/L) (1995 AND 1996)

FIGURE 5-2

LEGEND

- ● MONITORING WELL LOCATIONS
- ND NOT DETECTED
- J ESTIMATED BELOW METHOD DETECTION LIMIT
- R= RATIO OF PCA TO TCA CONCENTRATIONS
- * DETECTION LIMIT 25 ug/L
- ** DETECTION LIMIT 10 ug/L
- *** DETECTION LIMIT 50 ug/L
- **** DETECTION LIMIT 500 ug/L
- ▭ 1996 SAMPLING RESULTS
- ▭ 1995 SAMPLING RESULTS
- NI MONITORING WELL NOT INSTALLED
- NS MONITORING WELL NOT SAMPLED

N

TO SITE 07 & SITE 09

ALLEN HARBOR

WETLAND / ALTERED AREA
FORMER HEAVY EQUIPMENT
OPERATOR TRAINING AREA
(APPROXIMATE LOCATION)

"SNAKE PIT"
(GRAVEL PIT)
APPROXIMATE AREA

FORMER NIKE MISSILE SILO AREA

Perimeter Rd.
Boulevard
Battalion
Babcock Rd.
Parade
Davisville Rd.
Lacey St.
Sanford Rd.
Westcott
Rice Rd.
Thompson
Norwick St.
Sayers St.
Soares Ave.

EA-101 EA-102 EA-103 EA-104 EA-105 EA-106 EA-107 EA-108 EA-109

MW-Z3-1 MW-Z3-2 MW-Z3-3 MW-Z4-1

MW01-8D MW01-9D MW01-10D MW01-11D MW01-12D MW01-13D MW01-14D MW01-15D

MW02-03D MW02-07D MW02-08D MW02-10D MW02-11D

MW03-02D MW03-03D MW03-06D MW03-07D MW03-08D MW03-09D MW03-10D MW03-12D MW03-13D MW03-14D

RMW-01D RMW-02D

T16CT

D0272 D219

378 423 224 412 344 343 365 295 E108 299 E-111 279 280 E-107

PCA 62,000 J
TCA 310 J
1,1 DCE 1 J
1,1 DCA 1 J
VC 1 J
R=200

PCA 2 J
TCA 1 J
1,1 DCA 1 J
1,1 DCE 1 J
VC 1 J

PCA 49 J
TCA 1 J
R=49

PCA 2200
TCA 64
1,1 DCE 8
VC 5
R=34.4

PCA 200 J
TCA 13 J
R=15.4

PCA 9 J
TCA 1 J
R=9

PCA 2
TCA 6
1,1 DCA 3
VC 3
R=0.3

PCA 260
PCA 420
TCA 20
1,1 DCA 5
1,1 DCE 2
VC 3
R=21.0

PCA 1
PCA 1 J
TCA 1 J
1,1 DCA 1 J
1,1 DCE 1 J
R=1.0

PCA 5

PCA 2
PCA 5

PCA 4
PCA 8

PCA 6 J

PCA 3

PCA 330,000
TCA 8,000
1,1 DCE 160
R=41.2

PCA 78,000-260,000 J
TCA 1,500
R=52

PCA 3,300
TCA 79
R=41.7

PCA 700

PCA 6,800

PCA 810

PCA 120
TCA 7
1,1 DCA 2
R=17.1

PCA 95 J

PCA 110
TCA 7
1,1 DCA 3
R=15.7

PCA 41

PCA 110
TCA 12
1,1 DCA 3
1,1 DCE 1
VC 2
R=9.2

PCA 75

PCA 2

PCA 1 J
TCA 1 J
1,1 DCA 1 J
1,1 DCE 1 J
VC 1 J

PCA 3
TCA 2
R=1.5

PCA 2
TCA 3
R=0.67

TCA 2
VC 1

PCA 1
TCA 2
R=0.5

PCA 14
TCA 5
1,1 DCA 1
R=2.8

PCA 6
TCA 5
1,1 DCA 1
R=1.2

PCA 6

PCA 3

PCA 24
TCA 3

PCA 1
TCA 2

400 200 0 400
GRAPHIC SCALE IN FEET

NOTES:
1.) WELL LOCATIONS ARE APPROXIMATE
2.) BASE MAP DIGITIZED FROM: NCBC CENTER DAVISVILLE RI STATION MAP SEPT 1992
ADDITIONAL ROADS ADDED FROM AERIAL PHOTO, 4/95

FILE: F:\PROJECTS\29600.32\1994\REPORTS\COMP_RI\VRY_DFV\FIGURES\FIG5-3.DWG

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

DESIGNED BY	DRAWN BY	DATE	PROJECT NO.	FILE NAME
JEL	JFW/PMH	12/18/98	29600.32	FIG5-3.DWG
CHECKED BY	PROJECT MGR.	SCALE	DRAWING NO.	FIGURE
ARB	JAS	AS SHOWN	-	5-3

NORTHERN DIVISION
PHASE III COMPREHENSIVE RI REPORT
STUDY AREAS 01 AND 04 AND SITES 02 AND 03
NCBC DAVISVILLE, RHODE ISLAND

DISTRIBUTION OF PCA, TCA, 1,1-DCE (TOTAL), 1,1-DCA, AND VINYL CHLORIDE DETECTED IN DEEP GROUND WATER (ug/L) (1995 AND 1996)

FIGURE 5-3

Table 4-2A
Volatile Organic Compounds
Detected in Shallow
Ground-water Samples (ug/L)
May and November 1995

Well ID	25MW-01S	26MW-01S	26MW-03S	66MW-01S	ME-1	ME-2
Site/Study Area	UST	UST	UST	UST	NIKE	NIKE
Date of sample collection	05/30/1995	05/30/1995	05/30/1995	05/31/1995	05/25/1995	05/25/1995
1,1,1-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	5.00
1,1,2,2-TETRACHLOROETHANE	9.00	10.00 U	10.00 U	10.00 U	10.00 U	8.00
1,1,2-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	2.00
1,2-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROPROPANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
2-BUTANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
2-HEXANONE	10.00 U	10.00 UJ	10.00 U	10.00 UJ	10.00 U	10.00 U
4-METHYL-2-PENTANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
ACETONE	16.00 U	38.00 UJ	10.00 U	10.00 U	13.00 U	17.00 U
BENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMODICHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMOFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMOMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CARBON DISULFIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CARBON TETRACHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CIS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
DIBROMOCHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
ETHYLBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
METHYLENE CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
STYRENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TETRACHLOROETHENE	10.00 U	3.00	2.00	3.00	10.00 U	10.00 U
TOLUENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL 1,2-DICHLOROETHENE	5.00	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TRANS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TRICHLOROETHENE	13.00 U	10.00 U	10.00 U	10.00 U	10.00 U	4.00
VINYL CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
XYLENES (TOTAL)	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL BTEX						
TOTAL CHLORINATED CVOCS	14.00	3.00	2.00	3.00		19.00

Table 4-2A
Volatile Organic Compounds
Detected in Shallow
Ground-water Samples (ug/L)
May and November 1995

Well ID	ME-3	ME-4	ME-4 (DUP)	MW01-05S	MW01-06S
Site/Study Area	NIKE	NIKE	NIKE	Study Area 01	Study Area 01
Date of sample collection	05/25/1995	05/25/1995	05/25/1995	05/23/1995	05/23/1995
1,1,1-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1,2,2-TETRACHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1,2-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROPROPANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
2-BUTANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
2-HEXANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
4-METHYL-2-PENTANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
ACETONE	56.00 UJ	10.00 U	10.00 UJ	10.00 U	18.00 UJ
BENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMODICHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMOFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMOMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CARBON DISULFIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CARBON TETRACHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROMETHANE	10.00 U	10.00 U	10.00 U	1.00	10.00 U
CIS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
DIBROMOCHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
ETHYLBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
METHYLENE CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
STYRENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TETRACHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOLUENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL 1,2-DICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TRANS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TRICHLOROETHENE	10.00 U	10.00 U	10.00 U	1.00	10.00 U
VINYL CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
XYLENES (TOTAL)	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL BTEX					
TOTAL CHLORINATED CVOCS				1.00	

Table 4-2A
Volatile Organic Compounds Detected in Shallow Ground-water Samples (ug/L)
May and November 1995

Well ID	MW01-07S	MW01-07S(DUP)	MW01-10S
Site/Study Area	Study Area 01	Study Area 01	Study Area 01
Date of sample collection	05/23/1995	05/24/1995	11/14/1995
1,1,1-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U
1,1,2,2-TETRACHLOROETHANE	10.00 U	10.00 U	10.00 U
1,1,2-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHANE	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHENE	10.00 U	10.00 U	10.00 U
1,2-DICHLOROETHANE	10.00 U	10.00 U	10.00 U
1,2-DICHLOROPROPANE	10.00 U	10.00 U	10.00 U
2-BUTANONE	10.00 U	10.00 U	10.00 U
2-HEXANONE	10.00 U	10.00 U	10.00 U
4-METHYL-2-PENTANONE	10.00 U	10.00 U	10.00 U
ACETONE	11.00 U	10.00 U	10.00 U
BENZENE	10.00 U	10.00 U	10.00 U
BROMODICHLOROMETHANE	10.00 U	10.00 U	10.00 U
BROMOFORM	10.00 U	10.00 U	10.00 U
BROMOMETHANE	10.00 U	10.00 U	10.00 U
CARBON DISULFIDE	10.00 U	10.00 U	10.00 U
CARBON TETRACHLORIDE	10.00 U	10.00 U	10.00 U
CHLOROBENZENE	10.00 U	10.00 U	10.00 U
CHLOROETHANE	10.00 U	10.00 U	10.00 U
CHLOROFORM	10.00 U	10.00 U	10.00 U
CHLOROMETHANE	10.00 U	10.00 U	10.00 U
CIS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U
DIBROMOCHLOROMETHANE	10.00 U	10.00 U	10.00 U
ETHYLBENZENE	10.00 U	10.00 U	10.00 U
METHYLENE CHLORIDE	10.00 U	10.00 U	10.00 U
STYRENE	10.00 U	10.00 U	10.00 U
TETRACHLOROETHENE	2.00	2.00	10.00 U
TOLUENE	10.00 U	10.00 U	10.00 U
TOTAL 1,2-DICHLOROETHENE	10.00 U	10.00 U	10.00 U
TRANS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U
TRICHLOROETHENE	4.00	4.00	10.00 U
VINYL CHLORIDE	10.00 U	10.00 U	10.00 U
XYLENES (TOTAL)	10.00 U	10.00 U	10.00 U
TOTAL BTEX			
TOTAL CHLORINATED CVOCS	6.00	6.00	

Table 4-2A
Volatile Organic Compounds Detected in Shallow Ground-water Samples (ug/L)
May and November 1995

Well ID	MW01-12S	MW01-13S	MW01-14S	MW02-01S
Site/Study Area	Study Area 01	Study Area 01	Study Area 01	Site 02
Date of sample collection	11/10/1995	11/13/1995	11/13/1995	05/24/1995
1,1,1-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U
1,1;2,2-TETRACHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U
1,1,2-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROPROPANE	10.00 U	10.00 U	10.00 U	10.00 U
2-BUTANONE	10.00 U	10.00 U	10.00 U	10.00 U
2-HEXANONE	10.00 U	10.00 U	10.00 U	10.00 U
4-METHYL-2-PENTANONE	10.00 U	10.00 U	10.00 U	10.00 U
ACETONE	10.00 U	10.00 U	10.00 U	10.00 UJ
BENZENE	10.00 U	10.00 U	10.00 U	10.00 U
BROMODICHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U
BROMOFORM	10.00 U	10.00 U	10.00 U	10.00 U
BROMOMETHANE	10.00 U	10.00 U	10.00 U	10.00 U
CARBON DISULFIDE	10.00 U	10.00 U	10.00 U	10.00 U
CARBON TETRACHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROBENZENE	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROFORM	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U
CIS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U
DIBROMOCHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U
ETHYLBENZENE	10.00 U	10.00 U	10.00 U	10.00 U
METHYLENE CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U
STYRENE	10.00 U	10.00 U	10.00 U	10.00 U
TETRACHLOROETHENE	10.00 U	10.00 U	10.00 U	2.00
TOLUENE	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL 1,2-DICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U
TRANS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U
TRICHLOROETHENE	10.00 U	10.00 U	10.00 U	4.00
VINYL CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U
XYLENES (TOTAL)	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL BTEX				
TOTAL CHLORINATED CVOCS				6.00

Table 4-2A
Volatile Organic Compounds Detected in Shallow Ground-water Samples (ug/L)
May and November 1995

Well ID	MW02-02S	MW02-03S	MW02-03S(DUP)	MW02-04S
Site/Study Area	Site 02	Site 02	Site 02	Site 02
Date of sample collection	05/24/1995	05/24/1995	05/24/1995	05/24/1995
1,1,1-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U
1,1,2,2-TETRACHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U
1,1,2-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROPROPANE	10.00 U	10.00 U	10.00 U	10.00 U
2-BUTANONE	10.00 U	10.00 U	10.00 U	10.00 U
2-HEXANONE	10.00 U	10.00 U	10.00 U	10.00 U
4-METHYL-2-PENTANONE	10.00 U	10.00 U	10.00 U	10.00 U
ACETONE	11.00 UJ	19.00 UJ	12.00 U	18.00 UJ
BENZENE	10.00 U	10.00 U	10.00 U	10.00 U
BROMODICHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U
BROMOFORM	10.00 U	10.00 U	10.00 U	10.00 U
BROMOMETHANE	10.00 U	10.00 U	10.00 U	10.00 U
CARBON DISULFIDE	10.00 U	10.00 U	10.00 U	2.00
CARBON TETRACHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROBENZENE	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROFORM	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U
CIS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U
DIBROMOCHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U
ETHYLBENZENE	10.00 U	10.00 U	10.00 U	5.00
METHYLENE CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U
STYRENE	10.00 U	10.00 U	10.00 U	10.00 U
TETRACHLOROETHENE	1.00	10.00 U	10.00 U	10.00 U
TOLUENE	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL 1,2-DICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U
TRANS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U
TRICHLOROETHENE	1.00	10.00 U	10.00 U	10.00 U
VINYL CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U
XYLENES (TOTAL)	10.00 U	10.00 U	10.00 U	21.00
TOTAL BTEX				26.00
TOTAL CHLORINATED CVOCS	2.00			

Table 4-2A
Volatile Organic Compounds
Detected in Shallow
Ground-water Samples (ug/L)
May and November 1995

Well ID	MW02-05S	MW02-06S	MW02-07S	MW02-08S	MW02-09S
Site/Study Area	Site 02	Site 02	Site 02	Site 02	Site 02
Date of sample collection	05/21/1995	05/24/1995	05/24/1995	05/24/1995	05/22/1995
1,1,1-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1,2,2-TETRACHLOROETHANE	1.00	10.00 U	10.00 U	1.00	10.00 U
1,1,2-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROPROPANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
2-BUTANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
2-HEXANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 UJ
4-METHYL-2-PENTANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
ACETONE	10.00 U	10.00 UJ	10.00 UJ	10.00 UJ	10.00 UJ
BENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMODICHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMOFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMOMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CARBON DISULFIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CARBON TETRACHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CIS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
DIBROMOCHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
ETHYLBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
METHYLENE CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
STYRENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TETRACHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOLUENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL 1,2-DICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TRANS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TRICHLOROETHENE	10.00 U	10.00 U	10.00 U	1.00	10.00 U
VINYL CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
XYLENES (TOTAL)	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL BTEX					
TOTAL CHLORINATED CVOCS	1.00			2.00	

Table 4-2A
Volatile Organic Compounds Detected in Shallow Ground-water Samples (ug/L)
May and November 1995

Well ID	MW02-10S	MW02-10S(DUP)	MW02-11S	MW03-01S	MW03-02S
Site/Study Area	Site 02	Site 02	Site 02	Site 03	Site 03
Date of sample collection	05/16/1995	05/16/1995	05/17/1995	05/23/1995	05/22/1995
1,1,1-TRICHLOROETHANE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
1,1,2,2-TETRACHLOROETHANE	100.00 U	100.00 U	10.00 U	1.00	10.00 U
1,1,2-TRICHLOROETHANE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHANE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHENE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROETHANE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROPROPANE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
2-BUTANONE	39.00 J	100.00 U	10.00 U	10.00 UJ	10.00 U
2-HEXANONE	100.00 UJ	100.00 UJ	10.00 U	10.00 UJ	10.00 U
4-METHYL-2-PENTANONE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
ACETONE	100.00 UJ	100.00 UJ	10.00 UJ	10.00 UJ	10.00 UJ
BENZENE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
BROMODICHLOROMETHANE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
BROMOFORM	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
BROMOMETHANE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
CARBON DISULFIDE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
CARBON TETRACHLORIDE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
CHLOROBENZENE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
CHLOROETHANE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
CHLOROFORM	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
CHLOROMETHANE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
CIS-1,3-DICHLOROPROPENE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
DIBROMOCHLOROMETHANE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
ETHYLBENZENE	200.00	250.00	10.00 U	10.00 U	10.00 U
METHYLENE CHLORIDE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
STYRENE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
TETRACHLOROETHENE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
TOLUENE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
TOTAL 1,2-DICHLOROETHENE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
TRANS-1,3-DICHLOROPROPENE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
TRICHLOROETHENE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
VINYL CHLORIDE	100.00 U	100.00 U	10.00 U	10.00 U	10.00 U
XYLENES (TOTAL)	1700.00	2100.00	10.00 U	10.00 U	10.00 U
TOTAL BTEX	1800.00	2350.00			
TOTAL CHLORINATED CVOCS				1.00	

Table 4-2A
Volatile Organic Compounds
Detected in Shallow
Ground-water Samples (ug/L)
May and November 1995

Well ID	MW03-03S	MW03-04S	MW03-05S	MW03-11S	NMW-1	NMW-2
Site/Study Area	Site 03	Site 03	Site 03	NIKE	NIKE	NIKE
Date of sample collection	05/23/1995	05/22/1995	05/22/1995	05/31/1995	05/24/1995	05/25/1995
1,1,1-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1,2,2-TETRACHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1,2-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROPROPANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
2-BUTANONE	10.00 U	10.00 U	3.00 J	10.00 U	10.00 U	10.00 U
2-HEXANONE	10.00 U	10.00 U	10.00 U	10.00 UJ	10.00 U	10.00 U
4-METHYL-2-PENTANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
ACETONE	40.00 U	10.00 UJ	11.00 UJ	38.00 UJ	28.00 UJ	15.00 U
BENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMODICHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMOFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMOMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CARBON DISULFIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CARBON TETRACHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CIS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
DIBROMOCHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
ETHYLBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
METHYLENE CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
STYRENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TETRACHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOLUENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL 1,2-DICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TRANS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TRICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
VINYL CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
XYLENES (TOTAL)	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL BTEX						
TOTAL CHLORINATED CVOCS						

Table 4-2A
Volatile Organic Compounds
Detected in Shallow
Ground-water Samples (ug/L)
May and November 1995

Well ID	NMW-4
Site/Study Area	NIKE
Date of sample collection	05/25/1995
1,1,1-TRICHLOROETHANE	10.00 U
1,1,2,2-TETRACHLOROETHANE	10.00 U
1,1,2-TRICHLOROETHANE	10.00 U
1,1-DICHLOROETHANE	10.00 U
1,1-DICHLOROETHENE	10.00 U
1,2-DICHLOROETHANE	10.00 U
1,2-DICHLOROPROPANE	10.00 U
2-BUTANONE	10.00 U
2-HEXANONE	10.00 U
4-METHYL-2-PENTANONE	10.00 U
ACETONE	53.00 UJ
BENZENE	10.00 U
BROMODICHLOROMETHANE	10.00 U
BROMOFORM	10.00 U
BROMOMETHANE	10.00 U
CARBON DISULFIDE	10.00 U
CARBON TETRACHLORIDE	10.00 U
CHLOROBENZENE	10.00 U
CHLOROETHANE	10.00 U
CHLOROFORM	10.00 U
CHLOROMETHANE	10.00 U
CIS-1,3-DICHLOROPROPENE	10.00 U
DIBROMOCHLOROMETHANE	10.00 U
ETHYLBENZENE	10.00 U
METHYLENE CHLORIDE	10.00 U
STYRENE	10.00 U
TETRACHLOROETHENE	10.00 U
TOLUENE	10.00 U
TOTAL 1,2-DICHLOROETHENE	10.00 U
TRANS-1,3-DICHLOROPROPENE	10.00 U
TRICHLOROETHENE	10.00 U
VINYL CHLORIDE	10.00 U
XYLENES (TOTAL)	10.00 U
TOTAL BTEX	
TOTAL CHLORINATED CVOCS	

Table 4-2B
Volatile Organic Compounds
Detected in Deep
Ground-water Samples (ug/L)
May - November 1995

Well ID	MW01-08D	MW01-09D	MW01-10D	MW01-11D	MW01-12D
Site/Study Area	Study Area 01	Study Area 01	Study Area 01	Study Area 01	Study Area 01
Date of sample collection	11/9/95	11/7/95	11/7/95	11/7/95	11/9/95
1,1,1-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1,2,2-TETRACHLOROETHANE	5.00	10.00 U	10.00 U	10.00 U	8.00
1,1,2-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROPROPANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
2-BUTANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
2-HEXANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
4-METHYL-2-PENTANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
ACETONE	10.00 U	10.00 U	26.00 U	10.00 U	10.00 U
BENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMODICHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMOFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMOMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CARBON DISULFIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CARBON TETRACHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CIS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
DIBROMOCHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
ETHYLBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
METHYLENE CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	13.00 U
STYRENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TETRACHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOLUENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL 1,2-DICHLOROETHENE	7.00	10.00 U	10.00 U	10.00 U	14.00
TRANS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TRICHLOROETHENE	13.00	10.00 U	10.00 U	10.00 U	27.00
VINYL CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
XYLENES (TOTAL)	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL CHLORINATED CVOCS	25				49

Table 4-2B
Volatile Organic Compounds
Detected in Deep
Ground-water Samples (ug/L)
May - November 1995

Well ID	MW01-12D-D	MW01-13D	MW01-13D-D	MW01-14D	MW01-15D
Site/Study Area	Study Area 01	Study Area 01	Study Area 01	Study Area 01	Study Area 01
Date of sample collection	11/9/95	11/9/95	11/9/95	11/8/95	11/7/95
1,1,1-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1,2,2-TETRACHLOROETHANE	8.00	10.00 U	10.00 U	10.00 U	5.00
1,1,2-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1-DICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROPROPANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
2-BUTANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
2-HEXANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
4-METHYL-2-PENTANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
ACETONE	10.00 U	13.00 U	45.00 U	47.00 U	16.00 U
BENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMODICHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMOFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMOMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CARBON DISULFIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CARBON TETRACHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROMETHANE	10.00 U	10.00 U	1.00	10.00 U	10.00 U
CIS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
DIBROMOCHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
ETHYLBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
METHYLENE CHLORIDE	12.00 U	10.00 U	10.00 U	10.00 U	10.00 U
STYRENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TETRACHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOLUENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL 1,2-DICHLOROETHENE	15.00	10.00 U	10.00 U	10.00 U	9.00
TRANS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TRICHLOROETHENE	29.00	10.00 U	10.00 U	10.00 U	15.00
VINYL CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
XYLENES (TOTAL)	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL CHLORINATED CVOCS	52		1		29

Table 4-2B
Volatile Organic Compounds
Detected in Deep
Ground-water Samples (ug/L)
May - November 1995

Well ID	MW02-03D	MW02-07D	MW02-08D	MW02-10D	MW02-11D
Site/Study Area	Site 02	Site 02	Site 02	Site 02	Site 02
Date of sample collection	5/24/95	5/22/95	5/19/95	5/16/95	5/17/95
1,1,1-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,1,2,2-TETRACHLOROETHANE	3.00	24.00	6.00	14.00	10.00 U
1,1,2-TRICHLOROETHANE	2.00	3.00	10.00 U	5.00	2.00
1,1-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	1.00	10.00 U
1,1-DICHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
1,2-DICHLOROPROPANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
2-BUTANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
2-HEXANONE	10.00 U	10.00 UJ	10.00 U	10.00 UJ	10.00 U
4-METHYL-2-PENTANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
ACETONE	10.00 UJ	10.00 UJ	14.00 UJ	10.00 UJ	12.00 UJ
BENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMODICHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMOFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
BROMOMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CARBON DISULFIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CARBON TETRACHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
CHLOROMETHANE	10.00 U	10.00 U	2.00	10.00 U	10.00 U
CIS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
DIBROMOCHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
ETHYLBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
METHYLENE CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
STYRENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TETRACHLOROETHENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOLUENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL 1,2-DICHLOROETHENE	20.00	47.00	5.00	53.00	15.00
TRANS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TRICHLOROETHENE	6.00	110.00	10.00	23.00	10.00 U
VINYL CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	1.00
XYLENES (TOTAL)	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U
TOTAL CHLORINATED CVOCS	31	184	23	96	18

Table 4-2B
Volatile Organic Compounds
Detected in Deep
Ground-water Samples (ug/L)
May - November 1995

Well ID	MW03-02D	MW03-03D	MW03-05D	MW03-06D	MW03-07D	MW03-08D
Site/Study Area	Site 03	Site 03	Site 03	Site 03	Site 03	Site 03
Date of sample collection	5/22/95	5/23/95	5/22/95	5/23/95	5/23/95	5/23/95
1,1,1-TRICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
1,1,2,2-TETRACHLOROETHANE	1.00	110.00	2.00	420.00 D	97.00	3300.00
1,1,2-TRICHLOROETHANE	10.00 U	12.00	10.00 U	20.00	6.00	79.00
1,1-DICHLOROETHANE	10.00 U	3.00	10.00 U	5.00	2.00	400.00 U
1,1-DICHLOROETHENE	10.00 U	1.00	10.00 U	2.00	10.00 U	400.00 U
1,2-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
1,2-DICHLOROPROPANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
2-BUTANONE	3.00 J	10.00 U	4.00 J	10.00 U	10.00 U	400.00 U
2-HEXANONE	10.00 U	10.00 U	10.00 U	10.00 UJ	10.00 UJ	400.00 U
4-METHYL-2-PENTANONE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
ACETONE	10.00 UJ	10.00 UJ	26.00 UJ	10.00 UJ	10.00 UJ	400.00 UJ
BENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
BROMODICHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
BROMOFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
BROMOMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
CARBON DISULFIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
CARBON TETRACHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
CHLOROBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
CHLOROETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
CHLOROFORM	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
CHLOROMETHANE	10.00 U	10.00 U	2.00	10.00 U	10.00 U	400.00 U
CIS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
DIBROMOCHLOROMETHANE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
ETHYLBENZENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
METHYLENE CHLORIDE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
STYRENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
TETRACHLOROETHENE	10.00 U	10.00 U	10.00 U	1.00	10.00 U	400.00 U
TOLUENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
TOTAL 1,2-DICHLOROETHENE	3.00	200.00	10.00 U	290.00 D	98.00	1000.00
TRANS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
TRICHLOROETHENE	3.00	450.00 D	2.00	920.00 D	260.00 D	4000.00
VINYL CHLORIDE	10.00 U	2.00	10.00 U	3.00	10.00 U	400.00 U
XYLENES (TOTAL)	10.00 U	10.00 U	10.00 U	10.00 U	10.00 U	400.00 U
TOTAL CHLORINATED CVOCS	7	778	6	1661	463	8379

Table 4-2B
Volatile Organic Compounds
Detected in Deep
Ground-water Samples (ug/L)
May - November 1995

Well ID	MW03-09D	MW03-10D	MW03-12D	MW03-13D	MW03-14D
Site/Study Area	Site 03	Site 03	NIKE	NIKE	NIKE
Date of sample collection	5/24/95	5/21/95	6/8/95	6/9/95	5/30/95
1,1,1-TRICHLOROETHANE	10.00 U	10.00 U	10.00	500.00 U	500.00 U
1,1,2,2-TETRACHLOROETHANE	2.00	110.00	2200.00 D	6800.00	330000.00 D
1,1,2-TRICHLOROETHANE	6.00	7.00	64.00	500.00 U	8000.00
1,1-DICHLOROETHANE	3.00	3.00	10.00 U	500.00 U	500.00 U
1,1-DICHLOROETHENE	10.00 U	10.00 U	8.00	500.00 U	160.00
1,2-DICHLOROETHANE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
1,2-DICHLOROPROPANE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
2-BUTANONE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
2-HEXANONE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
4-METHYL-2-PENTANONE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
ACETONE	10.00 U	19.00 U	14.00	500.00 U	500.00 U
BENZENE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
BROMODICHLOROMETHANE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
BROMOFORM	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
BROMOMETHANE	10.00 U	10.00 U	10.00 U	500.00 U	120.00 J
CARBON DISULFIDE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
CARBON TETRACHLORIDE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
CHLOROBENZENE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
CHLOROETHANE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
CHLOROFORM	8.00	4.00	1.00	500.00 U	320.00
CHLOROMETHANE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
CIS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
DIBROMOCHLOROMETHANE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
ETHYLBENZENE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
METHYLENE CHLORIDE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
STYRENE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
TETRACHLOROETHENE	10.00 U	10.00 U	18.00	500.00 U	2000.00
TOLUENE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
TOTAL 1,2-DICHLOROETHENE	67.00	85.00	650.00 D	1600.00	26000.00 D
TRANS-1,3-DICHLOROPROPENE	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
TRICHLOROETHENE	2.00	200.00 D	2500.00 D	6800.00	160000.00 J
VINYL CHLORIDE	3.00	10.00 U	5.00	500.00 U	500.00 U
XYLENES (TOTAL)	10.00 U	10.00 U	10.00 U	500.00 U	500.00 U
TOTAL CHLORINATED CVOCS	91	409	5456	15200	526480

Table 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	EA-101	EA-102	EA-103	EA-103-D	EA-104
Site/Study Area	NIKE	NIKE	NIKE	NIKE	NIKE
Date of sample collection	12/16/1996	12/16/1996	12/17/1996	12/17/1996	12/17/1996
1,1,1,2-TETRACHLORROETHANE	1.00 UJ	21.00 J	1.00 U	1.00 U	12.00 U
1,1,1-TRICHLOROETHANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
1,1,2,2-TETRACHLOROETHANE	2.00 J	62000.00 J	1.00 U	1.00 U	200.00 J
1,1,2-TRICHLOROETHANE	1.00 UJ	310.00 J	1.00 U	1.00 U	13.00 J
1,1-DICHLOROETHANE	1.00 UJ	1.00 J	1.00 U	1.00 U	12.00 U
1,1-DICHLOROETHENE	1.00 UJ	1.00 J	1.00 U	1.00 U	12.00 U
1,1-DICHLOROPROPENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
1,2,3-TRICHLOROBENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
1,2,3-TRICHLOROPROPANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
1,2,4-TRICHLOROBENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
1,2,4-TRIMETHYLBENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
1,2-DIBROMOETHANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
1,2-DICHLOROBENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
1,2-DICHLOROETHANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
1,2-DICHLOROPROPANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
1,3,5-TRIMETHYLBENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
1,3-DICHLOROBENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
1,3-DICHLOROPROPANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
1,4-DICHLOROBENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
2,2-DICHLOROPROPANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
2-CHLOROTOLUENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
2-PHENYLBUTANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
4-CHLOROTOLUENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
BENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
BROMOBENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
BROMODICHLOROMETHANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
BROMOFORM	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
BROMOMETHANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
CARBON TETRACHLORIDE	1.00 UJ	6.00 J	1.00 U	1.00 U	12.00 U
CFC-11	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
CFC-12	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
CHLOROBENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
CHLOROBROMOMETHANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
CHLOROETHANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
CHLOROFORM	1.00 UJ	13.00 J	1.00 U	1.00 U	12.00 U
CHLOROMETHANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
CIS-1,2-DICHLOROETHENE	1.00 UJ	160.00 J	1.00 U	1.00 U	150.00 J
CYMENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
DIBROMOCHLOROMETHANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
DIBROMOMETHANE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
ETHYLBENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
HEXACHLOROBUTADIENE	1.00 UJ	2.00 J	1.00 U	1.00 U	12.00 U
ISOPROPYLBENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U

Table 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	EA-101	EA-102	EA-103	EA-103-D	EA-104
Site/Study Area	NIKE	NIKE	NIKE	NIKE	NIKE
Date of sample collection	12/16/1996	12/16/1996	12/17/1996	12/17/1996	12/17/1996
M,P-XYLENES	2.00 UJ	2.00 UJ	2.00 U	2.00 U	25.00 U
METHYLENE CHLORIDE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
N-BUTYLBENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
N-PROPYLBENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
NAPHTHALENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
O-XYLENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
STYRENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
TERT-BUTYLBENZENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
TETRACHLOROETHENE	1.00 UJ	210.00 J	1.00 U	1.00 U	12.00 U
TOLUENE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
TRANS-1,2-DICHLOROETHENE	1.00 UJ	53.00 J	1.00 U	1.00 U	56.00 J
TRICHLOROETHENE	1.00 J	2000.00 J	1.00 U	1.00 U	480.00 J
VINYL CHLORIDE	1.00 UJ	1.00 UJ	1.00 U	1.00 U	12.00 U
TOTAL BTEX					
TOTAL CHLORINATED CVOCS	3	64775			899

Table 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	EA-105	EA-106D	EA-107	EA-108	EA-109
Site/Study Area	NIKE	NIKE	NIKE	NIKE	NIKE
Date of sample collection	12/17/1996	12/12/1996	12/13/1996	12/13/1996	12/17/1996
1,1,1,2-TETRACHLORROETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,1,1-TRICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,1,2,2-TETRACHLOROETHANE	1.00 U	1.00 U	3.00	1.00 J	6.00 U
1,1,2-TRICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,1-DICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,1-DICHLOROETHENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,1-DICHLOROPROPENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2,3-TRICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2,3-TRICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2,4-TRICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2,4-TRIMETHYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DIBROMOETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,3,5-TRIMETHYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,3-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,3-DICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,4-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
2,2-DICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
2-CHLOROTOLUENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
2-PHENYLBUTANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
4-CHLOROTOLUENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BROMOBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BROMODICHLOROMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BROMOFORM	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CARBON TETRACHLORIDE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CFC-11	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CFC-12	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROBROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 J
CHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROFORM	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CIS-1,2-DICHLOROETHENE	1.00 U	1.00 U	1.00 U	1.00 U	7.00 J
CYMENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
DIBROMOCHLOROMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 J
DIBROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
ETHYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
HEXACHLOROBUTADIENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
ISOPROPYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U

Table 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	EA-105	EA-106D	EA-107	EA-108	EA-109
Site/Study Area	NIKE	NIKE	NIKE	NIKE	NIKE
Date of sample collection	12/17/1996	12/12/1996	12/13/1996	12/13/1996	12/17/1996
M,P-XYLENES	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U
METHYLENE CHLORIDE	1.00 U	3.00 U	1.00 U	2.00 U	1.00 U
N-BUTYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
N-PROPYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
NAPHTHALENE	1.00 U	1.00 U	2.00	1.00 U	1.00 U
O-XYLENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
STYRENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
TERT-BUTYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
TETRACHLOROETHENE	1.00 U	1.00	1.00 U	2.00	1.00 U
TOLUENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 J
TRANS-1,2-DICHLOROETHENE	1.00 U	1.00 U	1.00 U	1.00 U	5.00 J
TRICHLOROETHENE	1.00 U	1.00 U	1.00 U	1.00 U	29.00 J
VINYL CHLORIDE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
TOTAL BTEX					1
TOTAL CHLORINATED CVOCS		1	3	3	41

Table 4-3
Volatile Organic Compounds
[illegible]etected in December 1996
Ground-water Samples (ug/L)

Well ID	MW-Z3-01	MW-Z3-02	MW-Z3-03	MW-Z4-01
Site/Study Area	BasewideGW	BasewideGW	BasewideGW	BasewideGW
Date of sample collection	12/17/1996	12/09/1996	12/15/1996	12/17/1996
1,1,1,2-TETRACHLORROETHANE	1.00 U	1.00 U	1.00 U	1.00 U
1,1,1-TRICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U
1,1,2,2-TETRACHLOROETHANE	9.00 J	1.00 U	1.00	1.00 U
1,1,2-TRICHLOROETHANE	1.00 J	1.00 U	2.00	1.00 U
1,1-DICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U
1,1-DICHLOROETHENE	1.00 U	1.00 U	1.00 U	1.00 U
1,1-DICHLOROPROPENE	1.00 U	1.00 U	1.00 U	1.00 U
1,2,3-TRICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
1,2,3-TRICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U
1,2,4-TRICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
1,2,4-TRIMETHYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DIBROMOETHANE	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U
1,3,5-TRIMETHYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
1,3-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
[illegible]3-DICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U
[illegible],4-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
2,2-DICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U
2-CHLOROTOLUENE	1.00 U	1.00 U	1.00 U	1.00 U
2-PHENYLBUTANE	1.00 U	1.00 U	1.00 U	1.00 U
4-CHLOROTOLUENE	1.00 U	1.00 U	1.00 U	1.00 U
BENZENE	1.00 U	1.00 U	1.00 U	1.00 U
BROMOBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
BROMODICHLOROMETHANE	1.00 U	1.00 U	1.00 U	1.00 U
BROMOFORM	1.00 U	1.00 U	1.00 U	1.00 U
BROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U
CARBON TETRACHLORIDE	1.00 U	1.00 U	1.00 U	1.00 U
CFC-11	1.00 U	1.00 U	1.00 U	1.00 U
CFC-12	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROBROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROFORM	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROMETHANE	1.00 U	1.00 U	1.00 U	1.00 U
CIS-1,2-DICHLOROETHENE	14.00 J	1.00 U	25.00	1.00 U
CYMENE	1.00 U	1.00 U	1.00 U	1.00 U
DIBROMOCHLOROMETHANE	1.00 U	1.00 U	1.00 U	1.00 U
DIBROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U
[illegible]THYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
[illegible]XACHLOROBUTADIENE	1.00 U	1.00 U	1.00 U	1.00 U
ISOPROPYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U

Table 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	MW-Z3-01	MW-Z3-02	MW-Z3-03	MW-Z4-01
Site/Study Area	BasewideGW	BasewideGW	BasewideGW	BasewideGW
Date of sample collection	12/17/1996	12/09/1996	12/15/1996	12/17/1996
M,P-XYLENES	2.00 U	2.00 U	2.00 U	2.00 U
METHYLENE CHLORIDE	1.00 U	2.00 U	1.00 U	1.00 U
N-BUTYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
N-PROPYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
NAPHTHALENE	1.00 U	1.00 U	1.00 U	1.00 U
O-XYLENE	1.00 U	1.00 U	1.00 U	1.00 U
STYRENE	1.00 U	1.00 U	1.00 U	1.00 U
TERT-BUTYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
TETRACHLOROETHENE	1.00 U	1.00 U	1.00 U	1.00 U
TOLUENE	1.00 U	1.00 U	1.00 U	1.00 U
TRANS-1,2-DICHLOROETHENE	5.00 J	1.00 U	2.00	1.00 U
TRICHLOROETHENE	32.00 J	1.00 U	6.00	1.00 U
VINYL CHLORIDE	1.00 U	1.00 U	1.00 U	1.00 U
TOTAL BTEX				
TOTAL CHLORINATED CVOCS	61		36	

Table 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	MW01-08D	MW01-09D	MW01-10D	MW01-11D
Site/Study Area	Study Area 01	Study Area 01	Study Area 01	Study Area 01
Date of sample collection	12/15/1996	12/11/1996	12/13/1996	12/13/1996
1,1,1,2-TETRACHLORROETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,1,1-TRICHLOROETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,1,2,2-TETRACHLOROETHANE	1.00 J	1.00 U	1.00 U	1.00 U
1,1,2-TRICHLOROETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,1-DICHLOROETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,1-DICHLOROETHENE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,1-DICHLOROPROPENE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,2,3-TRICHLOROBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,2,3-TRICHLOROPROPANE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,2,4-TRICHLOROBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,2,4-TRIMETHYLBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	1.00 UJ	1.00 U	1.00 U	1.00 U
1,2-DIBROMOETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,2-DICHLOROBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,2-DICHLOROETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,2-DICHLOROPROPANE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,3,5-TRIMETHYLBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,3-DICHLOROBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,3-DICHLOROPROPANE	1.00 UJ	1.00 U	1.00 U	1.00 U
1,4-DICHLOROBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U
2,2-DICHLOROPROPANE	1.00 UJ	1.00 U	1.00 U	1.00 U
2-CHLOROTOLUENE	1.00 UJ	1.00 U	1.00 U	1.00 U
2-PHENYLBUTANE	1.00 UJ	1.00 U	1.00 U	1.00 U
4-CHLOROTOLUENE	1.00 UJ	1.00 U	1.00 U	1.00 U
BENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U
BROMOBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U
BROMODICHLOROMETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U
BROMOFORM	1.00 UJ	1.00 U	1.00 U	1.00 U
BROMOMETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U
CARBON TETRACHLORIDE	1.00 UJ	1.00 U	1.00 U	1.00 U
CFC-11	1.00 UJ	1.00 U	1.00 U	1.00 U
CFC-12	1.00 UJ	1.00 U	1.00 U	1.00 U
CHLOROBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U
CHLOROBROMOMETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U
CHLOROETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U
CHLOROFORM	1.00 UJ	1.00 U	1.00 U	1.00 U
CHLOROMETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U
CIS-1,2-DICHLOROETHENE	3.00 J	1.00 U	1.00 U	1.00 U
CYMENE	1.00 UJ	1.00 U	1.00 U	1.00 U
DIBROMOCHLOROMETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U
DIBROMOMETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U
ETHYLBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U
HEXACHLOROBUTADIENE	1.00 UJ	1.00 U	1.00 U	1.00 U
ISOPROPYLBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U

Table 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	MW01-08D	MW01-09D	MW01-10D	MW01-11D
Site/Study Area	Study Area 01	Study Area 01	Study Area 01	Study Area 01
Date of sample collection	12/15/1996	12/11/1996	12/13/1996	12/13/1996
M,P-XYLENES	2.00 UJ	2.00 U	2.00 U	2.00 U
METHYLENE CHLORIDE	1.00 UJ	2.00 U	2.00 U	2.00 U
N-BUTYLBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U
N-PROPYLBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U
NAPHTHALENE	1.00 UJ	1.00 U	1.00 U	1.00 U
O-XYLENE	1.00 UJ	1.00 U	1.00 U	1.00 U
STYRENE	1.00 UJ	1.00 U	1.00 U	1.00 U
TERT-BUTYLBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U
TETRACHLOROETHENE	1.00 UJ	1.00 U	1.00 U	1.00 U
TOLUENE	1.00 UJ	1.00 U	1.00 U	1.00 U
TRANS-1,2-DICHLOROETHENE	1.00 UJ	1.00 U	1.00 U	1.00 U
TRICHLOROETHENE	2.00 J	1.00 U	1.00 U	1.00 U
VINYL CHLORIDE	1.00 UJ	1.00 U	1.00 U	1.00 U
TOTAL BTEX				
TOTAL CHLORINATED CVOCS	6			

Table 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	MW01-12D	MW01-13D	MW01-13D-D	MW01-14D
Site/Study Area	Study Area 01	Study Area 01	Study Area 01	Study Area 01
Date of sample collection	12/10/1996	12/13/1996	12/13/1996	12/15/1996
1,1,1,2-TETRACHLORROETHANE	1.00 U	1.00 U	1.00 U	1.00 U
1,1,1-TRICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U
1,1,2,2-TETRACHLOROETHANE	4.00	1.00 U	1.00 U	1.00 U
1,1,2-TRICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U
1,1-DICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U
1,1-DICHLOROETHENE	1.00 U	1.00 U	1.00 U	1.00 U
1,1-DICHLOROPROPENE	1.00 U	1.00 U	1.00 U	1.00 U
1,2,3-TRICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
1,2,3-TRICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U
1,2,4-TRICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
1,2,4-TRIMETHYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DIBROMOETHANE	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U
1,3,5-TRIMETHYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
1,3-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
1,3-DICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U
1,4-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
2,2-DICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U
2-CHLOROTOLUENE	1.00 U	1.00 U	1.00 U	1.00 U
2-PHENYLBUTANE	1.00 U	1.00 U	1.00 U	1.00 U
4-CHLOROTOLUENE	1.00 U	1.00 U	1.00 U	1.00 U
BENZENE	1.00 U	1.00 U	1.00 U	1.00 U
BROMOBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
BROMODICHLOROMETHANE	1.00 U	1.00 U	1.00 U	1.00 U
BROMOFORM	1.00 U	1.00 U	1.00 U	1.00 U
BROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U
CARBON TETRACHLORIDE	1.00 U	1.00 U	1.00 U	1.00 U
CFC-11	1.00 U	1.00 U	1.00 U	1.00 U
CFC-12	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROBROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROFORM	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROMETHANE	1.00 U	1.00 U	1.00 U	1.00 U
CIS-1,2-DICHLOROETHENE	9.00	1.00 U	1.00 U	2.00
CYMENE	1.00 U	1.00 U	1.00 U	1.00 U
DIBROMOCHLOROMETHANE	1.00 U	1.00 U	1.00 U	1.00 U
DIBROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U
ETHYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
HEXACHLOROBUTADIENE	1.00 U	1.00 U	1.00 U	1.00 U
ISOPROPYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U

Tabl 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	MW01-12D	MW01-13D	MW01-13D-D	MW01-14D
Site/Study Area	Study Area 01	Study Area 01	Study Area 01	Study Area 01
Date of sample collection	12/10/1996	12/13/1996	12/13/1996	12/15/1996
M,P-XYLENES	2.00 U	2.00 U	2.00 U	2.00 U
METHYLENE CHLORIDE	1.00 U	3.00 U	2.00 U	1.00 U
N-BUTYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
N-PROPYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
NAPHTHALENE	1.00 U	1.00 U	1.00 U	1.00 U
O-XYLENE	1.00 U	1.00 U	1.00 U	1.00 U
STYRENE	1.00 U	1.00 U	1.00 U	1.00 U
TERT-BUTYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U
TETRACHLOROETHENE	1.00 U	1.00 U	1.00 U	1.00 U
TOLUENE	1.00 U	1.00 U	1.00 U	1.00 U
TRANS-1,2-DICHLOROETHENE	2.00	1.00 U	1.00 U	1.00 U
TRICHLOROETHENE	18.00	1.00 U	1.00 U	1.00 U
VINYL CHLORIDE	1.00 U	1.00 U	1.00 U	1.00 U
TOTAL BTEX				
TOTAL CHLORINATED CVOCS	33			2

Table 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	MW01-15D	MW02-03D	MW02-08D	MW02-10D	MW02-11D
Site/Study Area	Study Area 01	Site 02	Site 02	Site 02	Site 02
Date of sample collection	12/10/1996	12/10/1996	12/11/1996	12/15/1996	12/11/1996
1,1,1,2-TETRACHLORROETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,1,1-TRICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,1,2,2-TETRACHLOROETHANE	2.00	2.00	3.00	6.00	1.00
1,1,2-TRICHLOROETHANE	1.00 U	3.00	1.00 U	5.00	2.00
1,1-DICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00	1.00 U
1,1-DICHLOROETHENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,1-DICHLOROPROPENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2,3-TRICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2,3-TRICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2,4-TRICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2,4-TRIMETHYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DIBROMOETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,3,5-TRIMETHYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,3-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,3-DICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,4-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
2,2-DICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
2-CHLOROTOLUENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
2-PHENYLBUTANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
4-CHLOROTOLUENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BROMOBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BROMODICHLOROMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BROMOFORM	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CARBON TETRACHLORIDE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CFC-11	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CFC-12	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROBROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROFORM	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CIS-1,2-DICHLOROETHENE	5.00	25.00	4.00	44.00	17.00
CYMENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
DIBROMOCHLOROMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
DIBROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
ETHYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
HEXACHLOROBUTADIENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
ISOPROPYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U

Table 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	MW01-15D	MW02-03D	MW02-08D	MW02-10D	MW02-11D
Site/Study Area	Study Area 01	Site 02	Site 02	Site 02	Site 02
Date of sample collection	12/10/1996	12/10/1996	12/11/1996	12/15/1996	12/11/1996
M,P-XYLENES	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U
METHYLENE CHLORIDE	1.00 U	1.00 U	1.00 U	1.00 U	3.00 U
N-BUTYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
N-PROPYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
NAPHTHALENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
O-XYLENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
STYRENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
TERT-BUTYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
TETRACHLOROETHENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
TOLUENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
TRANS-1,2-DICHLOROETHENE	1.00 U	2.00	1.00 U	4.00	1.00 U
TRICHLOROETHENE	9.00	8.00	7.00	14.00	1.00 U
VINYL CHLORIDE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
TOTAL BTEX					
TOTAL CHLORINATED CVOCS	16	40	14	74	20

Table 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	MW03-02D	MW03-03D	MW03-05D	MW03-06D	MW03-06D-D
Site/Study Area	Site 03	Site 03	Site 03	Site 03	Site 03
Date of sample collection	12/10/1996	12/10/1996	12/13/1996	12/15/1996	12/15/1996
1,1,1,2-TETRACHLORROETHANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,1,1-TRICHLOROETHANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,1,2,2-TETRACHLOROETHANE	1.00 U	75.00	1.00 UJ	260.00	220.00
1,1,2-TRICHLOROETHANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,1-DICHLOROETHANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,1-DICHLOROETHENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,1-DICHLOROPROPENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,2,3-TRICHLOROBENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,2,3-TRICHLOROPROPANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,2,4-TRICHLOROBENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,2,4-TRIMETHYLBENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,2-DIBROMOETHANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,2-DICHLOROBENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,2-DICHLOROETHANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,2-DICHLOROPROPANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,3,5-TRIMETHYLBENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,3-DICHLOROBENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,3-DICHLOROPROPANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
1,4-DICHLOROBENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
2,2-DICHLOROPROPANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
2-CHLOROTOLUENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
2-PHENYLBUTANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
4-CHLOROTOLUENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
BENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
BROMOBENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
BROMODICHLOROMETHANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
BROMOFORM	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
BROMOMETHANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
CARBON TETRACHLORIDE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
CFC-11	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
CFC-12	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
CHLOROBENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
CHLOROBROMOMETHANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
CHLOROETHANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
CHLOROFORM	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
CHLOROMETHANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
CIS-1,2-DICHLOROETHENE	4.00	130.00	1.00 UJ	210.00	170.00
CYMENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
DIBROMOCHLOROMETHANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
DIBROMOMETHANE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
ETHYLBENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
HEXACHLOROBUTADIENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
ISOPROPYLBENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U

Table 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	MW03-02D	MW03-03D	MW03-05D	MW03-06D	MW03-06D-D
Site/Study Area	Site 03	Site 03	Site 03	Site 03	Site 03
Date of sample collection	12/10/1996	12/10/1996	12/13/1996	12/15/1996	12/15/1996
M,P-XYLENES	2.00 U	50.00 U	2.00 UJ	50.00 U	50.00 U
METHYLENE CHLORIDE	2.00 U	25.00 U	2.00 UJ	25.00 U	25.00 U
N-BUTYLBENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
N-PROPYLBENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
NAPHTHALENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
O-XYLENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
STYRENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
TERT-BUTYLBENZENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
TETRACHLOROETHENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
TOLUENE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
TRANS-1,2-DICHLOROETHENE	1.00 U	34.00	1.00 UJ	56.00	53.00
TRICHLOROETHENE	4.00	390.00	1.00 UJ	810.00	660.00
VINYL CHLORIDE	1.00 U	25.00 U	1.00 UJ	25.00 U	25.00 U
TOTAL BTEX					
TOTAL CHLORINATED CVOCS	8	629		1336	1103

Table 4-3
Volatile Organic Compounds
[illegible]etected in December 1996
Ground-water Samples (ug/L)

Well ID	MW03-07D	MW03-08D	MW03-09D	MW03-10D
Site/Study Area	Site 03	Site 03	Site 03	Site 03
Date of sample collection	12/12/1996	12/12/1996	12/12/1996	12/11/1996
1,1,1,2-TETRACHLORROETHANE	10.00 U	50.00 U	10.00 U	5.00 U
1,1,1-TRICHLOROETHANE	10.00 U	50.00 U	10.00 U	5.00 U
1,1,2,2-TETRACHLOROETHANE	95.00 J	700.00	10.00 U	41.00
1,1,2-TRICHLOROETHANE	10.00 U	50.00 U	10.00 U	5.00 U
1,1-DICHLOROETHANE	10.00 U	50.00 U	10.00 U	5.00 U
1,1-DICHLOROETHENE	10.00 U	50.00 U	10.00 U	5.00 U
1,1-DICHLOROPROPENE	10.00 U	50.00 U	10.00 U	5.00 U
1,2,3-TRICHLOROBENZENE	10.00 U	50.00 U	10.00 U	5.00 U
1,2,3-TRICHLOROPROPANE	10.00 U	50.00 U	10.00 U	5.00 U
1,2,4-TRICHLOROBENZENE	10.00 U	50.00 U	10.00 U	5.00 U
1,2,4-TRIMETHYLBENZENE	10.00 U	50.00 U	10.00 U	5.00 U
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	10.00 U	50.00 U	10.00 U	5.00 U
1,2-DIBROMOETHANE	10.00 U	50.00 U	10.00 U	5.00 U
1,2-DICHLOROBENZENE	10.00 U	50.00 U	10.00 U	5.00 U
1,2-DICHLOROETHANE	10.00 U	50.00 U	10.00 U	5.00 U
1,2-DICHLOROPROPANE	10.00 U	50.00 U	10.00 U	5.00 U
1,3,5-TRIMETHYLBENZENE	10.00 U	50.00 U	10.00 U	5.00 U
1,3-DICHLOROBENZENE	10.00 U	50.00 U	10.00 U	5.00 U
[illegible]3-DICHLOROPROPANE	10.00 U	50.00 U	10.00 U	5.00 U
[illegible],4-DICHLOROBENZENE	10.00 U	50.00 U	10.00 U	5.00 U
2,2-DICHLOROPROPANE	10.00 U	50.00 U	10.00 U	5.00 U
2-CHLOROTOLUENE	10.00 U	50.00 U	10.00 U	5.00 U
2-PHENYLBUTANE	10.00 U	50.00 U	10.00 U	5.00 U
4-CHLOROTOLUENE	10.00 U	50.00 U	10.00 U	5.00 U
BENZENE	10.00 U	50.00 U	10.00 U	5.00 U
BROMOBENZENE	10.00 U	50.00 U	10.00 U	5.00 U
BROMODICHLOROMETHANE	10.00 U	50.00 U	10.00 U	5.00 U
BROMOFORM	10.00 U	50.00 U	10.00 U	5.00 U
BROMOMETHANE	10.00 U	50.00 U	10.00 U	5.00 U
CARBON TETRACHLORIDE	10.00 U	50.00 U	10.00 U	5.00 U
CFC-11	10.00 U	50.00 U	10.00 U	5.00 U
CFC-12	10.00 U	50.00 U	10.00 U	5.00 U
CHLOROBENZENE	10.00 U	50.00 U	10.00 U	5.00 U
CHLOROBROMOMETHANE	10.00 U	50.00 U	10.00 U	5.00 U
CHLOROETHANE	10.00 U	50.00 U	10.00 U	5.00 U
CHLOROFORM	10.00 U	50.00 U	10.00 U	5.00 U
CHLOROMETHANE	10.00 U	50.00 U	10.00 U	5.00 U
CIS-1,2-DICHLOROETHENE	90.00 J	210.00	190.00	36.00
CYMENE	10.00 U	50.00 U	10.00 U	5.00 U
DIBROMOCHLOROMETHANE	10.00 U	50.00 U	10.00 U	5.00 U
DIBROMOMETHANE	10.00 U	50.00 U	10.00 U	5.00 U
[illegible]HYLBENZENE	10.00 U	50.00 U	10.00 U	5.00 U
XACHLOROBUTADIENE	10.00 U	50.00 U	10.00 U	5.00 U
ISOPROPYLBENZENE	10.00 U	50.00 U	10.00 U	5.00 U

Table 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	MW03-07D	MW03-08D	MW03-09D	MW03-10D
Site/Study Area	Site 03	Site 03	Site 03	Site 03
Date of sample collection	12/12/1996	12/12/1996	12/12/1996	12/11/1996
M,P-XYLENES	20.00 U	100.00 U	20.00 U	10.00 U
METHYLENE CHLORIDE	10.00 U	50.00 U	10.00 U	5.00 U
N-BUTYLBENZENE	10.00 U	50.00 U	10.00 U	5.00 U
N-PROPYLBENZENE	10.00 U	50.00 U	10.00 U	5.00 U
NAPHTHALENE	10.00 U	50.00 U	10.00 U	5.00 U
O-XYLENE	10.00 U	50.00 U	10.00 U	5.00 U
STYRENE	10.00 U	50.00 U	10.00 U	5.00 U
TERT-BUTYLBENZENE	10.00 U	50.00 U	10.00 U	5.00 U
TETRACHLOROETHENE	10.00 U	50.00 U	10.00 U	5.00 U
TOLUENE	10.00 U	50.00 U	10.00 U	5.00 U
TRANS-1,2-DICHLOROETHENE	21.00 J	90.00	21.00	12.00
TRICHLOROETHENE	330.00 J	1200.00	39.00	100.00
VINYL CHLORIDE	10.00 U	50.00 U	10.00 U	5.00 U
TOTAL BTEX				
TOTAL CHLORINATED CVOCS	536	2200	250	189

Table 4-3
Volatile Organic Compounds
[illegible]etected in December 1996
Ground-water Samples (ug/L)

Well ID	MW03-10D-D	MW03-12D	MW03-13D	MW03-14D
Site/Study Area	Site 03	NIKE	NIKE	NIKE
Date of sample collection	12/11/1996	12/16/1996	12/12/1996	12/16/1996
1,1,1,2-TETRACHLORROETHANE	5.00 U	1.00 U	25.00 U	6200.00 U
1,1,1-TRICHLOROETHANE	5.00 U	1.00 U	25.00 U	6200.00 U
1,1,2,2-TETRACHLOROETHANE	44.00	49.00 J	810.00	260000.00 J
1,1,2-TRICHLOROETHANE	5.00 U	1.00 J	25.00 U	6200.00 U
1,1-DICHLOROETHANE	5.00 U	1.00 U	25.00 U	6200.00 U
1,1-DICHLOROETHENE	5.00 U	1.00 U	25.00 U	6200.00 U
1,1-DICHLOROPROPENE	5.00 U	1.00 U	25.00 U	6200.00 U
1,2,3-TRICHLOROBENZENE	5.00 U	1.00 U	25.00 U	6200.00 U
1,2,3-TRICHLOROPROPANE	5.00 U	1.00 U	25.00 U	6200.00 U
1,2,4-TRICHLOROBENZENE	5.00 U	1.00 U	25.00 U	6200.00 U
1,2,4-TRIMETHYLBENZENE	5.00 U	1.00 U	25.00 U	6200.00 U
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	5.00 U	1.00 U	25.00 U	6200.00 U
1,2-DIBROMOETHANE	5.00 U	1.00 U	25.00 U	6200.00 U
1,2-DICHLOROBENZENE	5.00 U	1.00 U	25.00 U	6200.00 U
1,2-DICHLOROETHANE	5.00 U	1.00 U	25.00 U	6200.00 U
1,2-DICHLOROPROPANE	5.00 U	1.00 U	25.00 U	6200.00 U
1,3,5-TRIMETHYLBENZENE	5.00 U	1.00 U	25.00 U	6200.00 U
1,3-DICHLOROBENZENE	5.00 U	1.00 U	25.00 U	6200.00 U
[illegible]3-DICHLOROPROPANE	5.00 U	1.00 U	25.00 U	6200.00 U
[illegible]4-DICHLOROBENZENE	5.00 U	1.00 U	25.00 U	6200.00 U
2,2-DICHLOROPROPANE	5.00 U	1.00 U	25.00 U	6200.00 U
2-CHLOROTOLUENE	5.00 U	1.00 U	25.00 U	6200.00 U
2-PHENYLBUTANE	5.00 U	1.00 U	25.00 U	6200.00 U
4-CHLOROTOLUENE	5.00 U	1.00 U	25.00 U	6200.00 U
BENZENE	5.00 U	1.00 U	25.00 U	6200.00 U
BROMOBENZENE	5.00 U	1.00 U	25.00 U	6200.00 U
BROMODICHLOROMETHANE	5.00 U	1.00 U	25.00 U	6200.00 U
BROMOFORM	5.00 U	1.00 U	25.00 U	6200.00 U
BROMOMETHANE	5.00 U	1.00 U	25.00 U	6200.00 U
CARBON TETRACHLORIDE	5.00 U	1.00 U	25.00 U	6200.00 U
CFC-11	5.00 U	1.00 U	25.00 U	6200.00 U
CFC-12	5.00 U	1.00 U	25.00 U	6200.00 U
CHLOROBENZENE	5.00 U	1.00 U	25.00 U	6200.00 U
CHLOROBROMOMETHANE	5.00 U	1.00 U	25.00 U	6200.00 U
CHLOROETHANE	5.00 U	1.00 U	25.00 U	6200.00 U
CHLOROFORM	5.00 U	1.00 U	25.00 U	6200.00 U
CHLOROMETHANE	5.00 U	1.00 U	25.00 U	6200.00 U
CIS-1,2-DICHLOROETHENE	38.00	10.00 J	97.00	13000.00 J
CYMENE	5.00 U	1.00 U	25.00 U	6200.00 U
DIBROMOCHLOROMETHANE	5.00 U	1.00 U	25.00 U	6200.00 U
DIBROMOMETHANE	5.00 U	1.00 U	25.00 U	6200.00 U
[illegible]THYLBENZENE	5.00 U	1.00 U	25.00 U	6200.00 U
[illegible]XACHLOROBUTADIENE	5.00 U	1.00 U	25.00 U	6200.00 U
ISOPROPYLBENZENE	5.00 U	1.00 U	25.00 U	6200.00 U

Table 4-3
Volatile Organic Compounds
Detected in December 1996
Ground-water Samples (ug/L)

Well ID	MW03-10D-D	MW03-12D	MW03-13D	MW03-14D
Site/Study Area	Site 03	NIKE	NIKE	NIKE
Date of sample collection	12/11/1996	12/16/1996	12/12/1996	12/16/1996
M,P-XYLENES	10.00 U	2.00 U	50.00 U	12000.00 U
METHYLENE CHLORIDE	5.00 U	1.00 U	25.00 U	6200.00 U
N-BUTYLBENZENE	5.00 U	1.00 U	25.00 U	6200.00 U
N-PROPYLBENZENE	5.00 U	1.00 U	25.00 U	6200.00 U
NAPHTHALENE	5.00 U	1.00 U	25.00 U	6200.00 U
O-XYLENE	5.00 U	1.00 U	25.00 U	6200.00 U
STYRENE	5.00 U	1.00 U	25.00 U	6200.00 U
TERT-BUTYLBENZENE	5.00 U	1.00 U	25.00 U	6200.00 U
TETRACHLOROETHENE	5.00 U	1.00 U	29.00	6200.00 U
TOLUENE	5.00 U	1.00 U	25.00 U	6200.00 U
TRANS-1,2-DICHLOROETHENE	11.00	5.00 J	43.00	6200.00 U
TRICHLOROETHENE	110.00	47.00 J	740.00	150000.00 J
VINYL CHLORIDE	5.00 U	1.00 U	25.00 U	6200.00 U
TOTAL BTEX				
TOTAL CHLORINATED CVOCS	203	112	1719	423000

Table 4-4
Volatile Organic Compounds
Detected in the March 1998
Ground-Water Samples (ug/L)

Well ID	EA-105	EA-106R	EA-110D	EA-110R	EA-111D
Site/Study Area	NIKE	NIKE	Site 03	Site 03	Site 03
Date of sample collection	03/11/1998	03/13/1998	03/12/1998	03/17/1998	03/12/1998
1,1,1,2-TETRACHLORROETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,1,1-TRICHLOROETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,1,2,2-TETRACHLOROETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,1,2-TRICHLOROETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,1-DICHLOROETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U	0.60 J
1,1-DICHLOROETHENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,1-DICHLOROPROPENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,2,3-TRICHLOROBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,2,3-TRICHLOROPROPANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,2,3-TRIMETHYLBENZENE	2.00 R	2.00 R	2.00 R	2.00 R	2.00 R
1,2,4-TRICHLOROBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,2,4-TRIMETHYLBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DIBROMOETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROPROPANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,3,5-TRIMETHYLBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 R	1.00 U
1,3-DICHLOROBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,3-DICHLOROPROPANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
1,4-DICHLOROBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
2,2-DICHLOROPROPANE	1.00 UJ	1.00 U	1.00 U	1.00 UJ	1.00 U
2-CHLOROTOLUENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
2-PHENYLBUTANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
4-CHLOROTOLUENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
BENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
BROMOBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
BROMODICHLOROMETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
BROMOFORM	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
BROMOMETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
CARBON TETRACHLORIDE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
CFC-11	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
CFC-12	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROBROMOMETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROFORM	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROMETHANE	1.00 UJ	1.00 U	1.00 U	1.00 UJ	1.00 U
CIS-1,2-DICHLOROETHENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
CYMENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
DIBROMOCHLOROMETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
DIBROMOMETHANE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
ETHYLBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
HEXACHLOROBUTADIENE	1.00 UJ	1.00 U	1.00 U	1.00 UJ	1.00 U

Table 4-4
Volatile Organic Compounds
Detected in the March 1998
Ground-Water Samples (ug/L)

Well ID	EA-105	EA-106R	EA-110D	EA-110R	EA-111D
Site/Study Area	NIKE	NIKE	Site 03	Site 03	Site 03
Date of sample collection	03/11/1998	03/13/1998	03/12/1998	03/17/1998	03/12/1998
ISOPROPYLBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
M,P-XYLENES	2.00 UJ	2.00 U	2.00 U	2.00 U	2.00 U
METHYLENE CHLORIDE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
N-BUTYLBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
N-PROPYLBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
NAPHTHALENE	1.00 UJ	1.00 UJ	1.00 UJ	1.00 UJ	1.00 UJ
O-XYLENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
STYRENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
TERT-BUTYLBENZENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
TETRACHLOROETHENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
TOLUENE	1.00 UJ	1.00 U	1.00 U	2.00	1.00 U
TRANS-1,2-DICHLOROETHENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
TRICHLOROETHENE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
VINYL CHLORIDE	1.00 UJ	1.00 U	1.00 U	1.00 U	1.00 U
TOTAL BTEX				2	
TOTAL CHLORINATED CVOCS					0.6

Table 4-4
Volatile Organic Compounds
Detected in the March 1998
Ground-Water Samples (ug/L)

Well ID	EA-111D-D	EA-111R	EA-112D	EA-112R	EA-113D
Site/Study Area	Site 03	Site 03	NIKE	NIKE	NIKE
Date of sample collection	03/12/1998	03/13/1998	03/12/1998	03/13/1998	03/13/1998
1,1,1,2-TETRACHLORROETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,1,1-TRICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,1,2,2-TETRACHLOROETHANE	1.00 U	1.00 U	4.00	18.00	1.00 U
1,1,2-TRICHLOROETHANE	1.00 U	1.00 U	0.80 J	4.00	1.00 U
1,1-DICHLOROETHANE	0.60 J	1.00 U	1.00 U	1.00 U	1.00 U
1,1-DICHLOROETHENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,1-DICHLOROPROPENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2,3-TRICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2,3-TRICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2,3-TRIMETHYLBENZENE	2.00 R	2.00 R	2.00 R	2.00 R	2.00 R
1,2,4-TRICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2,4-TRIMETHYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DIBROMOETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-DICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,3,5-TRIMETHYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,3-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,3-DICHLOROPROPANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,4-DICHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
2,2-DICHLOROPROPANE	1.00 U	1.00 UJ	1.00 U	1.00 UJ	1.00 U
2-CHLOROTOLUENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
2-PHENYLBUTANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
4-CHLOROTOLUENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BROMOBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BROMODICHLOROMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BROMOFORM	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
BROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CARBON TETRACHLORIDE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CFC-11	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CFC-12	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROBROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
CHLOROFORM	1.00 U	1.00	1.00 U	1.00 U	1.00 U
CHLOROMETHANE	1.00 U	1.00 UJ	1.00 U	1.00 UJ	1.00 U
CIS-1,2-DICHLOROETHENE	1.00 U	1.00 U	10.00	44.00	0.80 J
CYMENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
DIBROMOCHLOROMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
DIBROMOMETHANE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
ETHYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
HEXACHLOROBUTADIENE	1.00 U	1.00 UJ	1.00 U	1.00 UJ	1.00 U

Table 4-4
Volatile Organic Compounds
Detected in the March 1998
Ground-Water Samples (ug/L)

Well ID	EA-111D-D	EA-111R	EA-112D	EA-112R	EA-113D
Site/Study Area	Site 03	Site 03	NIKE	NIKE	NIKE
Date of sample collection	03/12/1998	03/13/1998	03/12/1998	03/13/1998	03/13/1998
ISOPROPYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
M,P-XYLENES	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U
METHYLENE CHLORIDE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
N-BUTYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
N-PROPYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
NAPHTHALENE	1.00 UJ	1.00 UJ	1.00 UJ	1.00 UJ	1.00 UJ
O-XYLENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
STYRENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
TERT-BUTYLBENZENE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
TETRACHLOROETHENE	1.00 U	1.00	1.00 U	1.00 U	1.00 U
TOLUENE	1.00 U	1.00	1.00 U	1.00 U	1.00 U
TRANS-1,2-DICHLOROETHENE	1.00 U	1.00 U	4.00	12.00	1.00 U
TRICHLOROETHENE	1.00 U	1.00 U	24.00	90.00 J	0.70 J
VINYL CHLORIDE	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
TOTAL BTEX		1			
TOTAL CHLORINATED CVOCS	0.6	1	42.8	168	1.5

Table 4-4
Volatile Organic Compounds
Detected in the March 1998
Ground-Water Samples (ug/L)

Well ID	MW-Z3-01	MW-Z3-03	MW-Z4-01	MW-Z4-01-D
Site/Study Area	BasewideGW	BasewideGW	BasewideGW	BasewideGW
Date of sample collection	03/12/1998	03/10/1998	03/13/1998	03/13/1998
1,1,1,2-TETRACHLORROETHANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,1,1-TRICHLOROETHANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,1,2,2-TETRACHLOROETHANE	170.00 J	2.00 J	1.00 U	1.00 U
1,1,2-TRICHLOROETHANE	21.00 J	2.00 J	1.00 U	1.00 U
1,1-DICHLOROETHANE	25.00 UJ	0.70 J	1.00 U	1.00 U
1,1-DICHLOROETHENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,1-DICHLOROPROPENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,2,3-TRICHLOROBENZENE	25.00 UJ	1.00 UJ	1.00 UJ	1.00 UJ
1,2,3-TRICHLOROPROPANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,2,3-TRIMETHYLBENZENE	50.00 R	2.00 R	2.00 R	2.00 R
1,2,4-TRICHLOROBENZENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,2,4-TRIMETHYLBENZENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,2-DIBROMOETHANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,2-DICHLOROBENZENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,2-DICHLOROETHANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,2-DICHLOROPROPANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,3,5-TRIMETHYLBENZENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,3-DICHLOROBENZENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,3-DICHLOROPROPANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
1,4-DICHLOROBENZENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
2,2-DICHLOROPROPANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
2-CHLOROTOLUENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
2-PHENYLBUTANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
4-CHLOROTOLUENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
BENZENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
BROMOBENZENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
BROMODICHLOROMETHANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
BROMOFORM	25.00 UJ	1.00 UJ	1.00 U	1.00 U
BROMOMETHANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
CARBON TETRACHLORIDE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
CFC-11	25.00 UJ	1.00 UJ	1.00 U	1.00 U
CFC-12	25.00 UJ	1.00 UJ	1.00 U	1.00 U
CHLOROBENZENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
CHLOROBROMOMETHANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
CHLOROETHANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
CHLOROFORM	25.00 UJ	1.00 UJ	1.00 U	1.00 U
CHLOROMETHANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
CIS-1,2-DICHLOROETHENE	270.00 J	25.00 J	1.00 U	1.00 U
CYMENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
DIBROMOCHLOROMETHANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
DIBROMOMETHANE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
ETHYLBENZENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
HEXACHLOROBUTADIENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U

Table 4-4
Volatile Organic Compounds
Detected in the March 1998
Ground-Water Samples (ug/L)

Well ID	MW-Z3-01	MW-Z3-03	MW-Z4-01	MW-Z4-01-D
Site/Study Area	BasewideGW	BasewideGW	BasewideGW	BasewideGW
Date of sample collection	03/12/1998	03/10/1998	03/13/1998	03/13/1998
ISOPROPYLBENZENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
M,P-XYLENES	50.00 UJ	2.00 UJ	2.00 U	2.00 U
METHYLENE CHLORIDE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
N-BUTYLBENZENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
N-PROPYLBENZENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
NAPHTHALENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
O-XYLENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
STYRENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
TERT-BUTYLBENZENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
TETRACHLOROETHENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
TOLUENE	25.00 UJ	1.00 UJ	1.00 U	1.00 U
TRANS-1,2-DICHLOROETHENE	100.00 J	2.00 J	1.00 U	1.00 U
TRICHLOROETHENE	620.00 J	8.00 J	1.00 U	1.00 U
VINYL CHLORIDE	25.00 UJ	0.80 J	1.00 U	1.00 U
TOTAL BTEX				
TOTAL CHLORINATED CVOCS	1181	40.5		

Table 4-4
Volatile Organic Compounds
Detected in the March 1998
Ground-Water Samples (ug/L)

Well ID	MW-Z4-02	MW01-12D	MW01-14D	MW02-03D	MW02-10D
Site/Study Area	BasewideGW	Study Area 01	Study Area 01	Site 02	Site 02
Date of sample collection	03/13/1998	03/10/1998	03/10/1998	03/10/1998	03/11/1998
1,1,1,2-TETRACHLORROETHANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,1,1-TRICHLOROETHANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,1,2,2-TETRACHLOROETHANE	1.00 U	2.00 J	1.00 UJ	1.00 J	9.00 J
1,1,2-TRICHLOROETHANE	1.00 U	0.60 J	0.60 J	3.00 J	5.00 J
1,1-DICHLOROETHANE	1.00 U	1.00 UJ	1.00 UJ	0.60 J	1.00 J
1,1-DICHLOROETHENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,1-DICHLOROPROPENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,2,3-TRICHLOROBENZENE	1.00 UJ	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,2,3-TRICHLOROPROPANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,2,3-TRIMETHYLBENZENE	2.00 R	2.00 R	2.00 R	2.00 R	4.00 R
1,2,4-TRICHLOROBENZENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,2,4-TRIMETHYLBENZENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,2-DIBROMOETHANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,2-DICHLOROBENZENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,2-DICHLOROETHANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,2-DICHLOROPROPANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,3,5-TRIMETHYLBENZENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,3-DICHLOROBENZENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,3-DICHLOROPROPANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
1,4-DICHLOROBENZENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
2,2-DICHLOROPROPANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
2-CHLOROTOLUENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
2-PHENYLBUTANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
4-CHLOROTOLUENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
BENZENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
BROMOBENZENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
BROMODICHLOROMETHANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
BROMOFORM	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
BROMOMETHANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
CARBON TETRACHLORIDE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
CFC-11	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
CFC-12	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
CHLOROBENZENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
CHLOROBROMOMETHANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
CHLOROETHANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
CHLOROFORM	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
CHLOROMETHANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
CIS-1,2-DICHLOROETHENE	1.00 U	6.00 J	3.00 J	22.00 J	40.00 J
CYMENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
DIBROMOCHLOROMETHANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
DIBROMOMETHANE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
ETHYLBENZENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
HEXACHLOROBUTADIENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ

Table 4-4
Volatile Organic Compounds
Detected in the March 1998
Ground-Water Samples (ug/L)

Well ID	MW-Z4-02	MW01-12D	MW01-14D	MW02-03D	MW02-10D
Site/Study Area	BasewideGW	Study Area 01	Study Area 01	Site 02	Site 02
Date of sample collection	03/13/1998	03/10/1998	03/10/1998	03/10/1998	03/11/1998
ISOPROPYLBENZENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
M,P-XYLENES	2.00 U	2.00 UJ	2.00 UJ	2.00 UJ	4.00 UJ
METHYLENE CHLORIDE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
N-BUTYLBENZENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
N-PROPYLBENZENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
NAPHTHALENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	1.00 J
O-XYLENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
STYRENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
TERT-BUTYLBENZENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
TETRACHLOROETHENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
TOLUENE	1.00 U	1.00 UJ	1.00 UJ	1.00 UJ	2.00 UJ
TRANS-1,2-DICHLOROETHENE	1.00 U	1.00 J	1.00 UJ	2.00 J	5.00 J
TRICHLOROETHENE	1.00 U	8.00 J	1.00 UJ	8.00 J	19.00 J
VINYL CHLORIDE	1.00 U	1.00 UJ	1.00 UJ	0.70 J	1.00 J
TOTAL BTEX					
TOTAL CHLORINATED CVOCS		17.6	3.6	37.3	80

Table 4-4
Volatile Organic Compounds
Detected in the March 1998
Ground-Water Samples (ug/L)

Well ID	MW03-03D	MW03-07D	MW03-08D	MW03-08D-D	MW03-14D
Site/Study Area	Site 03	Site 03	Site 03	Site 03	NIKE
Date of sample collection	03/11/1998	03/11/1998	03/11/1998	03/11/1998	03/12/1998
1,1,1,2-TETRACHLORROETHANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,1,1-TRICHLOROETHANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,1,2,2-TETRACHLOROETHANE	67.00 J	180.00 J	1200.00 J	1300.00 J	210000.00 J
1,1,2-TRICHLOROETHANE	25.00 UJ	16.00 J	49.00 J	49.00 J	4800.00 J
1,1-DICHLOROETHANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,1-DICHLOROETHENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,1-DICHLOROPROPENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,2,3-TRICHLOROBENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,2,3-TRICHLOROPROPANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,2,3-TRIMETHYLBENZENE	50.00 R	50.00 R	100.00 R	100.00 R	10000.00 R
1,2,4-TRICHLOROBENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,2,4-TRIMETHYLBENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,2-DIBROMO-3-CHLOROPROPANE (DBCP)	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,2-DIBROMOETHANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,2-DICHLOROBENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,2-DICHLOROETHANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,2-DICHLOROPROPANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,3,5-TRIMETHYLBENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,3-DICHLOROBENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,3-DICHLOROPROPANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
1,4-DICHLOROBENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
2,2-DICHLOROPROPANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
2-CHLOROTOLUENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
2-PHENYLBUTANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
4-CHLOROTOLUENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
BENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
BROMOBENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
BROMODICHLOROMETHANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
BROMOFORM	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
BROMOMETHANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
CARBON TETRACHLORIDE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
CFC-11	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
CFC-12	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
CHLOROBENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
CHLOROBROMOMETHANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
CHLOROETHANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
CHLOROFORM	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
CHLOROMETHANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
CIS-1,2-DICHLOROETHENE	130.00 J	140.00 J	440.00 J	460.00 J	13000.00 J
CYMENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
DIBROMOCHLOROMETHANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
DIBROMOMETHANE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
ETHYLBENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
HEXACHLOROBUTADIENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ

Table 4-4
Volatile Organic Compounds
Detected in the March 1998
Ground-Water Samples (ug/L)

Well ID	MW03-03D	MW03-07D	MW03-08D	MW03-08D-D	MW03-14D
Site/Study Area	Site 03	Site 03	Site 03	Site 03	NIKE
Date of sample collection	03/11/1998	03/11/1998	03/11/1998	03/11/1998	03/12/1998
ISOPROPYLBENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
M,P-XYLENES	50.00 UJ	50.00 UJ	100.00 UJ	100.00 UJ	10000.00 UJ
METHYLENE CHLORIDE	25.00 UJ	25.00 UJ	84.00 UJ	50.00 UJ	5000.00 UJ
N-BUTYLBENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
N-PROPYLBENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
NAPHTHALENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	4500.00 J
O-XYLENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
STYRENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
TERT-BUTYLBENZENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
TETRACHLOROETHENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	2900.00 J
TOLUENE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
TRANS-1,2-DICHLOROETHENE	45.00 J	46.00 J	230.00 J	240.00 J	7800.00 J
TRICHLOROETHENE	400.00 J	480.00 J	2200.00 J	2300.00 J	130000.00 J
VINYL CHLORIDE	25.00 UJ	25.00 UJ	50.00 UJ	50.00 UJ	5000.00 UJ
TOTAL BTEX					
TOTAL CHLORINATED CVOCS	642	862	4119	4349	368500

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 193701 E: 519074
Surface Elevation: 29.58 ft MSL
Well Riser Elevation: 31.27 ft MSL

Job. No.	Client:	Location:
60957.56	USACE-NED	Nike PR-58 Site North Kingstown, RI

Drilling Method: 3.875 in. rollerbit, drive and wash

Boring No. **MW03-11R**

Core Barrel used:

Sheet 1 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	07/06/2000 1330	07/06/2000 1700

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	DRILLING LOG Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
					28					
					29					
					30		500 psi hydraulic down pressure, 3rd gear		7:00	30-31
					31		same as above increase down pressure to 650 psi at 31.5 ft		10:20	31-32
					32					
					33					
					34		driller notes softer rock at 34 ft			
					35		decrease pressure to 500 psi		3:10	35-36
					36		decrease pressure to 450 psi			
					37		increase pressure to 550 psi			
					38					
					39		same as above		3:30	39-40
					40				3:45	40-41
					41					
					42		increase pressure to 600 psi			
					43					
					44		decrease pressure to 550 psi		5:55	44-45
					45		same as above		5:35	45-46
					46					

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: Brett Swiateh

DRAFT

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 193701 E: 519074
Surface Elevation: 29.58 ft MSL
Well Riser Elevation: 31.27 ft MSL

Job. No.	Client:	Location:
60957.56	USACE-NED	Nike PR-58 Site North Kingstown, RI

Drilling Method: 3.875 in. rollerbit, drive and wash

Boring No. **MW03-11R**

Core Barrel used:

Sheet 2 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	07/06/2000 1330	07/06/2000 1700

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
					47					
					48					
					49		same as above		5:05	49-50
					50		same as above		5:00	50-51
					51		increase pressure to 600 psi			
					52					
					53					
					54		same as above		2:10	54-55
					55		bottom of boring at 55 ft			

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: Brett Swiateh

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194274 E: 518491
Surface Elevation:	31.86 ft MSL
Well Riser Elevation:	33.35 ft MSL

Job. No. 60957.56	Client: USACE-NED	Location: Nike PR-58 Site North Kingstown, RI
Drilling Method: 8.75" RB to 43'		Boring No. **MW03-14R2**
5.75" RB to 68		
NW Core 68-93'		
Core Barrel used: NW		Sheet 1 of 2

Packer Test

Tested	Yes	
Interval		
See packer test log if applicable		

Drilling Times	Start	Finish
	06/21/2000 1330	06/22/2000 0815

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
				68					
Run 1/5							Core run	Drill	Total
68 - 73 ft bg							Length	Time/ft	Depth
88% 83%				69		0-47": light gray fine-med grained quartzite with	(ft)	(min:sec)	(ft bgs)
						bands of phyllite from 19"-25".	5	3:45	68-69
				70		Rusted fractures at 19" and 25".		5:00	69-70
						47"- Med. Gray phyllite		5:35	70-71
				71		rusted low angle fracture at 51".		2:55	71-72
								3:30	72-73
				72					
				73					
Run 2/5						0-20 " Med gray phyllite with w/ quartzite bands at 8-11"	4.9	3:25	73-74
73-77.9				74		Low angle fractures at 6", 10.5", and 16"		3:30	74-75
100% 94%						20-28" light gray fine grained quartzite		3:35	75-76
				75		Grades back to phyllite at 28" to bottom,		3:20	76-77
								3:00	77-77.9
				76		rusted low angle fracture at 31", 33 1/2", 43 1/2", 44",			
						52 1/2", 52 3/4", 53"(w/ white mineralization).			
				77		Bands of quartzite at 45" to 58"			
				78					
Run 3/5						Med. To dark gray phyllite w/ low angle fractures at	5.1	3:20	77.9-78.9
77.9-83'				79		1 1/2", 8" (w/ white mineralization),		4:15	78.9-79.9
99.6% 89.7%						31" (w/ white mineralization), and 42".		4:00	79.9-80.9
				80		Broken core from 44"-47"			80.9-81.9
								4:00	81.9-82.9
				81					82.9-83.0
				82					
				83					
				84					
				85					
				86					
				87					

NOTES:

Logged by: R. Clark

Drilling Contractor: Dragin Drilling

Driller: George Henner

DRAFT

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N:. 194274 E: 518491
Surface Elevation: 31.86 ft MSL
Well Riser Elevation: 33.35 ft MSL

Job. No.	Client:	Location:
60957.56	USACE-NED	Nike PR-58 Site North Kingstown, RI

Drilling Method:
8.75" RB to 43'
5.75" RB to 68
NW Core 68-93'
Core Barrel used: NW

Boring No. **MW03-14R2**

Sheet 2 of 2

Packer Test

Tested	Yes	
Interval		

See packer test log if applicable

	Drilling Times	
Start		Finish
06/21/2000		06/22/2000
1330		0815

Core Run / Run # / REC / RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
				83					
Run 4/5 83 - 88 ft bg 100% 100%				84		0-18" Med. Dark gray phyllite,			
						low angle fractures at 7 1/2"and 18".			
						Grades to quartzite at 18" and from gray to	5	3:00	83-84
				85		light gray in color at 26".		1:40	84-85
						Low angle fracture at 25".		1:35	85-86
				86		Drill breaks of the core at 31", 38", 43 1/2",46", 56"		1:50	86-87
								1:55	87-88
				87					
				88					
Run 5/5 88-93' 100% 92%						0-6" Fine grained, med. light gray quartzite	5	1:50	88-89
				89		6-60" med. dark gray phyllite		1:40	89-90
						Low angle fractures at 6", 10", and 13" (white mineral		2:00	90-91
				90		bands at 6" and 13")		2:10	91-92
						Highly fractured w/ rust at 15 1/2-19".		2:00	92-93
				91		One high angle fracture 19-21".			
						Rusted low angle fracture at 27".			
				92		White band at 28".			
						Low low-angle fractures at 30", 36", 42" (w/ white			
				93		mineral bands), 47", 53", and 60" w/ white mineral.			

NOTES:

Logged by: R. Clark

Drilling Contractor: Dragin Drilling

Driller: George Henner

DRAFT

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 194708 E: 518826
Surface Elevation:	35.87 ft MSL
Well Riser Elevation:	37.84 ft MSL

Job. No. 60957.56	Client: USACE-NED	Location: Nike PR-58 Site, North Kingstown, RI
Drilling Method: 3.875 in. rollerbit, drive and wash		Boring No. EA-104R
Core Barrel used:		Sheet 1 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	07/06/2000 0900	07/06/2000 1200

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Depth Filling in feet	Graphic Log	COMMENTS	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
				71					
				72					
				73		500 psi hydraulic down pressure, 3rd gear		3:30	73-74
				74		same as above		3:25	74-75
				75		same as above		2:45	75-76
				76					
				77					
				78		same as above		4:35	78-79
				79		same as above		5:45	79-80
				80					
				81					
				82					
				83					
				84		same as above		3:55	84-85
				85		same as above		4:35	85-86
				86					
				87					
				88					
				89					

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: Brett Swiateh

DRAFT

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 194708 E: 518826
Surface Elevation: 35.87 ft MSL
Well Riser Elevation: 37.84 ft MSL

Job. No.	Client:	Location:
60957.56	USACE-NED	Nike PR-58 Site North Kingstown, RI

Drilling Method: 3.875 in. rollerbit, drive and wash

Boring No. **EA-104R**

Core Barrel used:

Sheet 2 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	07/06/2000 0900	07/06/2000 1200

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
					90		same as above		2:25	90-91
					91					
					92					
					93					
					94		same as above		2:35	94-95
					95		same as above		2:55	95-96
					96		bottom of boring 96 ft			
					97					

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: Brett Swiateh

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 194180 E: 519074
Surface Elevation: 29.58 ft MSL
Well Riser Elevation: 31.27 ft MSL

Job. No.	Client:	Location:
60957.56	USACE-NED	Nike PR-58 Site North Kingstown, RI

Drilling Method: 3.875 in. rollerbit, drive and wash

Boring No. **EA-105R**

Core Barrel used:

Sheet 1 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	07/07/2000 1330	07/07/2000 1500

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
				33					
				34					
				35		450 psi hydraulic down pressure, 3rd gear		1:40	35-36
				36					
				37					
				38					
				39		same as above		1:30	39-40
				40		same as above		1:30	40-41
				41					
				42					
				43					
				44		same as above		2:40	44-45
				45		same as above		1:25	45-46
				46					
				47					
				48					
				49		same as above		3:55	49-50
				50		same as above		2:10	50-51
				51					

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: Brett Swiateh

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 194180 E: 519074
Surface Elevation: 29.58 ft MSL
Well Riser Elevation: 31.27 ft MSL

Job. No.	Client:	Location:
60957.56	USACE-NED	Nike PR-58 Site North Kingstown, RI

Drilling Method: 3.875 in. rollerbit, drive and wash

Boring No. **EA-105R**

Core Barrel used:

Sheet 2 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	07/07/2000 1330	07/07/2000 1500

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	DRILLING LOG Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
					52					
					53					
					54		same as above		1:35	54-55
					55		same as above		1:40	55-56
					56					
					57		same as above		1:25	57-58
					58		same as above		2:20	58-59
					59		same as above		2:10	59-60
					60		bottom of boring at 60 ft			

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: Brett Swiateh

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 193890 E: 517682
Surface Elevation: 29.05 ft MSL
Well Riser Elevation: 30.68 ft MSL

Job. No.	Client:	Location:
60957.56	USACE-NED	Nike PR-58 Site North Kingstown, RI

Drilling Method: 3.875 in. rollerbit, drive and wash

Boring No. **EA-107R**

Core Barrel used:

Sheet 1 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	06/23/2000 1000	06/23/2000 1145

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	DRILLING LOG Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
					43					
					44					
					45					
					46		2nd gear, 1100 psi hydraulic down pressure		2:10	46-47
							(soft rock)			
					47		same as above		2:30	47-48
					48					
					49					
					50					
					51		same as above		2:55	51-52
					52					
					53					
					54					
					55					
					56		same as above		2:40	56-57
					57					
					58		harder rock at 58 ft			
					59					
					60					
					61		Same as above		6:05	61-62

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: George Henner

DRAFT

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 193890 E: 517682
Surface Elevation: 29.05 ft MSL
Well Riser Elevation: 30.68 ft MSL

Job. No. 60957.56	Client: USACE-NED	Location: Nike PR-58 Site North Kingstown, RI
Drilling Method: 3.875 in. rollerbit, drive and wash		Boring No. **EA-107R**
Core Barrel used:		Sheet 2 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	06/23/2000 1000	06/23/2000 1145

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
					62					
					63					
					64					
					65					
					66		same as above		5:35	66-67
					67					
					68					
					69		bottom of boring = 68.4 ft bgs			

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: George Henner

DRAG

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 193743 E: 518127
Surface Elevation: 31.56 ft MSL
Well Riser Elevation: 33.11 ft MSL

Job. No.	Client:	Location:
60957.56	USACE-NED	Nike PR-58 Site North Kingstown, RI

Drilling Method: 3.875 in. rollerbit, drive and wash

Boring No. **EA-108R**

Core Barrel used:

Sheet 1 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	06/19/2000 1600	06/20/2000 0900

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
				33					
				34		1,000 psi hydraulic down pressure, first gear		6:05	34-35
				35		same as above		9:55	35-36
				36					
				37					
				38		same psi as above, second gear		9:30	38-39
				39					
				40		driller reports softer rock at 40 ft		2:15	40-41
				41		same as above		2:10	41-42
				42		06/20/00			
				43		1,100 psi hydraulic down pressure, first gear cuttings look like phyllite		2:45	43-44
				44					
				45		same as above		2:25	45-46
				46		same as above		2:05	46-47
				47					
				48					
				49					
				50		same as above		5:00	50-51
				51					

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: George Henner

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 193743 E: 518127
Surface Elevation: 31.56 ft MSL
Well Riser Elevation: 33.11 ft MSL

Job. No.	Client:	Location:
60957.56	USACE-NED	Nike PR-58 Site North Kingstown, RI

Drilling Method: 3.875 in. rollerbit, drive and wash

Boring No. **EA-108R**

Core Barrel used:

Sheet 2 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	06/19/2000 1600	06/20/2000 0900

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
							Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
				52		same as above		4:10	52-53
				53		same as above		3:50	53-54
				54					
				55					
				56		same as above		4:40	56-57
				57					
				58		bottom of boring 58 ft			
				59					

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: George Henner

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 195317 E: 519188
Surface Elevation: 45.24 ft MSL
Well Riser Elevation: 46.84 ft MSL

Job. No. 60957.56 | Client: USACE-NED | Location: Nike PR-58 Site, North Kingstown, RI

Drilling Method: 3.875 in. rollerbit, drive and wash

Boring No. **EA-112R2**

Core Barrel used:

Sheet 1 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	06/23/2000 1400	06/26/2000 0830

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Depth in feet	Graphic Log	COMMENTS	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
			131		1,200 psi hydraulic down pressure, 2nd gear		1:55	131-132
			132		same as above		1:45	132-133
			133					
			134					
			135					
			136		same as above		1:35	136-137
			137		same as above		1:30	137-138
			138					
			139					
			140		driller reports fracture at 140 ft			
			141		same as above		1:55	141-142
			142		same as above		1:20	142-143
			143					
			144					
			145					
					driller reports fractured rock at 145.5-146 ft			
			146		same as above		2:05	146-147
			147					
			148					
			149					

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: George Henner

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 195317 E: 519188
Surface Elevation: 45.24 ft MSL
Well Riser Elevation: 46.84 ft MSL

Job. No.	Client:	Location:
60957.56	USACE-NED	Nike PR-58 Site North Kingstown, RI

Drilling Method: 3.875 in. rollerbit, drive and wash

Boring No. **EA-112R2**

Core Barrel used:

Sheet 2 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	06/23/2000 1400	06/26/2000 0830

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Depth in feet	Graphic Log	COMMENTS	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
			150		same as above		2:45	150-151
			151					
			152					
			153					
			154					
			155		same as above		2:00	155-156
			156					
			157		bottom of boring 156.6 ft			

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: George Henner

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 195132 E: 518635
Surface Elevation:	27.77 ft MSL
Well Riser Elevation:	29.31 ft MSL.

Job. No. 60957.56	Client: USACE-NED	Location: Nike PR-58 Site, North Kingstown, RI
Drilling Method: 3.875 in. rollerbit, drive and wash		Boring No. EA-113R
Core Barrel used:		Sheet 1 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	07/07/2000 900	07/07/2000 1200

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
					55		450 psi hydraulic down pressure, 3rd gear		4:05	55-56
					56		Same as above		3:30	56-57
					57					
					58		Same as above		1:50	58-59
					59		Same as above		2:20	59-60
					60					
					61					
					62					
					63		Same as above		6:45	63-64
					64		Same as above		7:00	64-65
					65		500 psi down pressure, 60 psi water pressure			
					66					
					67					
					68		Same as above		3:40	68-69
					69		500 ppm headspace on water from top of mud tub		5:00	69-70
					70					
					71					
					72					
					73		309 ppm headspace on water from top of mud tub		3:40	73-74

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: Brett Swieteh

DRAFT

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 195132 E: 518635
Surface Elevation: 27.77 ft MSL
Well Riser Elevation: 29.31 ft MSL

Job. No. 60957.56	Client: USACE-NED	Location: Nike PR-58 Site, North Kingstown, RI
Drilling Method: 3.875 in. rollerbit, drive and wash		Boring No. EA-113R
Core Barrel used:		Sheet 2 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	07/07/2000 900	07/07/2000 1200

Core Run / Run # / REC / RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Depth Filling	Depth in feet	Graphic Log	COMMENTS	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
				74		3rd gear, 500 psi hydraulic down pressure		4:25	74-75
				75					
				76					
				77		Same as above		7:20	77-78
				78		Same as above		4:45	78-79
				79		Same as above		4:10	79-80
				80		Bottom of boring 80 ft			

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: Brett Swieteh

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 193849 E: 518369
Surface Elevation: 30.14 FT MSL
Well Riser Elevation: 31.96 FT MSL

Job. No. 60957.56	Client: USACE-NED North Kingstown,RI	Location: Former PR-58 Nike Site	
Drilling Method: CME 1500		Boring No.	
Hydraulic 140 hammer 30" stroke		**EA 114R**	
HSA 6 1/4"			
Sampling Method:			
3" split spoon		Sheet 1 of 1	
Drilling Water Level		Start 1500 6/14/00	Drilling Date/Times	Finish 1700 06/19/00
Date				
Time				
Surface Conditions: woodland				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
3" SS	24 / 24	--	0-2	0.0	3, 5	0		0-8" dark brown silty sand, roots, organics	
					5, 6	1		8-20" olive brown silty sand; damp.	
						2			
						3			
						4			
3" SS	24 / 22	5	5-7	0.0	10, 13	5		0-12" as above (olive brown silty sand) wet (vf-crs sand)	
					11, 13	6		12-22" dark olive brown gravelly (< 1 1/2") silty sand (sa-sr); wet	
3" SS	24 / 15	7	7-9	0.0	16, 18	7		0-8" dark olive brown sandy silt, trace gravel; satuated	
					21, 18	8		8-15" dark olive brown sandy (med-crs) gravel (< 1/2") saturated. (trace large gravel)	
SS	20 / 20	9	9-10.7	6.6	18, 24	9		Dark olive brown sandy (vf-crs) silty gravel (f-crs < 3")	
					30, 40/2	10			
						11			Driller reports 6' sand run in
						12			Continue Augering
						13			
						14		Auger refusal at 14'	
						15			
						16			
						17			
						18			
						19			

Logged by: Jeff Norberg Date: 06/19/00

Drilling Contractor: DRAGIN Drilling Driller: George and Steve

DRAFT

SPECIFICATIONS:

Diam. of Riser: 4 in. steel Screen Interval: Open borehole 17.6 ft - 42.7 ft bgs Sandpack: NA Grout: NA

Bottom of Hole: 42.7 ft bg Riser Interval: 1.82 ft ags to 17.6 ft bgs Bentonite: NA Cover: 4 in. locking steel

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates:	N: 193849 E: 518369
Surface Elevation:	30.14 ft MSL
Well Riser Elevation:	31.96 ft MSL

Job. No. 60957.56	Client: USACE-NED	Location: Nike PR-58 Site, North Kingstown, RI
Drilling Method: HSA to 14.5'		Boring No. EA114R
5 7/8 RB to 17.6'		
HX core 17.6-42.7'		
Core Barrel used: HX		Sheet 1 of 2

Packer Test

Tested	Yes	
Interval		

See packer test log if applicable

Drilling Times	
Start	06/16/2000 1430
Finish	06/19/2000 0945

Core Run / Run # / REC / RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG: Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
—				17					
Run 1/5 —						Med. Light gray fine			
17.6-24.2 ft. long				18		grained quartzite.			
85% — 65.3%						Low angle fractures at	6.6	1:55	17.6-18.6
—				19		6", 8", 9", 11", 13 1/2", 16",		2:40	18.6-19.6
—						23", 25", 31", 38", 58", 72", (77" 45")		2:30	19.6-20.6
—				20		High angle fracture 42", 45", 46"-51"		2:45	20.6-21.6
—								2:45	21.6-22.6
—				21				1:20	22.6-24.2
—									
—				22					
—									
—				23					
—									
—				24					
Run 2/5 —						0-30": Med light gray quartzite	5	2:05	24.2-25.2
2-29.2 —				25		begins to grade to phyllite (med. dark gray.) at 30"		1:30	25.2-26.2
% — 63%						low angle fract. 32", 38", high angle fract.		2:30	26.2-27.2
—				26		40-43", white mineral banding		2:30	27.2-28.2
—						at 34", 37", 45"		2:20	28.2-29.2
—				27		low angle fract. 48", 51", 52", 53 1/2".			
—						broken core 53 1/2 - 57".			
—				28		minor rust staining at 38" and 48"			
—									
—				29					
Run 3/5 —						Med. Dark gray fine gravel	1.7	3:05	29.2-30.2
29.2-30.9 —				30		quartzite.		2:00	30.2-30.9
100% — 77.5%						Low angle fracture at 1 1/2", 5" (w/ rust),			
—				31		15" high angle fracture 13-15".			
—						Very fine grained at bottom 5".			
—				32					
—									
—									
—									
—									
—									
—									
—									
—									
—									
—									
—									
—									
—									

NOTES:

Logged by: R. Clark

Drilling Contractor: Dragin Drilling

Driller: George Henner

DRAFT

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 193849 E: 518369
Surface Elevation: 30.14 ft MSL
Well Riser Elevation: 31.96 ft MSL

Job. No. 60957.56	Client: USACE-NED	Location: Nike PR-58 Site, North Kingstown, RI
Drilling Method: HSA to 14.5'		Boring No. **EA114R**
5 7/8 RB to 17.6'		
HX core 17.6-42.7'		
Core Barrel used: HX		Sheet 2 of 2

Packer Test

Tested	Yes	
Interval		
See packer test log if applicable		

Drilling Times	Start	Finish
	06/16/2000 1430	06/19/2000 0945

Core Run Run # REC RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Depth Filling	Depth in feet	Graphic Log	LITHOLOGIC LOG	DRILLING LOG Core run Length (ft)	Drill Time/ft (min:sec)	Total Depth (ft bgs)
				30					
Run 4/5 30.9-39.2 100% 85%				31		Med. Gray fine grained quartzite			
						Med. Dark gray phyllite, but			
				32		mixed w/ quartzite from 7-13 1/2"	8.3	1:45	30.9-31.9
						1/2" white band at 45 degree angle from		1:30	31.9-32.9
				33		18-21".		3:00	32.9-33.9
						25-27" quartzite med. (like 0-4")		1:15	33.9-34.2
						27-31" phyllite		3:15	34.2-35.2
				34		31" quartzite med. Light gray.		3:15	35.2-36.2
						Fine gravel to 82".		3:10	36.2-37.2
				35		White mineral bands (high angle)		4:25	37.2-38.2
						82" phyllite to bottom (med. Dark gray).		4:40	38.2-39.2
				36		White mineral bands 96-97"			
						Low angle fract. 7 1/2", 22", 23", 24", 31", 41", 43"			
				37		47", 62", 87" (white mineral 87-91")			
						91", 96 1/2".			
				38		High angle fract. 41-49", 54-56", 71"-75", 77-79"			
						minor rust staining at 7.5", 31", and 62".			
				39					
Run 5/5 39.2-43.2 96% 87.5						0-9" Med. Dark gray phyllite	4		39.2-40.2
				40		w/ white banding at 3 + 6"		4:50	40.2-41.2
						Low angle fractures at 2", 3", 5"		3:30	41.2-42.2
				41		grades to quartzite at 9" dark med.		4:25	42.2-43.2
						gray at 9" grades to light med.			
				42		gray at bottom med. To fine gravel			
				43		Low angle fract. At 20"			
						High angle fract. 43-48"			
				44					
				45					
				46					

NOTES:

Logged by: R. Clark

Drilling Contractor: Dragin Drilling

Driller: George Henner

DRAFT

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 195368 E: 519431
Surface Elevation: 43.95 FT MSL
Well Riser Elevation: 45.51 FT MSL

Job. No. 60957.56	Client: USACE-NED North Kingstown,RI	Location: Former PR-58 Nike Site
Drilling Method: CME 1050 Hydraulic 140 lb Hammer 30" stroke		Boring No. **EA 116D**
Sampling Method: 1 1/2" split spoon sampler		Sheet 1 of 5
Drilling Water Level: 19.5' BG; Date: 6/8/00; Time: 0842 hrs		Start 6/8/00 0730 hrs; Drilling Date/Times; Finish 6/12/00 1700 hrs
Surface Conditions: woodland/humus		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
			0-1' 6"			0		Just below grade 1' 5" dia. Boulder rolled	
								out of way began split spoon 1'6"-3'6"	
	24	0	1'6"-3'6"			1			
	18			0.0 HS	3			VF-M sand with minor silt and trace	
					5	2		gravel (< 1/2" dia. Subangular to to subrounded),	
					6			brown; damp	
	24	3' 6"	3'6"-5'6"		14	3			
	18			0.0 HS	10			Same as 1'6"-3'6" but dark grayish brown	
					10	4			
					12				
					17	5			
						6			
						7			
	24	8'	8-10		9	8		Gravelly fine sand with minor silt, grayish	Broke tip of split
	19			0.0 HS	10			brown, trace cobbles, gravel <1 1/2" dia.	spoon sampler
					11	9		angular-subrounded; damp	
					15				
						10			
						11			
						12			
	24	13'	13-15		9	13		Gravelly fine sand with trace silt, dark gray,	Cobbles logged
	6			0.0 HS	14			gravel F.C. cobbles < 3" dia., subrounded to subangular;	from cuttings of HSA
					16	14		damp	
					15				
						15			
						16			
						17			
	24	18'	18-20		6	18		Gravelly F-C sand with trace silt, dark grayish brown,	
	18			0.0HS	7			gravel F-M < 1" dia., subrounded-subangular, damp.	
					7	19		Wet at 19' 6"	
					8				

Logged by: Jeff Norberg Date: 6/8/00

Drilling Contractor: DRAGIN Drilling Driller: George Henner

WELL SPECIFICATIONS:

Diam. of Riser: 2" PVC Screen Interval: 75.2-85.2 ft bgs Sandpack: 73-85.2 ft bgs Grout: 71 ft bgs to grade
Depth of Hole: 94 ft bgs Riser Interval: 1.56 ft ags to 75.2 ft bgs Bentonite: 71-73 ft bgs Cover: 4 in. locking steel

DRAFT

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 195368 E: 519431
Surface Elevation: 43.95 FT MSL
Well Riser Elevation: 45.51 FT MSL

Job. No. 60957.56	Client: USACE-NED North Kingstown,RI	Location: Former PR-58 Nike Site
Drilling Method: CME 1050 Hydraulic 140 lb Hammer 30" stroke		Boring No. **EA-116D**
Sampling Method: 1 1/2" split spoon sampler		Sheet 2 of 5
Drilling Water Level: 19.5' BG; Date: 6/8/00; Time: 0842 hrs		Start 6/8/00 0730 hrs; Drilling Date/Times; Finish 6/12/00 1700 hrs
Surface Conditions: woodland/humus		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
						20			
						21			
						22			
	24 10	23	23-25	0.0 HS	4 5	23		F-C sand with minor gravel, dark brown, f gravel < 1/2" dia., subrounded-subangular,	
					5 5	24		with interlayered lenses of F-M sand or silty VF-F sand < 2" thick, wet	
						25			
						26			
						27			
	24 15	28	28-30	0.0 HS	4 4	28		Same as 23-25' BGS	
					5 5	29			
						30			
						31			
						32			
	24 16	33	33-35	0.0 HS	4 6	33		Same as 28-30' BGS but with bands of Fe staining < 2" thick (minor)	Adding water to
					5 5	34			prevent sand from heaving into HSA
						35			
						36			
						37			
	24 12	38	38-40	0.0 HS	5 6	38		Same as 33-35' BGS but no bands of Fe staining, trace gravel < 1" dia.	
					6 7	39			

Logged by: Jeff Norberg Date: 6/8/00

Drilling Contractor: DRAGIN Drilling Driller: George Henner

WELL SPECIFICATIONS:

Diam. of Riser: 2" PVC Screen Interval: 75.2-85.2 ft bgs Sandpack: 73-85.2 ft bgs Grout: 71 ft bgs to grade
Bottom of Hole: 94 ft bgs Riser Interval: 1.56 ft ags to 75.2 ft bgs Bentonite: 71-73 ft bgs Cover: 4 in. locking steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates: N: 195368 E: 519431
Surface Elevation: 43.95 FT MSL
Well Riser Elevation: 45.51 FT MSL

Job. No. 60957.56	Client: USACE-NED North Kingstown,RI	Location: Former PR-58 Nike Site
Drilling Method: CME 1050 Hydraulic 140 lb Hammer 30" stroke		Boring No. EA-116D
Sampling Method: 1 1/2" split spoon sampler		Sheet 3 of 5

Drilling Water Level	19.5' BG
Date	6/8/00
Time	0842 hrs
Surface Conditions:	woodland/humus

Start	Drilling Date/Times	Finish
6/8/00 0730 hrs		6/12/00 1700 hrs

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
						40			
						41			
						42			
	24 20	43	43-45	0.0 HS	5 5	43		VF-F sand, trace silt, dark grayish brown; wet	
					5 6	44			
						45			
						46			
						47			
	24 20	48	48-50	0.0 HS	4 5	48		(0-12") Same as 43-45' BGS (12-20") F-M sand with minor Fe staining	
					6 6	49			
						50			
						51			
						52			
	24 20	53	53-55	0.0 HS	3 4	53		(0"-8") F-M sand Fe staining grayish brown wet (8"-13") clayey silt, dark gray; wet	
					4 4	54		(13"-20") VF-F sand, trace silt, dark gray; wet	
						55			
						56			
						57			
	24 18	58	58-60	0.0 HS	2 2	58		Silty VF-F sand, dark gray; wet	
					3 3	59			

Logged by: Jeff Norberg Date: 6/8/00

Drilling Contractor: DRAGIN Drilling Driller: George Henner

WELL SPECIFICATIONS:

Diam. of Riser: 2" PVC Screen Interval: 75.2-85.2 ft bgs Sandpack: 73-85.2 ft bgs Grout: 71 ft bgs to grade
Depth of Hole: 94 ft bgs Riser Interval: 1.56 ft ags to 75.2 ft bgs Bentonite: 71-73 ft bgs Cover: 4 in. locking steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 195368 E: 519431
Surface Elevation:	43.95 FT MSL
Well Riser Elevation:	45.51 FT MSL

Job. No. 60957.56	Client: USACE-NED North Kingstown,RI	Location: Former PR-58 Nike Site
Drilling Method: CME 1050		Boring No.
Hydraulic 140 lb Hammer		
30" stroke		**EA 116D**
Sampling Method: 1 1/2" split spoon		
sampler		Sheet 4 of 5

			Start	Drilling Date/Times	Finish
Drilling Water Level	19.5' BG		6/8/00		6/12/00
Date	6/8/00		0730 hrs		1700 hrs
Time	0842 hrs				
Surface Conditions:	woodland/humus				

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs		USCS Log	SOIL DESCRIPTION	COMMENTS
						60				
						61				
						62				
	24 24	63	63-65	0.0 HS	3 3	63			Silty clay, dark gray; wet	
					3 4	64				
						65				
						66				
						67				
	24 8	68	38-70	0.0 HS	3 4	68			F-M gravel < 1" dia. with trace silt, clay, F-C sand, dark gray; wet. Gravel is subrounded-subangular.	
					5 5	69				
						70				
						71				
						72				
	24 8	73	73-75	0.0 HS	5 5	73			Same as 68-70' BGS	
					5 6	74				
						75				
						76				
						77				
	24 8	78	78-80	0.0 HS	4 5	78			Silty VF-C sandy clay with trace fine gravel < 1/2" dia., subrounded-subangular, dark gray; wet	
					5 6	79				

Logged by: Jeff Norberg Date: 6/8/00

Drilling Contractor: DRAGIN Drilling Driller: George Henner

WELL SPECIFICATIONS:

Diam. of Riser:	2" PVC	Screen Interval:	75.2-85.2 ft bgs	Sandpack:	73-85.2 ft bgs	Grout:	71 ft bgs to grade
Bottom of Hole:	94 ft bgs	Riser Interval:	1.56 ft ags to 75.2 ft bgs	Bentonite:	71-73 ft bgs	Cover:	4 in. locking steel

EA Engineering, Science, and Technology, Inc.

LOG OF SOIL BORING

Coordinates:	N: 195368 E: 519431
Surface Elevation:	43.95 FT MSL
Well Riser Elevation:	45.51 FT MSL

Job. No. 60957.56	Client: USACE-NED North Kingstown,RI	Location: Former PR-58 Nike Site
Drilling Method: CME 1050 Hydraulic 140 lb Hammer 30" stroke		Boring No. **EA 116D**
Sampling Method: 1 1/2" split spoon sampler		Sheet 5 of 5
Drilling Water Level: 19.5' BG; Date: 6/8/00; Time: 0842 hrs		Start 6/8/00 0730 hrs; Drilling Date/Times; Finish 6/12/00 1700 hrs
Surface Conditions: woodland/humus		

Sample Type	Inches Driven/In. Recvrd	Dpth Csg.	Samp # / depth (ft)	PID (ppm) Above bk.	Blows per 6"	Ft bgs	USCS Log	SOIL DESCRIPTION	COMMENTS
						80			
						81			
						82			
	24 16	83	83-85		3 5	83		0"-4" same as 78-80' BGS 4"-16" silty F-C sand with trace clay and fine gravel, very dark gray; wet	
					6 4	84			
						85			
						86		Auger refusal 86' BGS	Begin 1350hrs. 12' of sand heaved up into
						87		30' of heaving sand in HSA casing on morning of 6/9/00	HSA. Drillers setup to rollerbit sand from
						88			HSA pipe and remove with 3" dia. sampler.
						89			30' of heaving sand in
						90		Rollerbit 86-89' BGS 6/9/00 Core 89-94' BGS	HSA casing on morning of 6/9/00
						91			Lost ~ 250 gallons
						92			of water in boring ~ 85 BGS
						93			
						94			
						95			
						96			
						97			
						98			
						99			

Logged by: Jeff Norberg Date: 6/8/00

Drilling Contractor: DRAGIN Drilling Driller: George Henner

WELL SPECIFICATIONS:

Diam. of Riser: 2" PVC Screen Interval: 75.2-85.2 ft bgs Sandpack: 73-85.2 ft bgs Grout: 71 ft bgs to grade

Depth of Hole: 94 ft bgs Riser Interval: 1.56 ft ags to 75.2 ft bgs Bentonite: 71-73 ft bgs Cover: 4 in. locking steel

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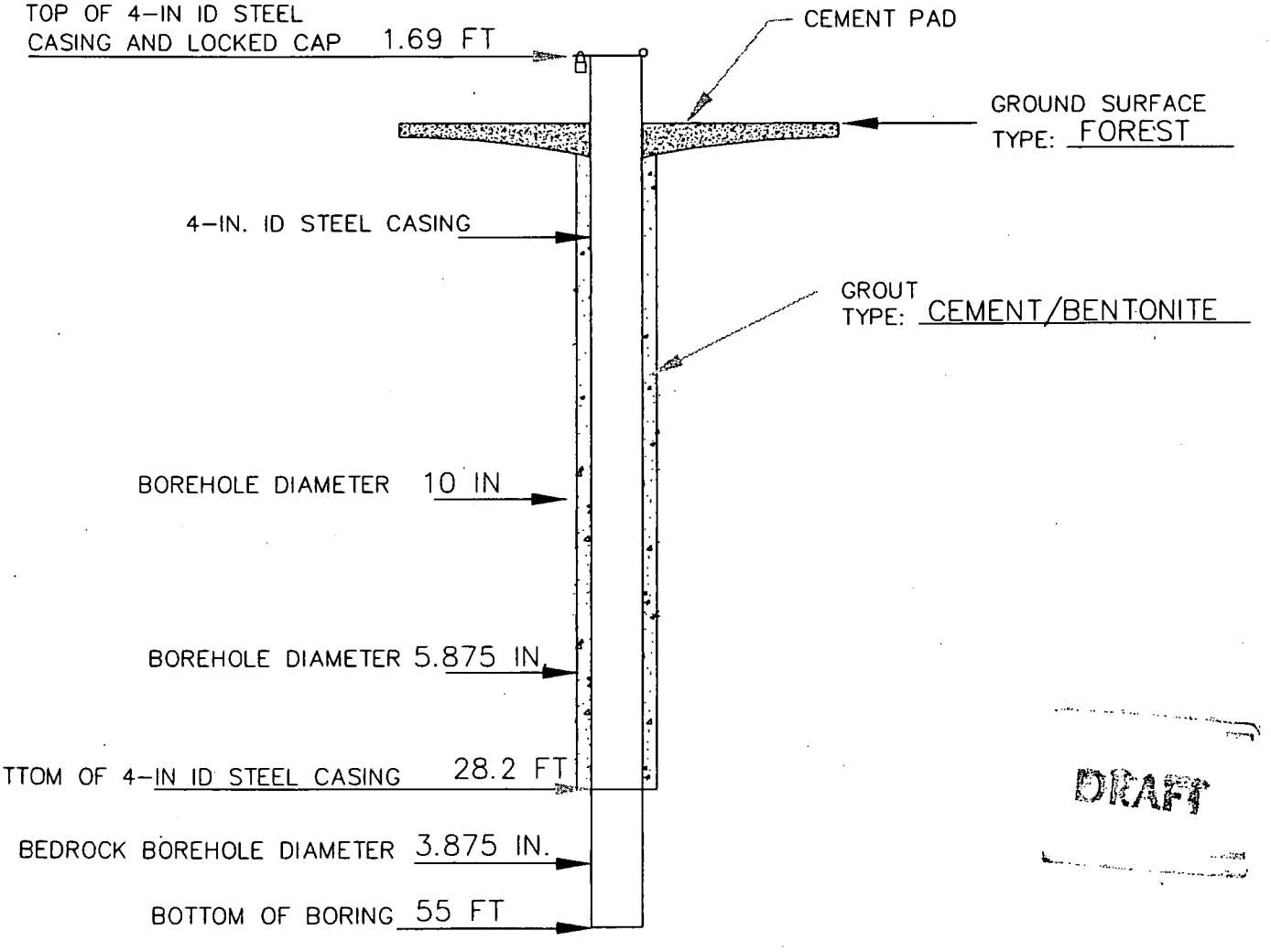
MONITORING WELL CONSTRUCTION

MW03-11R

CLIENT/SITE NAME: USACE-NED/NIKE PR-58 SITE	
DATE INSTALLED: 7/6/00	PROJECT No. 60957.56.0007
ELEVATION OF GROUND SURFACE: 29.58 MSL ELEVATION TOP OF WELL RISER: 31.27 MSL	COORDINATES: N: 193700.84 E: 519074.15
DEPTH TO WATER: 9.82 (BELOW TOP OF RISER) DATE/TIME 7/26/00 1359	EA INSPECTOR: R. CLARK
DRILLING METHOD & DEPTH: 6.25 IN. ID HOLLOW STEM AUGER TO 25 FT 5.875-IN. ID ROLLERBIT TO 28.2 FT 3.875-IN. ID ROLLERBIT TO 55 FT	



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MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

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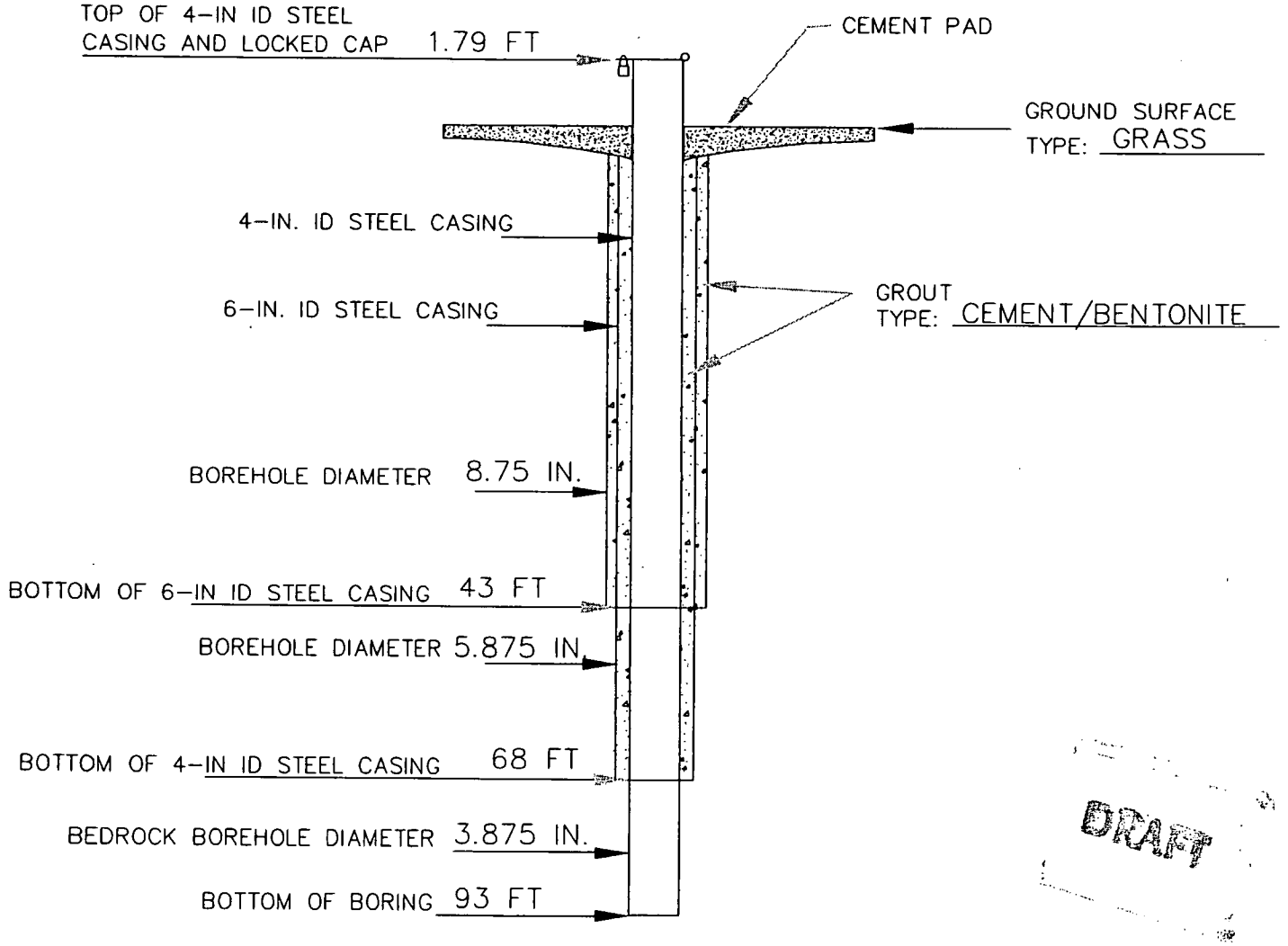
MONITORING WELL CONSTRUCTION

MW03-14R2

CLIENT/SITE NAME: USACE-NED/NIKE PR-58 SITE	
DATE INSTALLED: 6/16/00	PROJECT No. 60957.56.0007
ELEVATION OF GROUND SURFACE: 31.86 MSL ELEVATION TOP OF WELL RISER: 33.65 MSL	COORDINATES: N: 194274.97 E: 518491.86
DEPTH TO WATER: 10.72 (BELOW TOP OF RISER) DATE/TIME 7/26/00 1229	EA INSPECTOR: R. CLARK
DRILLING METHOD & DEPTH: 8.75-IN. ID ROLLERBIT TO 43 FT 5.875-IN. ID ROLLERBIT TO 68 FT NW CORE BARREL TO 93 FT	



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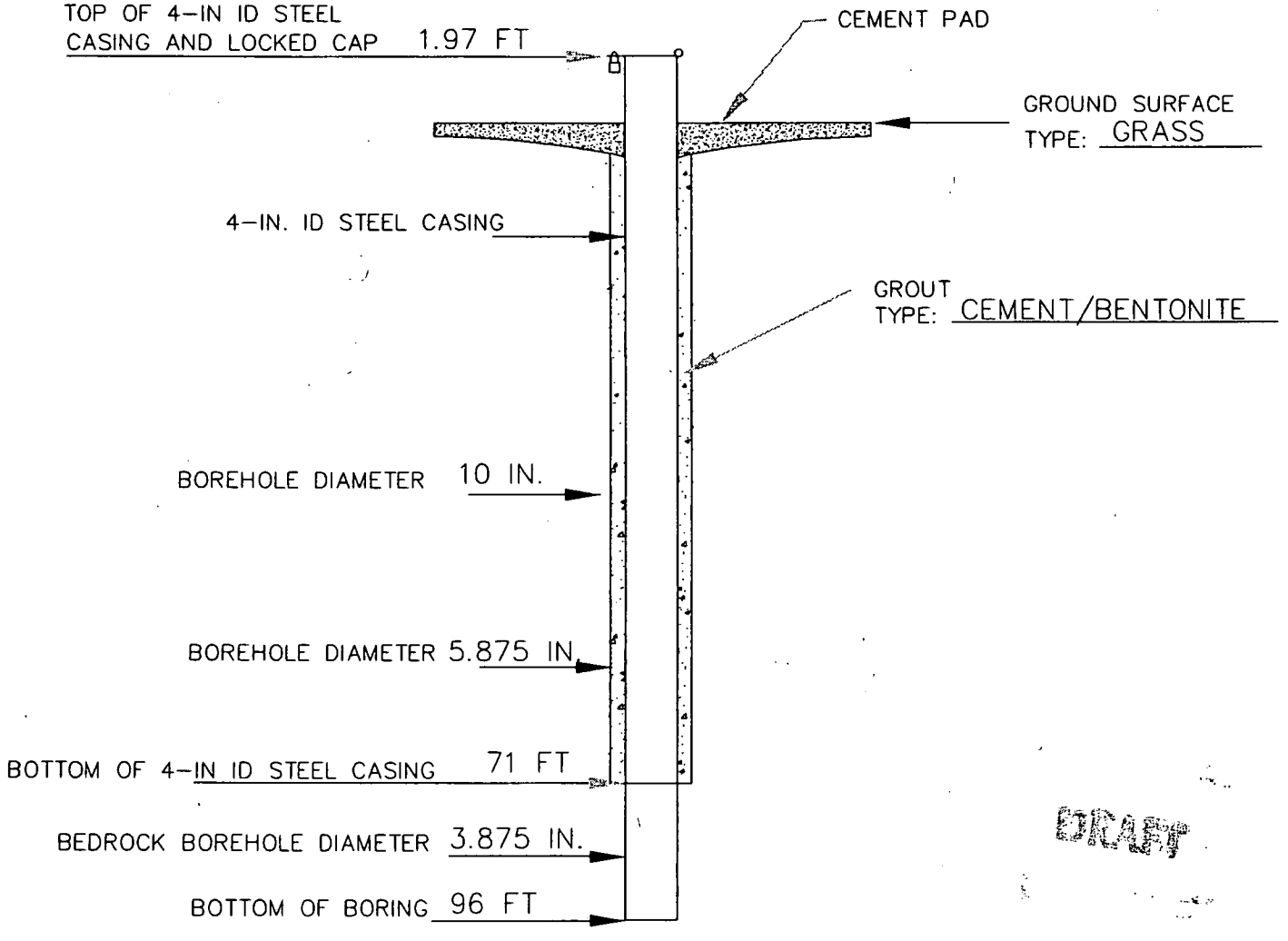
MONITORING WELL CONSTRUCTION

EA-104R

CLIENT/SITE NAME: USACE-NED/NIKE PR-58 SITE	
DATE INSTALLED: 7/6/00	PROJECT No. 60957.56.0007
ELEVATION OF GROUND SURFACE: 35.87 MSL ELEVATION TOP OF WELL RISER: 37.84 MSL	COORDINATES: N: 194707.91 E: 518826.54
DEPTH TO WATER: 14.83 (BELOW TOP OF RISER) DATE/TIME 7/26/00 1332	EA INSPECTOR: R. CLARK
DRILLING METHOD & DEPTH: 6.25 IN. ID HOLLOW STEM AUGER TO 62 FT 5.875-IN. ID ROLLERBIT TO 71 FT 3.875-IN. ID ROLLERBIT TO 96 FT	



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(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

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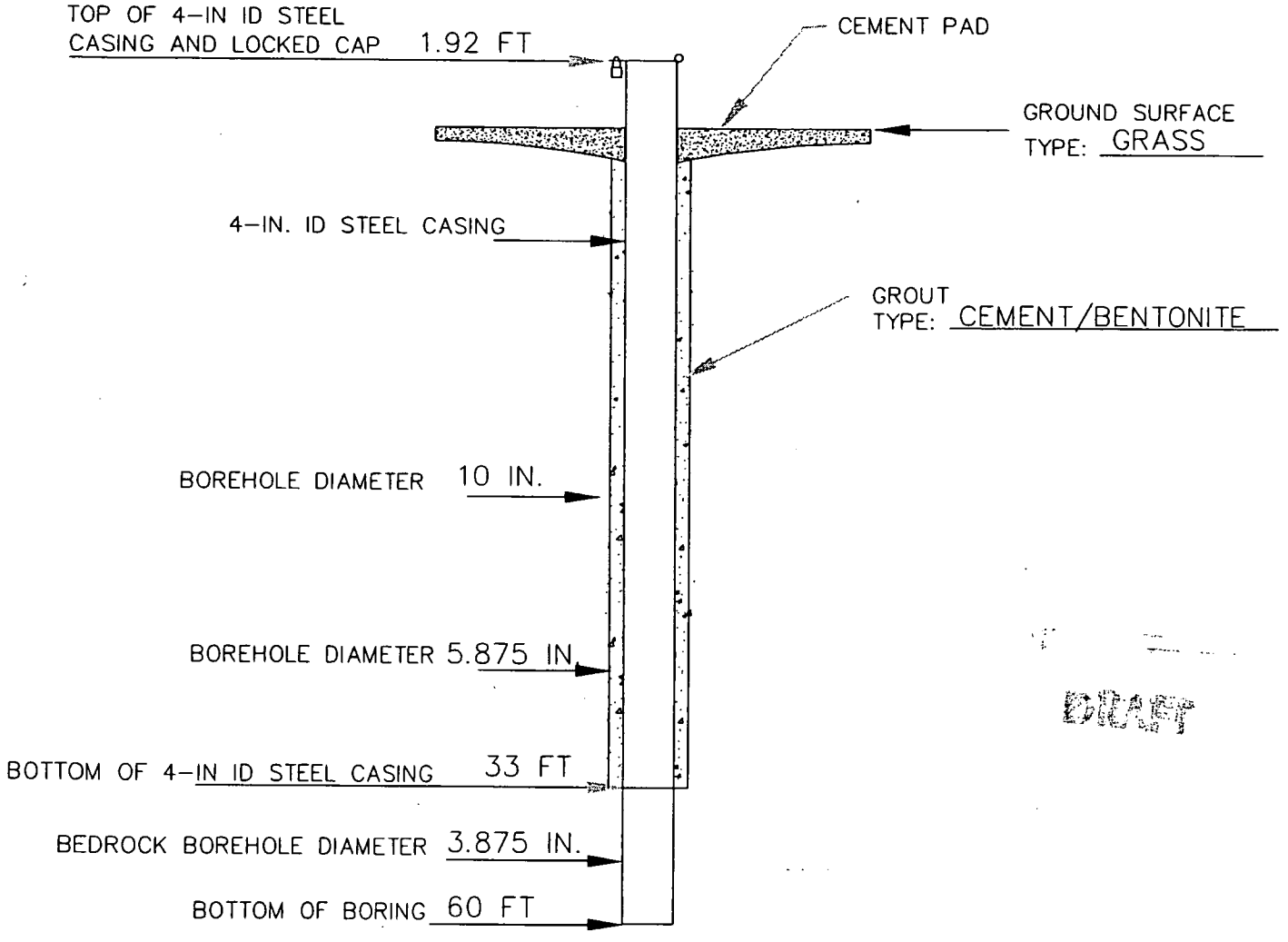
MONITORING WELL CONSTRUCTION

EA-105R

CLIENT/SITE NAME: USACE-NED/NIKE PR-58 SITE	
DATE INSTALLED: 7/7/00	PROJECT No. 60957.56.0007
ELEVATION OF GROUND SURFACE: 29.53 MSL ELEVATION TOP OF WELL RISER: 31.45 MSL	COORDINATES: N: 194180.03 E: 517791.97
DEPTH TO WATER: 9.55 (BELOW TOP OF RISER) DATE/TIME 7/26/00 1026	EA INSPECTOR: R. CLARK
DRILLING METHOD & DEPTH: 6.25 IN. ID HOLLOW STEM AUGER TO 31 FT 5.875-IN. ID ROLLERBIT TO 33.5 FT 3.875-IN. ID ROLLERBIT TO 60 FT	



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(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

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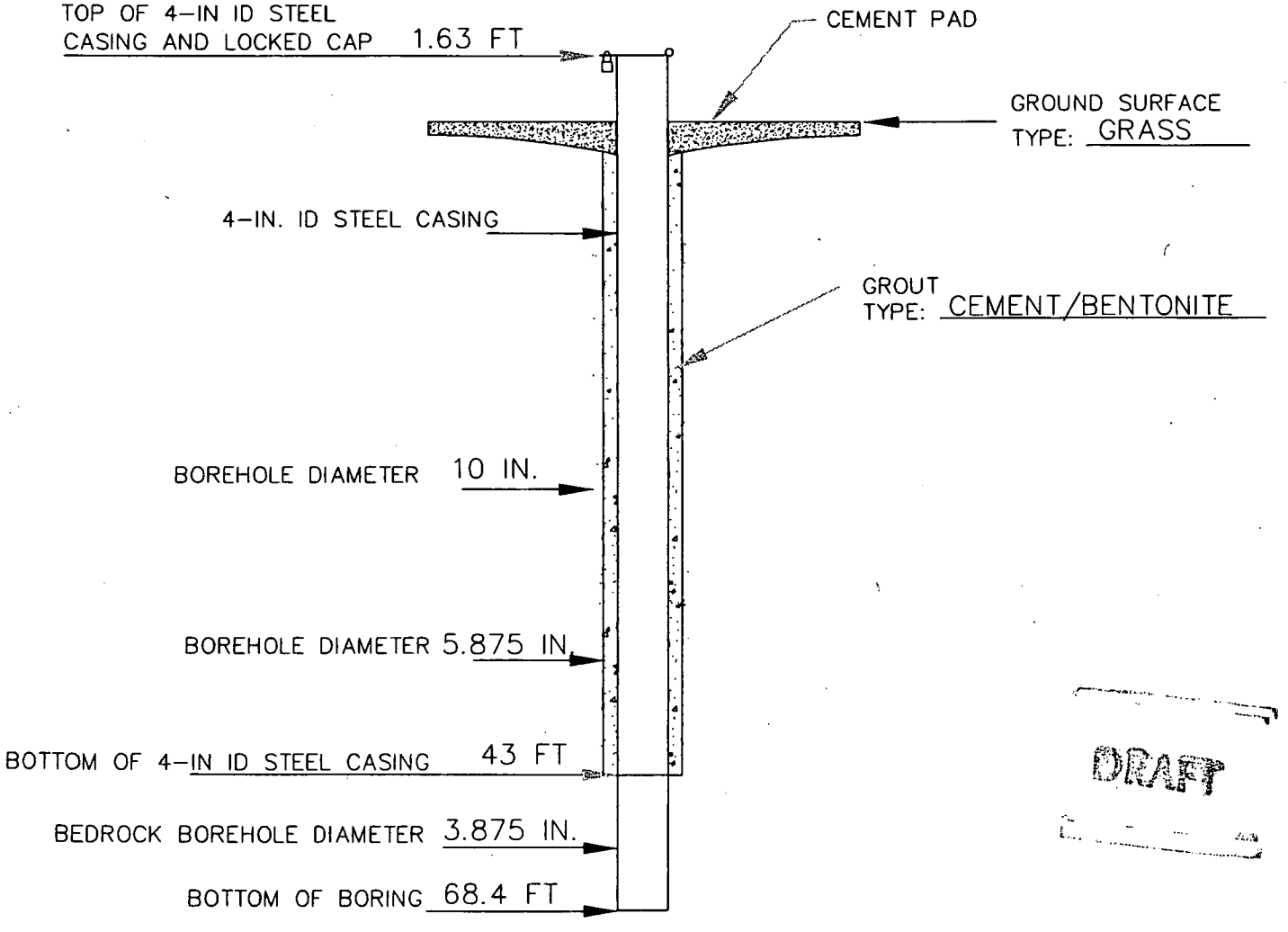
MONITORING WELL CONSTRUCTION

EA-107R

CLIENT/SITE NAME: USACE-NED/NIKE PR-58 SITE	
DATE INSTALLED: 6/23/00	PROJECT No. 60957.56.0007
ELEVATION OF GROUND SURFACE: 29.05 MSL ELEVATION TOP OF WELL RISER: 30.68 MSL	COORDINATES: N: 193890.33 E: 517681.95
DEPTH TO WATER: 37.53 (BELOW TOP OF RISER) DATE/TIME 1020	EA INSPECTOR: S. WHITIN / R. CLARK
DRILLING METHOD & DEPTH: 6.25 IN. ID HOLLOW STEM AUGER TO 33 FT 5.875-IN. ID ROLLERBIT TO 43 FT 3.875-IN. ID ROLLERBIT TO 68.4 FT	



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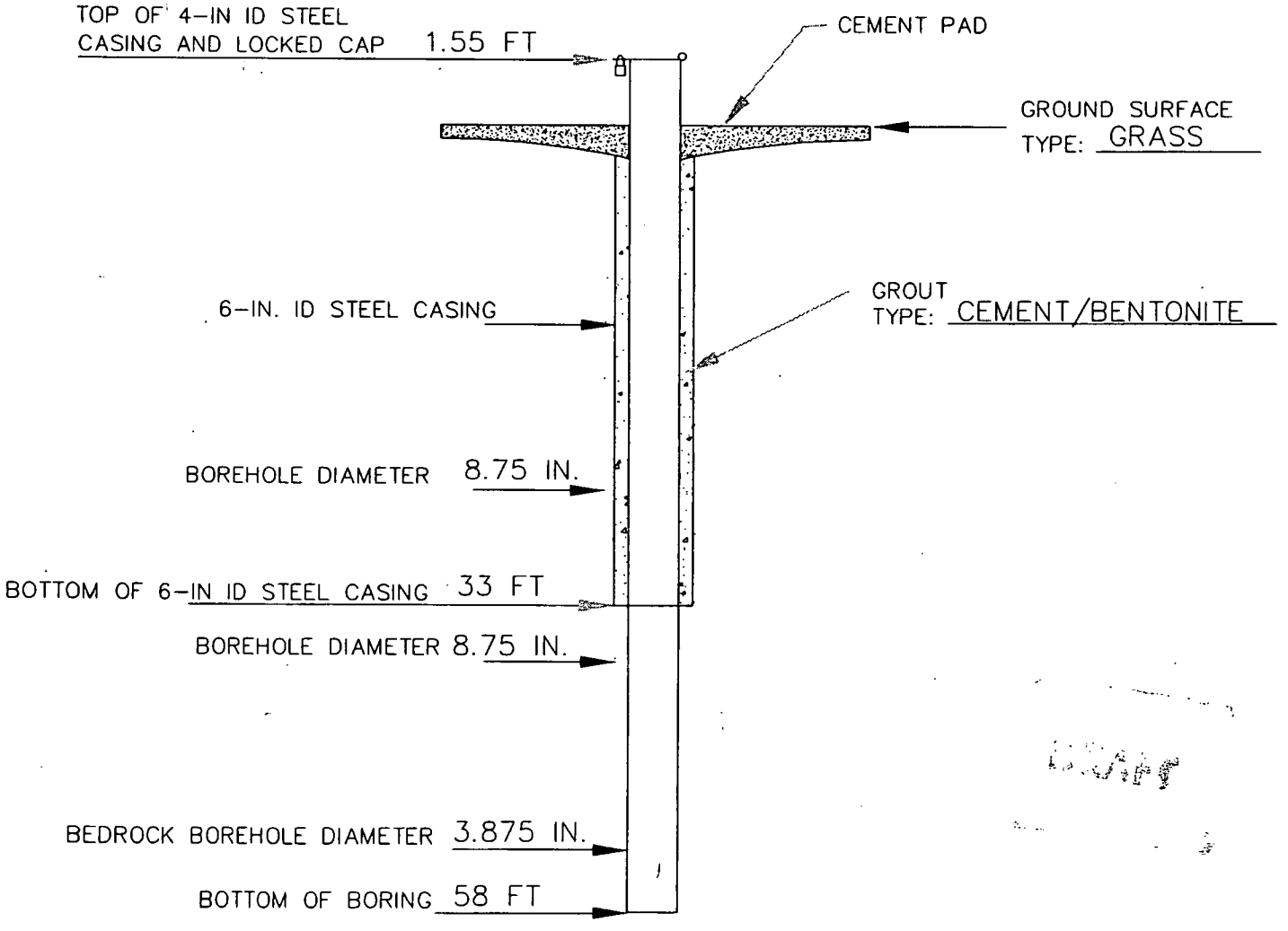
MONITORING WELL CONSTRUCTION

EA-108R

CLIENT/SITE NAME: USACE-NED/NIKE PR-58 SITE	
DATE INSTALLED: 6/21/00	PROJECT No. 60957.56.0007
ELEVATION OF GROUND SURFACE: 31.56 MSL ELEVATION TOP OF WELL RISER: 33.11 MSL	COORDINATES: N: 193743.21 E: 518126.84
DEPTH TO WATER: 10.34 (BELOW TOP OF RISER) DATE/TIME 7/26/00 1034	EA INSPECTOR: T. BIOLSI/ R. CLARK
DRILLING METHOD & DEPTH: 8.75-IN. ID ROLLERBIT TO 33 FT 3.875-IN. ID ROLLERBIT TO 58 FT	



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(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

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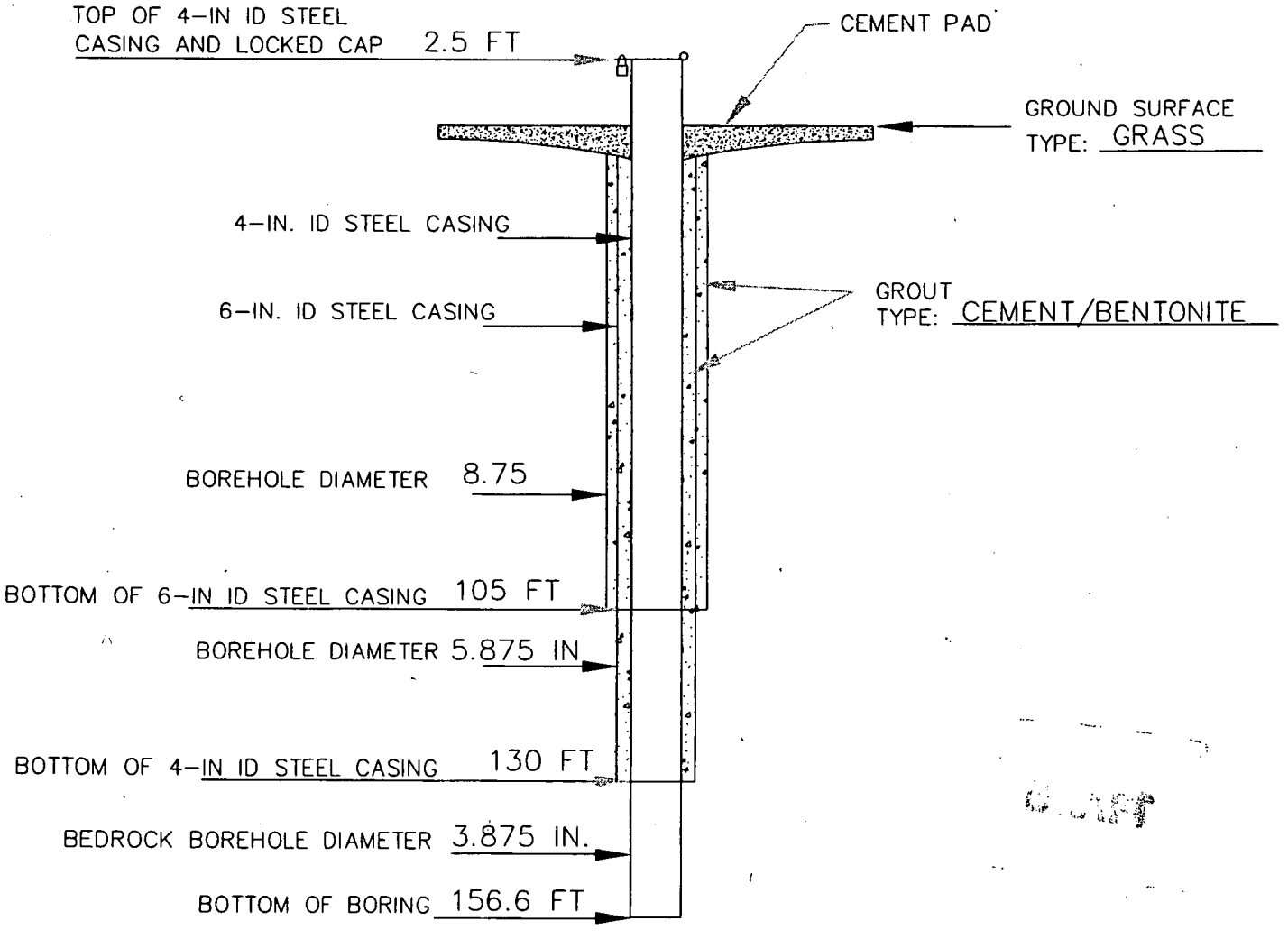
MONITORING WELL CONSTRUCTION

EA-112R2

CLIENT/SITE NAME: USACE-NED/NIKE PR-58 SITE	
DATE INSTALLED: 6/26/00	PROJECT No. 60957.56.0007
ELEVATION OF GROUND SURFACE: 45.24 MSL ELEVATION TOP OF WELL RISER: 46.84 MSL	COORDINATES: N: 195317.44 E: 519187.76
DEPTH TO WATER: 24.29 (BELOW TOP OF RISER) DATE/TIME 7/26/00 1310	EA INSPECTOR: T. BIOLSI
DRILLING METHOD & DEPTH: 8.75-IN. ID ROLLERBIT TO 105 FT 5.875-IN. ID ROLLERBIT TO 130 FT 3.875-IN. ID ROLLERBIT TO 156.6 FT	



MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

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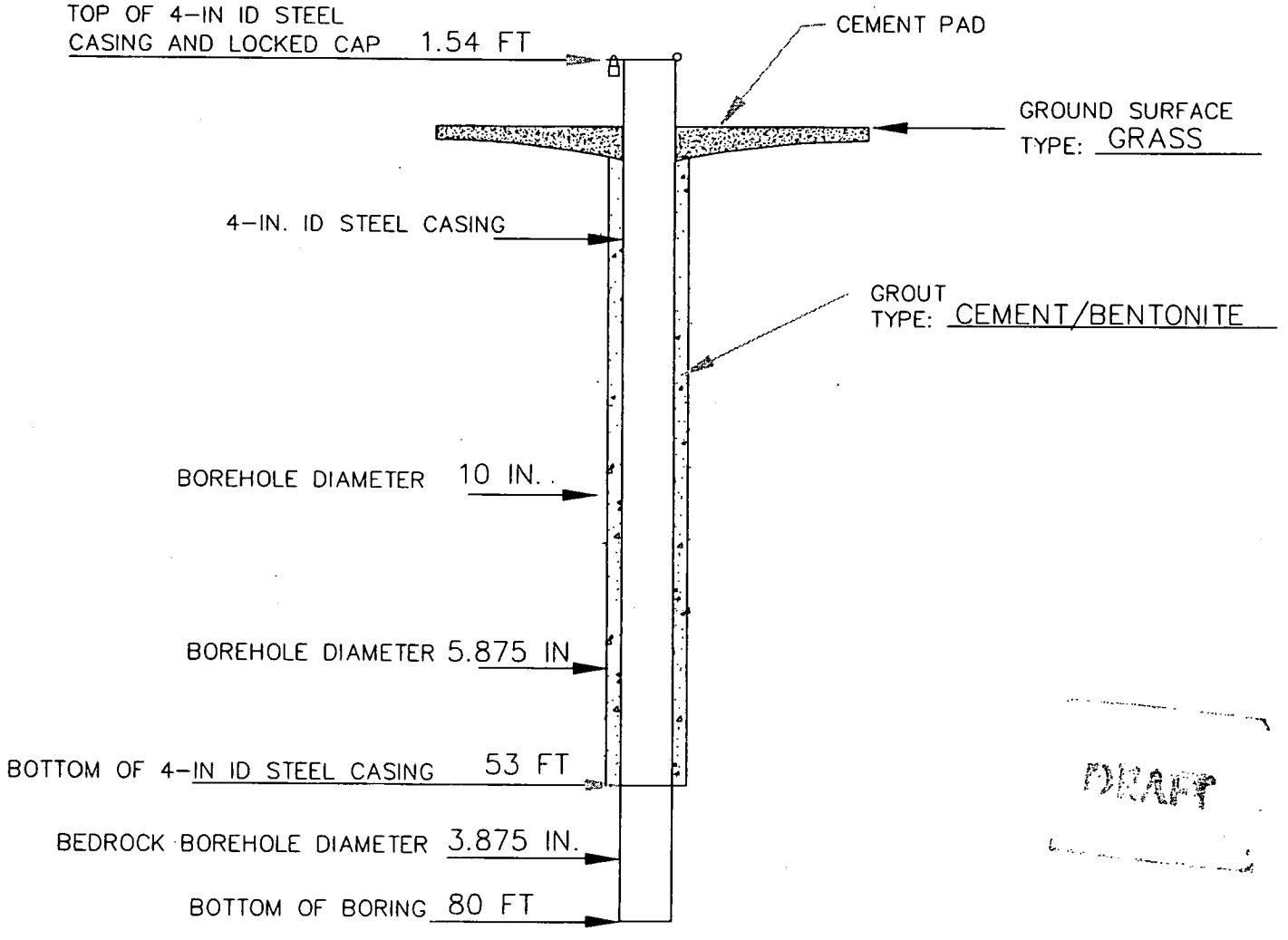
MONITORING WELL CONSTRUCTION

EA-113R

CLIENT/SITE NAME: USACE-NED/NIKE PR-58 SITE	
DATE INSTALLED: 7/7/00	PROJECT No. 60957.56.0007
ELEVATION OF GROUND SURFACE: 27.77 MSL ELEVATION TOP OF WELL RISER: 29.61 MSL	COORDINATES: N: 195132.44 E: 518635.25
DEPTH TO WATER: 6.42 (BELOW TOP OF RISER) DATE/TIME 7/26/00 1249	EA INSPECTOR: R. CLARK
DRILLING METHOD & DEPTH: 6.25 IN. ID HOLLOW STEM AUGER TO 45 FT 5.875-IN. ID ROLLERBIT TO 55 FT 3.875-IN. ID ROLLERBIT TO 80 FT	



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MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

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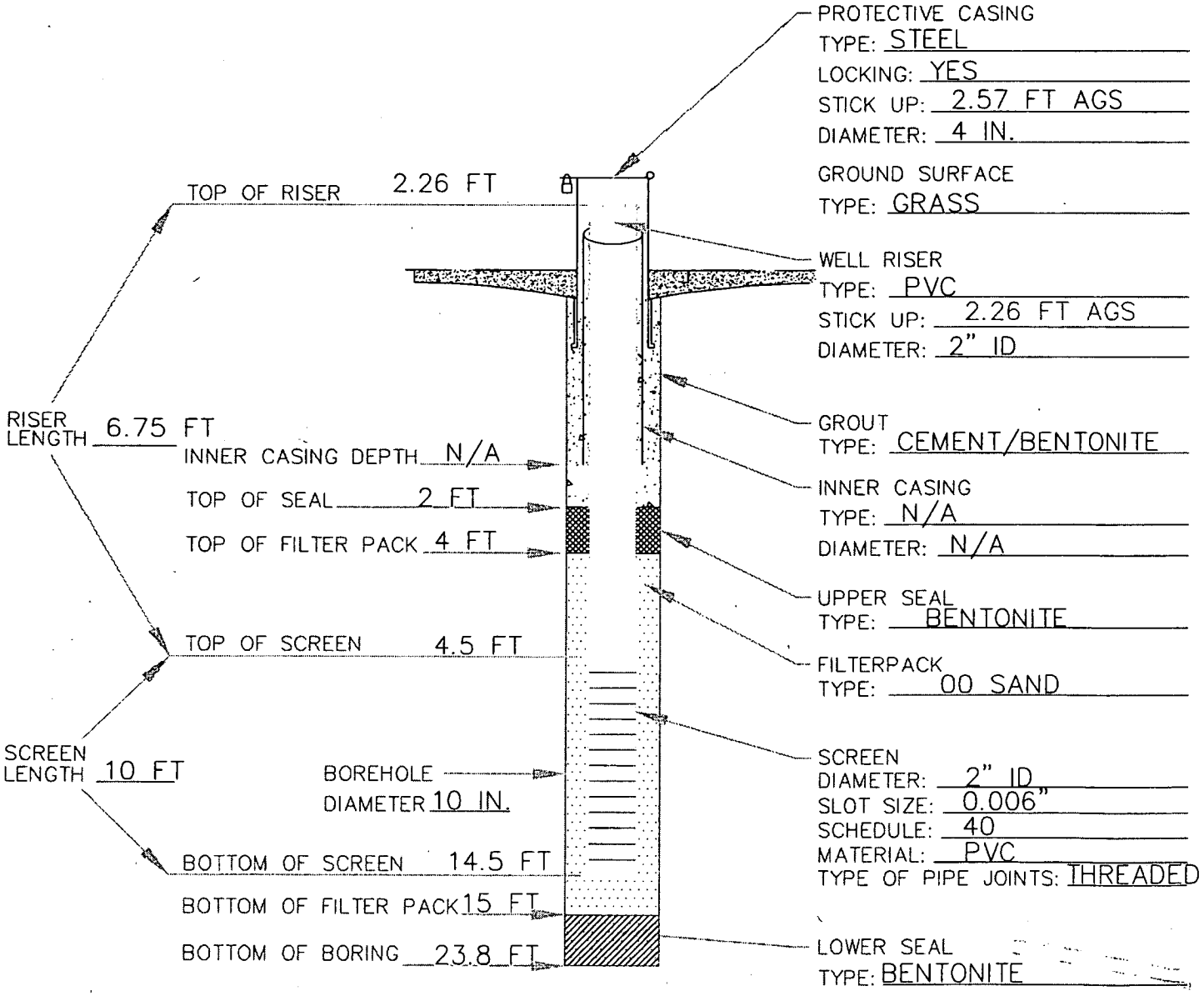
MONITORING WELL CONSTRUCTION

EA-114D

CLIENT/SITE NAME: USACE-NED/NIKE PR-58 SITE	
DATE INSTALLED: 6/2/00	PROJECT No. 6095756.0007
ELEVATION OF GROUND SURFACE: 29.77 MSL ELEVATION TOP OF WELL RISER: 32.34 MSL	COORDINATES: N: 193858.82 E: 518382.86
DEPTH TO WATER: 9.25 (BELOW TOP OF RISER) DATE/TIME 7/26/00 1050	EA INSPECTOR: J. NORBERG
DRILLING METHOD & DEPTH: 6.25 IN. ID HOLLOW STEM AUGER TO 14.5 FT 3.875-IN. ID ROLLERBIT TO 17.5 FT HX CORE TO 23.8 FT	



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MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

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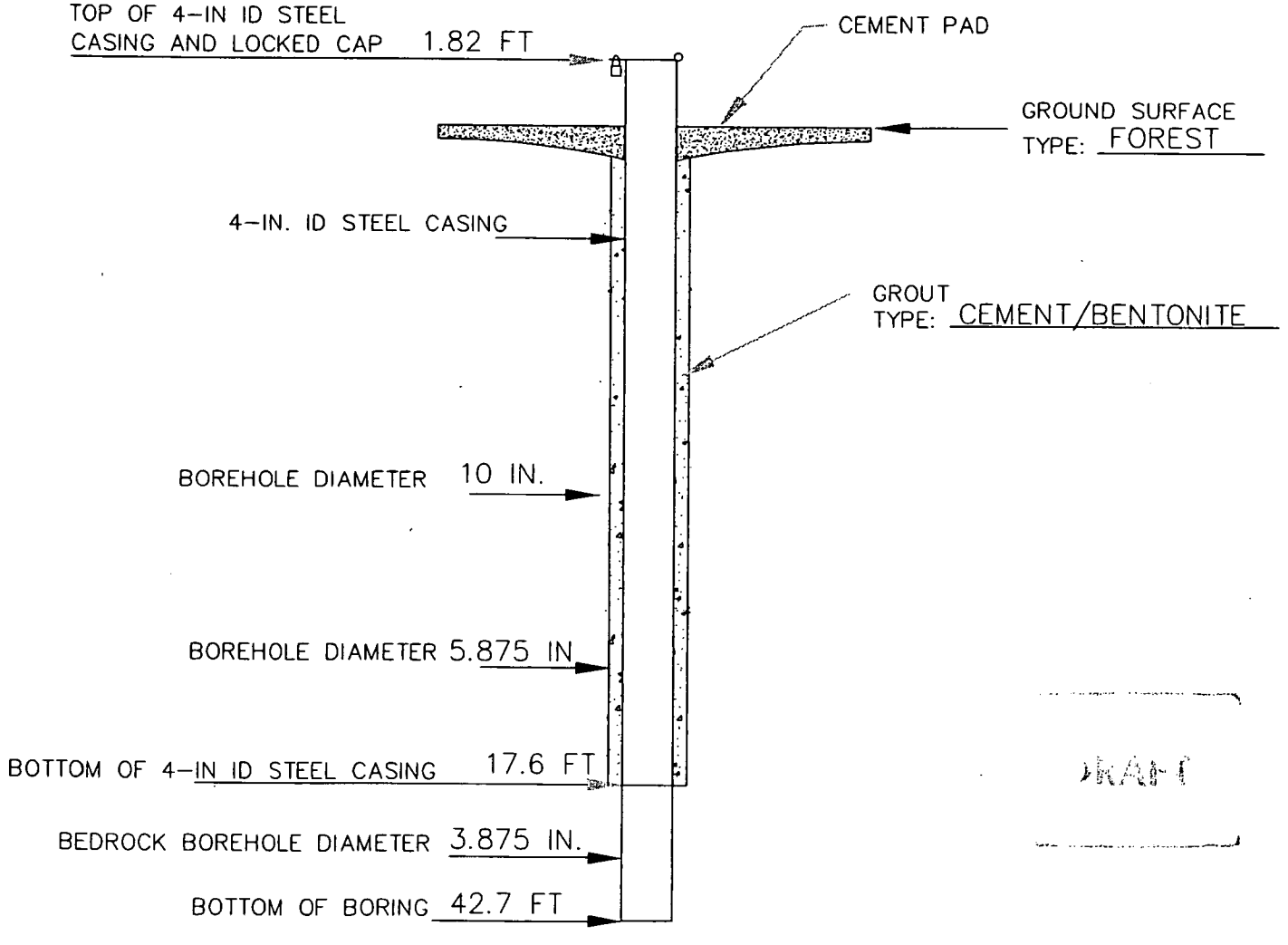
MONITORING WELL CONSTRUCTION

EA-114R

CLIENT/SITE NAME: USACE-NED/NIKE PR-58 SITE	
DATE INSTALLED: 6/19/00	PROJECT No. 60957.56.0007
ELEVATION OF GROUND SURFACE: 30.14 MSL ELEVATION TOP OF WELL RISER: 31.96 MSL	COORDINATES: N: 193849.66 E: 518369.76
DEPTH TO WATER: 9.15 (BELOW TOP OF RISER) DATE/TIME 7/28/00 1458	EA INSPECTOR: R. CLARK
DRILLING METHOD & DEPTH: 6.25 IN. ID HOLLOW STEM AUGER TO 14 FT 5.875-IN. ID ROLLERBIT TO 17.6 FT HQ COREBARREL TO 42.7 FT	



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MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

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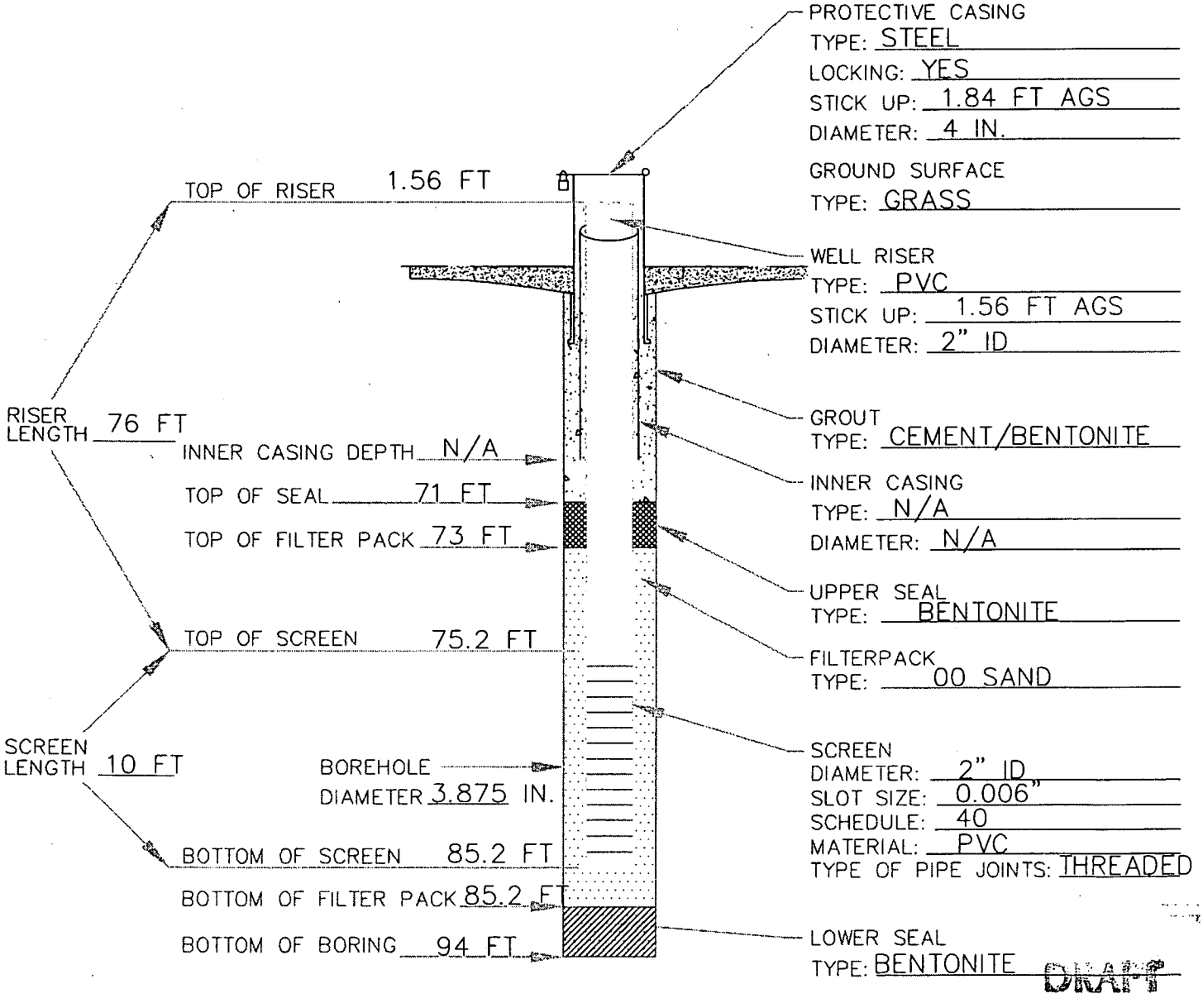
MONITORING WELL CONSTRUCTION

EA-116D

CLIENT/SITE NAME: USACE-NED/NIKE PR-58 SITE	
DATE INSTALLED: 6/12/00	PROJECT No. 6095756.0007
ELEVATION OF GROUND SURFACE: 43.95 MSL ELEVATION TOP OF WELL RISER: 45.79 MSL	COORDINATES: N: 195368.47 E: 519431.78
DEPTH TO WATER: 23.64 (BELOW TOP OF RISER) DATE/TIME 7/26/00 1259	EA INSPECTOR: J. NORBERG
DRILLING METHOD & DEPTH: 6.25 IN. ID HOLLOW STEM AUGER TO 86 FT 3.875-IN. ID ROLLERBIT TO 89 FT HX CORE TO 94 FT	



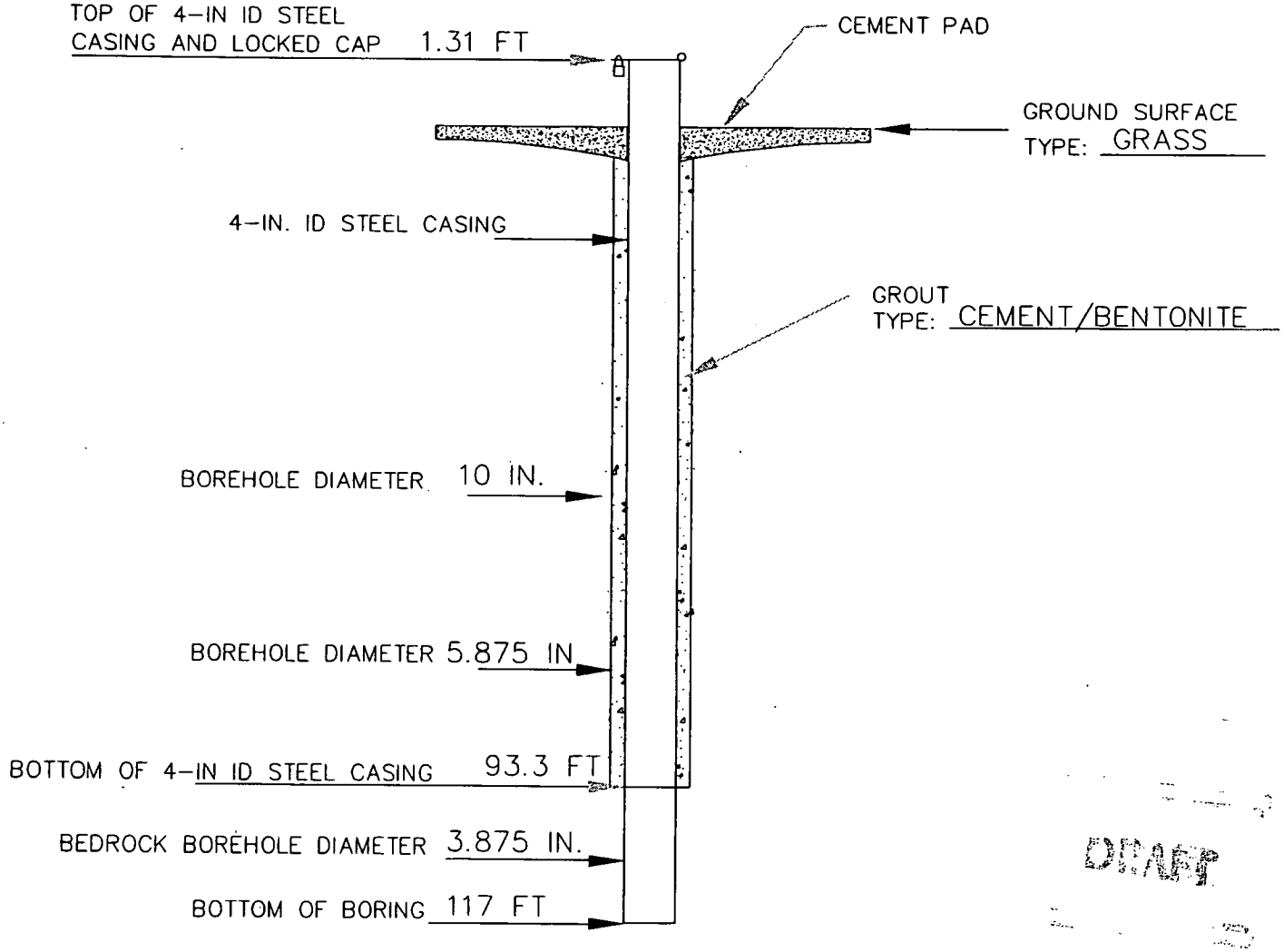
MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

MONITORING WELL CONSTRUCTION

EA-116R

CLIENT/SITE NAME: USACE-NED/NIKE PR-58 SITE	
DATE INSTALLED: 6/22/00	PROJECT No. 60957.56.0007
ELEVATION OF GROUND SURFACE: 43.14 MSL ELEVATION TOP OF WELL RISER: 44.45 MSL	COORDINATES: N: 195386.41 E: 519433.07
DEPTH TO WATER: 22.59 (BELOW TOP OF RISER) DATE/TIME 7/28/00 1442	EA INSPECTOR: J. NORBERG
DRILLING METHOD & DEPTH: 6.25 IN. ID HOLLOW STEM AUGER TO 87 FT 5.875-IN. ID ROLLERBIT TO 90.3 FT 3.875-IN. ID ROLLERBIT TO 117 FT	



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MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

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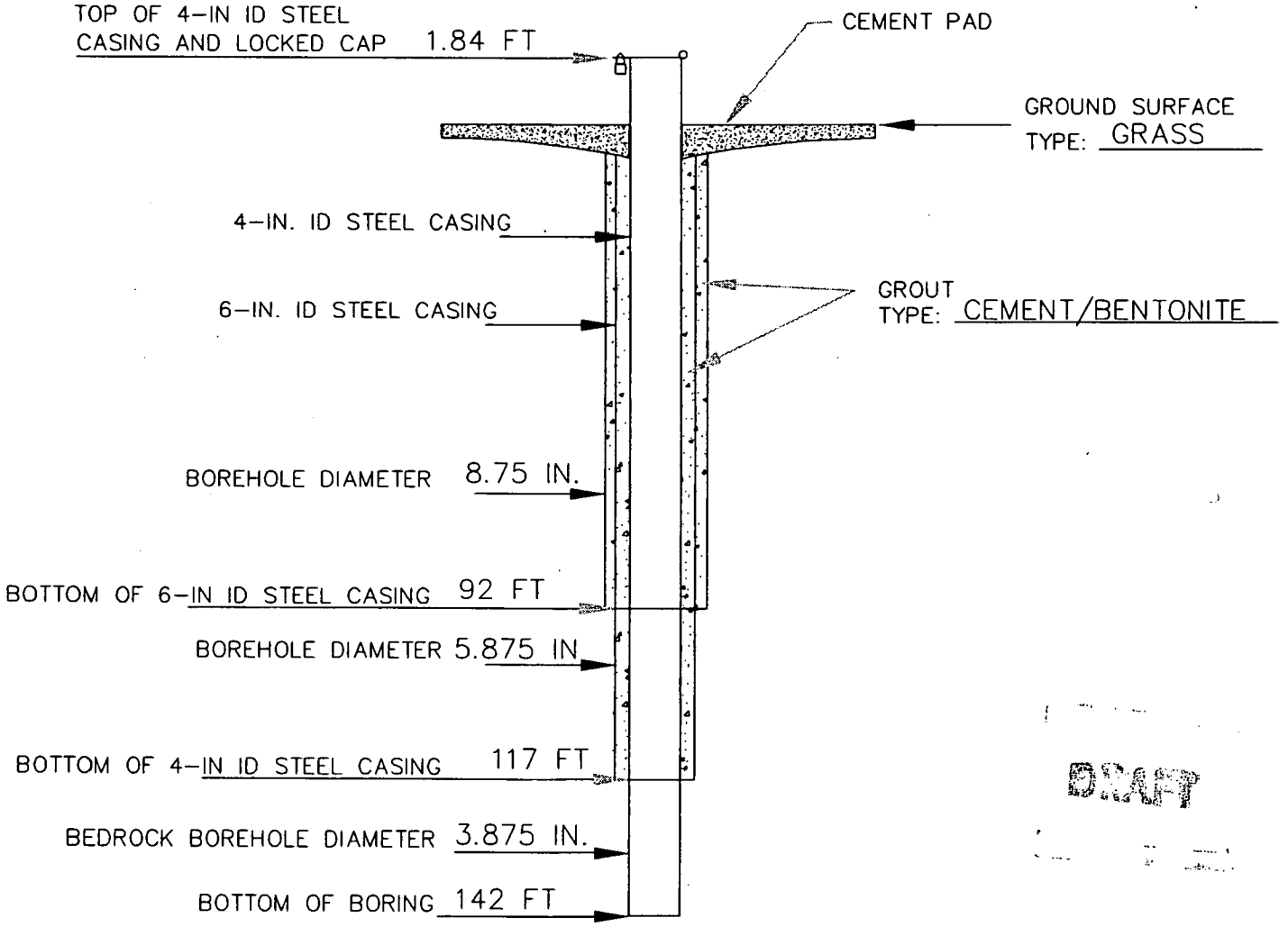
MONITORING WELL CONSTRUCTION

EA-116R2

CLIENT/SITE NAME: USACE-NED/NIKE PR-58 SITE	
DATE INSTALLED: 6/26/00	PROJECT No. 60957.56.0007
ELEVATION OF GROUND SURFACE: 44.04 MSL ELEVATION TOP OF WELL RISER: 45.88 MSL	COORDINATES: N: 195374.82 E: 519425.62
DEPTH TO WATER: 24.21 (BELOW TOP OF RISER) DATE/TIME 7/26/00 1300	EA INSPECTOR: T. BIOLSI/ S. WHITIN
DRILLING METHOD & DEPTH: 8.75-IN. ID ROLLERBIT TO 92 FT 5.875-IN. ID ROLLERBIT TO 117 FT 3.875-IN. ID ROLLERBIT TO 142 FT	



DRAFT

MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA® EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 194866 E: 519764
Surface Elevation: 41.88 ft MSL
Well Riser Elevation: 44.25 ft MSL

Job. No.	Client:	Location:
29600.96	NORDIV/NAVFAC	Site 03 NCBC Davisville, North Kingstown, RI

Drilling Method: 3.875 in. rollerbit, drive and wash

Boring No. **MW01-10R**

Core Barrel used:

Sheet 1 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	07/14/2000 0945	07/14/2000 1400

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
					85		500 psi hydraulic down pressure, 3rd gear		2:55	85-86
					86		Same as above		5:45	86-87
					87		Same as above		6:00	87-88
					88		Same as above		2:50	88-89
					89		Same as above		2:50	89-90
					90		Same as above		2:35	90-91
					91		Same as above		2:55	91-92
					92		Same as above		2:30	92-93
					93		Same as above		2:50	93-94
							fractured at 93.5 ft			
					94		Same as above		1:20	94-95
					95		Same as above		2:30	95-96
							soft and/or fractured at ~95.8-96 ft			
					96		Same as above		4:40	96-97
							harder rock at 96-96.8 ft, softer at 96.8 to 98 ft			
					97		Same as above		2:05	97-98
					98		Same as above		3:15	98-99
					99					
					100		Same as above		3:35	100-101
					101		Same as above		7:10	101-102
					102		Same as above		8:00	102-103
					103		Same as above		6:55	103-104

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: Brett Swiateh

Draft

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 194866 E: 519764
Surface Elevation: 41.88 ft MSL
Well Riser Elevation: 44.25 ft MSL

Job. No. 29600.96	Client: NORDIV/NAVFAC	Location: Site 03 NCBC Davisville, North Kingstown, RI
Drilling Method: 3.875 in. rollerbit, drive and wash		Boring No. **MW01-10R**
Core Barrel used:		Sheet 2 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	
Start	Finish
07/14/2000 0945	07/14/2000 1400

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
					104		Same as above		4:40	104-105
					105		Same as above		4:30	105-106
					106		Same as above		5:00	106-107
					107		Same as above		5:45	107-108
					108		Same as above		8:05	108-109
					109		Same as above		3:15	109-110
					110		Same as above softer rock at 110 ft, possibly fractured		8:20	110-111
							rig chattering			
					111		Same as above		5:25	111-112
							fractured rock 111-111.5 ft			
					112		Same as above		3:30	112-113
					113		Same as above		1:10	113-114
					114		Same as above		2:35	114-115
					115		bottom of boring 115 ft			
					116					

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: Brett Swiateh

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 194994 E: 521371
Surface Elevation: 24.70 ft MSL
Well Riser Elevation: 26.74 ft MSL

Job. No.	Client:	Location:
29600.96	NORDIV/NAVFAC	Site 03 NCBC Davisville, North Kingstown, RI

Drilling Method: 3.875 in. rollerbit, drive and wash

Boring No. **MW01-13R**

Core Barrel used:

Sheet 1 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	07/14/2000 1600	07/17/2000 1030

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	DRILLING LOG Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
					78		550 psi hydraulic down pressure, 3rd gear		5:40	78-79
					79		Same as above		3:40	79-80
					80		Same as above		2:40	80-81
					81					
					82		Same as above		2:50	82-83
					83					
					84					
					85		Same as above		3:55	85-86
					86		Same as above		5:05	86-87
					87		decreased pressure to 450 psi		7:30	87-88
					88		Same as above		9:50	88-89
					89		Same as above		6:50	89-90
					90		Same as above		6:00	90-91
					91		Same as above		4:15	91-92
							fracture at ~91.8 ft			
					92		Same as above		10:20	92-93
					93		Same as above		6:40	93-94
					94		Same as above		5:30	94-95
					95		Same as above		4:45	95-96
							fractured rock from 91.5 - 100 ft			
					96		Same as above		8:00	96-97

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: Brett Swiateh

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EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 194994 E: 521371
Surface Elevation: 24.70 ft MSL
Well Riser Elevation: 26.74 ft MSL

Job. No.	Client:	Location:
29600.96	NORDIV/NAVFAC	Site 03 NCBC Davisville, North Kingstown, RI

Drilling Method: 3.875 in. rollerbit, drive and wash

Boring No. **MW01-13R**

Core Barrel used:

Sheet 2 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	07/14/2000 1600	07/17/2000 1030

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	DRILLING LOG Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
					97		Same as above		10:15	97-98
					98		Same as above		7:00	98-99
					99		Same as above		12:05	99-100
							fracture from 99.5 to 100 ft			
					100		Same as above		6:05	100-101
					101		Same as above		8:30	101-102
					102		Same as above		11:45	102-103
					103		Same as above		7:15	103-104
					104		Same as above		8:30	104-105
					105		bottom of boring 105 ft			

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: Brett Swiateh

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EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 194379 E: 521036
Surface Elevation: 39.33 ft MSL
Well Riser Elevation: 41.41 ft MSL

Job. No.	Client:	Location:
29600.96	NORDIV/NAVFAC	Site 03 NCBC Davisville, North Kingstown, RI

Drilling Method: 3.875 in. air hammer

Boring No. **MW02-03R**

Core Barrel used:

Sheet 1 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	07/19/2000 1000	07/19/2000 1400

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Depth Filling in feet	Graphic Log	COMMENTS	Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
				46		200 psi hydraulic down pressure, 3rd gear		3:30	46-47
				47		Same as above		4:20	47-48
				48		decreased pressure to 150 psi		4:30	48-49
				49		Same as above		4:20	49-50
				50		Same as above		4:50	50-51
				51		Same as above		5:25	51-52
				52		Same as above		4:45	52-53
				53		Same as above		3:30	53-54
				54		Same as above		4:40	54-55
				55		Same as above		4:45	55-56
				56		Same as above		5:05	56-57
				57		Same as above		4:00	57-58
				58					
				59		Same as above		3:50	59-60
				60		Same as above		4:10	60-61
				61		Same as above		3:45	61-62
				62		Same as above		3:35	62-63
				63		Same as above		3:15	63-64
				64		Same as above		4:15	64-65

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

Driller: Brett Swiateh

DRAFT

EA Engineering, Science, and Technology, Inc.

LOG OF CORE BORING

Coordinates: N: 194379 E: 521036
Surface Elevation: 39.33 ft MSL
Well Riser Elevation: 41.41 ft MSL

Job. No.	Client:	Location:
29600.96	NORDIV/NAVFAC	Site 03 NCBC Davisville, North Kingstown, RI

Drilling Method: 3.875 in. air hammer

Boring No. **MW02-03R**

Core Barrel used:

Sheet 2 of 2

Packer Test

Tested	No	
Interval		

See packer test log if applicable

Drilling Times	Start	Finish
	07/19/2000 1000	07/19/2000 1400

Core Run Run # REC	RQD	Strat-igraphy	Bedding / Fractures (dip & angle)	Filling	Depth in feet	Graphic Log	COMMENTS	DRILLING LOG Core run Length (ft)	Drill Time/ft (min:sec)	Depth Interval (ft bgs)
					65		Same as above		3:40	65-66
					66		Same as above		3:40	66-67
					67		Same as above		4:00	67-68
					68		Same as above		5:00	68-69
					69		Same as above		3:40	69-70
					70		Same as above		3:10	70-71
					71		bottom of boring 71 ft			
					72					
					73					

NOTES:

Logged by: R. Clark

Drilling Contractor: DRAGIN Drilling

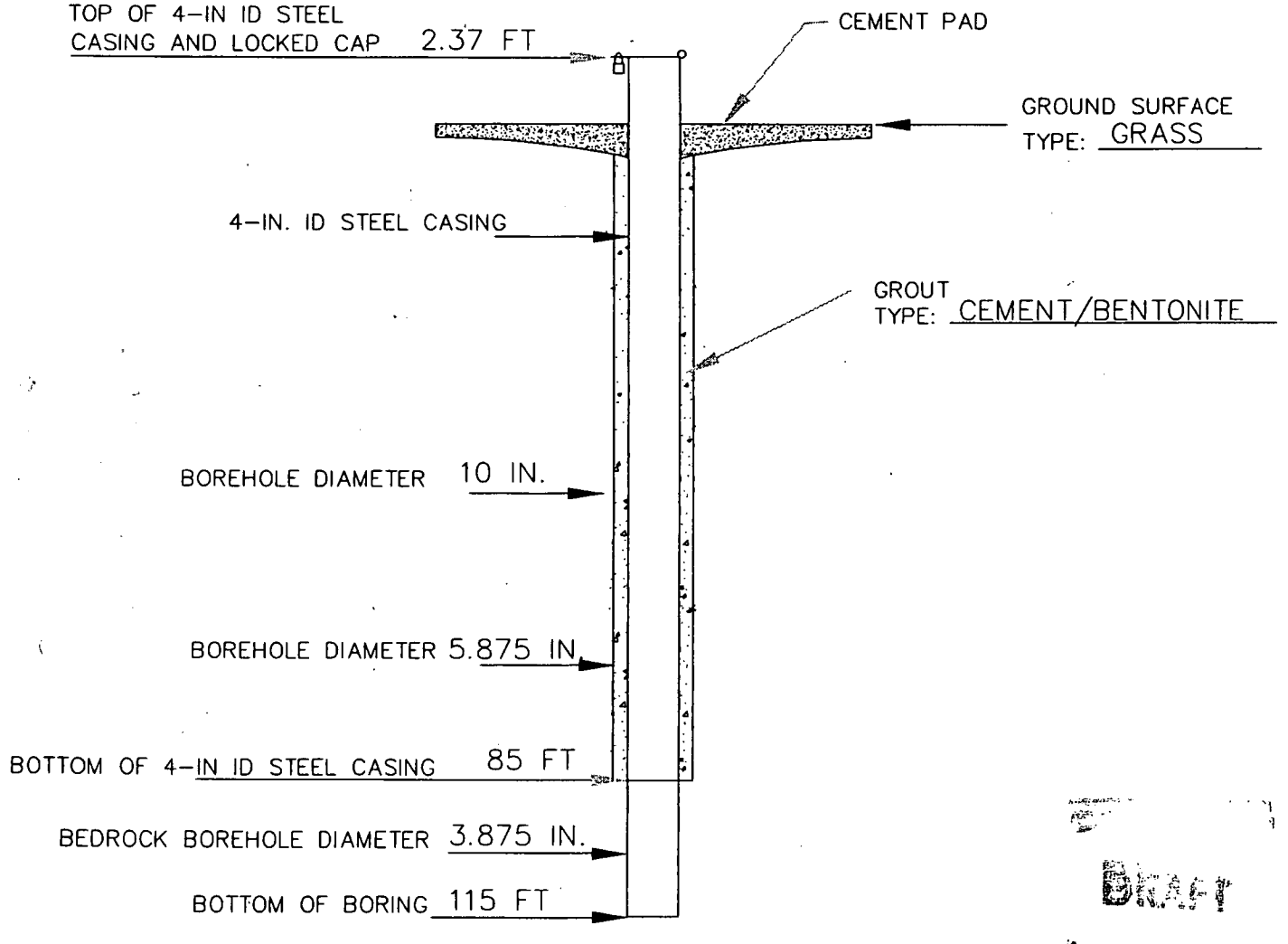
Driller: Brett Swiateh

DRAFT

MONITORING WELL CONSTRUCTION

MW01-10R

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE	
DATE INSTALLED: 7/14/00	PROJECT No. 29600.96.3201
ELEVATION OF GROUND SURFACE: 41.88 MSL ELEVATION TOP OF WELL RISER: 43.96 MSL	COORDINATES: N: 194865.72 E: 519763.66
DEPTH TO WATER: 17.72 (BELOW TOP OF RISER) DATE/TIME 7/26/00 1315	EA INSPECTOR: R. CLARK
DRILLING METHOD & DEPTH: 6.25 IN. ID HOLLOW STEM AUGER TO 81 FT 5.875-IN. ID ROLLERBIT TO 85 FT 3.875-IN. ID ROLLERBIT TO 115 FT	



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MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

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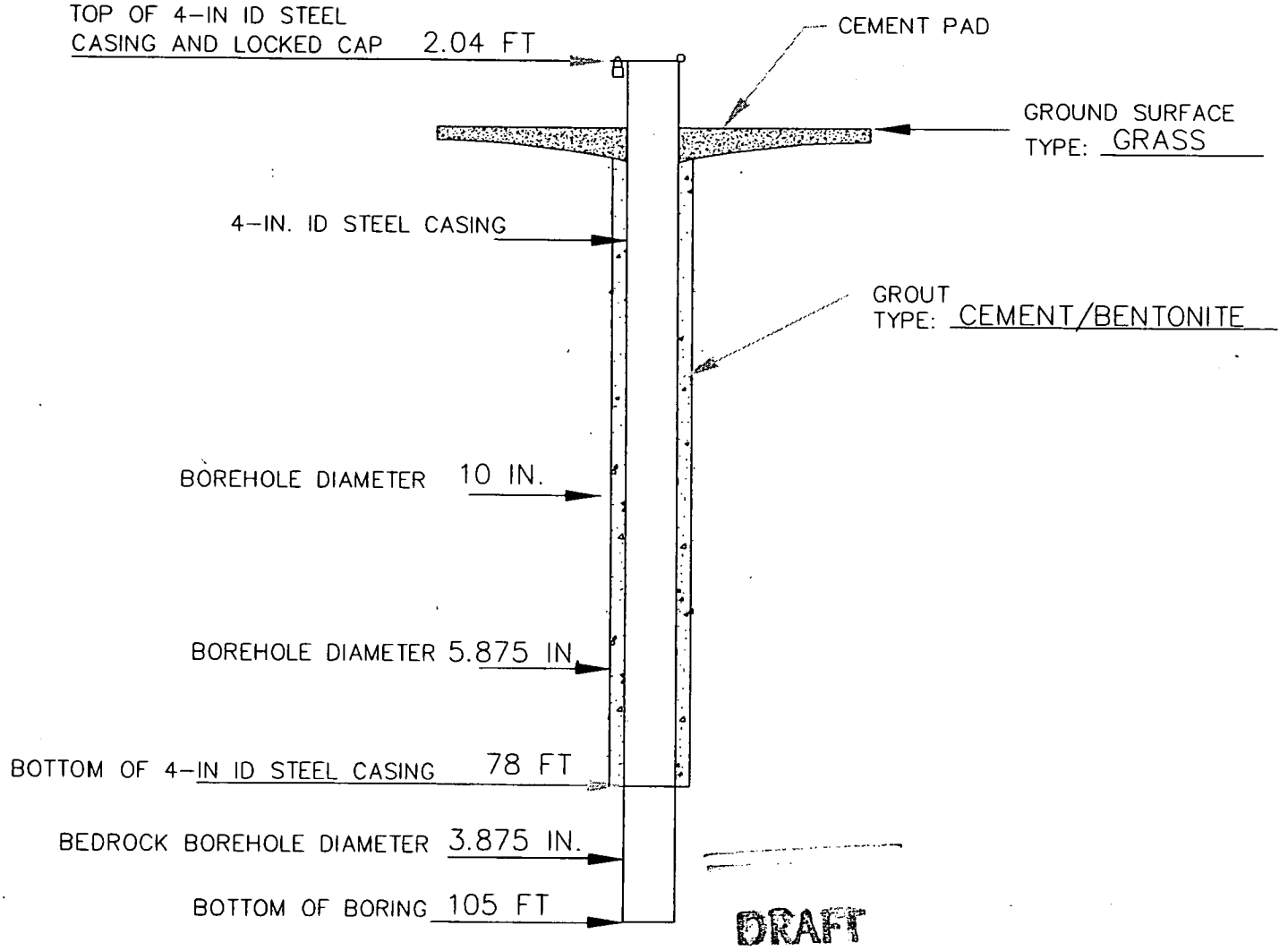
MONITORING WELL CONSTRUCTION

MW01-13R

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE	
DATE INSTALLED: 7/17/00	PROJECT No. 29600.96.3201
ELEVATION OF GROUND SURFACE: 24.70 MSL ELEVATION TOP OF WELL RISER: 26.45 MSL	COORDINATES: N: 194993.83 E: 521371.40
DEPTH TO WATER: 13.16 (BELOW TOP OF RISER) DATE/TIME 7/26/00 1422	EA INSPECTOR: R. CLARK
DRILLING METHOD & DEPTH: 6.25 IN. ID HOLLOW STEM AUGER TO 67 FT 5.875-IN. ID ROLLERBIT TO 78 FT 3.875-IN. ID ROLLERBIT TO 105 FT	



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MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

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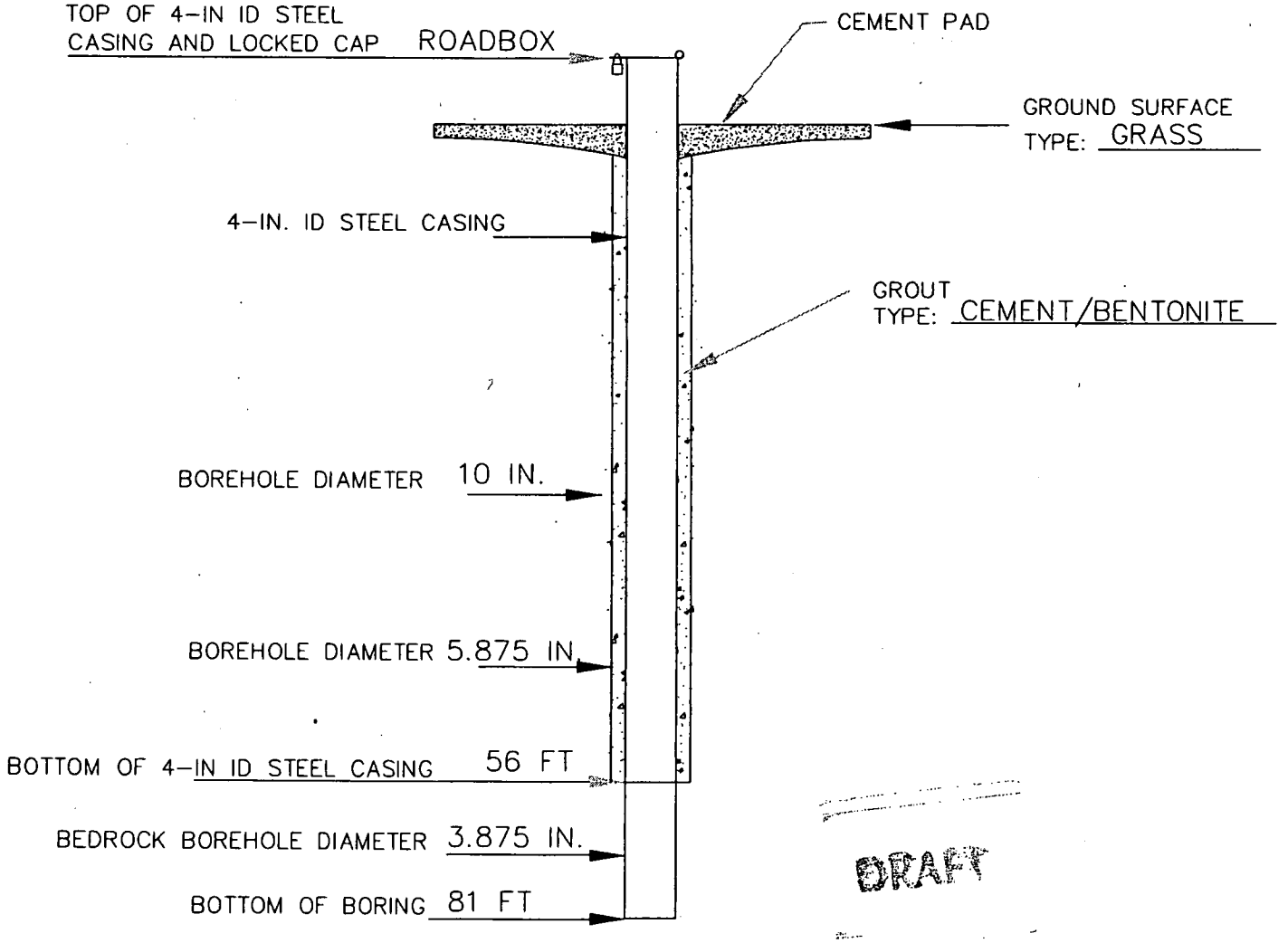
MONITORING WELL CONSTRUCTION

MW01-15R

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE	
DATE INSTALLED: 7/20/00	PROJECT No. 29600.96.3201
ELEVATION OF GROUND SURFACE: 32.88 MSL ELEVATION TOP OF WELL RISER: 32.37 MSL	COORDINATES: N: 194867.98 E: 520696.62
DEPTH TO WATER: 14.49 (BELOW TOP OF RISER) DATE/TIME 9/30/00 0930	EA INSPECTOR: R. CLARK
DRILLING METHOD & DEPTH: 6.25 IN. ID HOLLOW STEM AUGER TO 53 FT 5.875-IN. ID ROLLERBIT TO 56 FT 3.875-IN. ID ROLLERBIT TO 81 FT	



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MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

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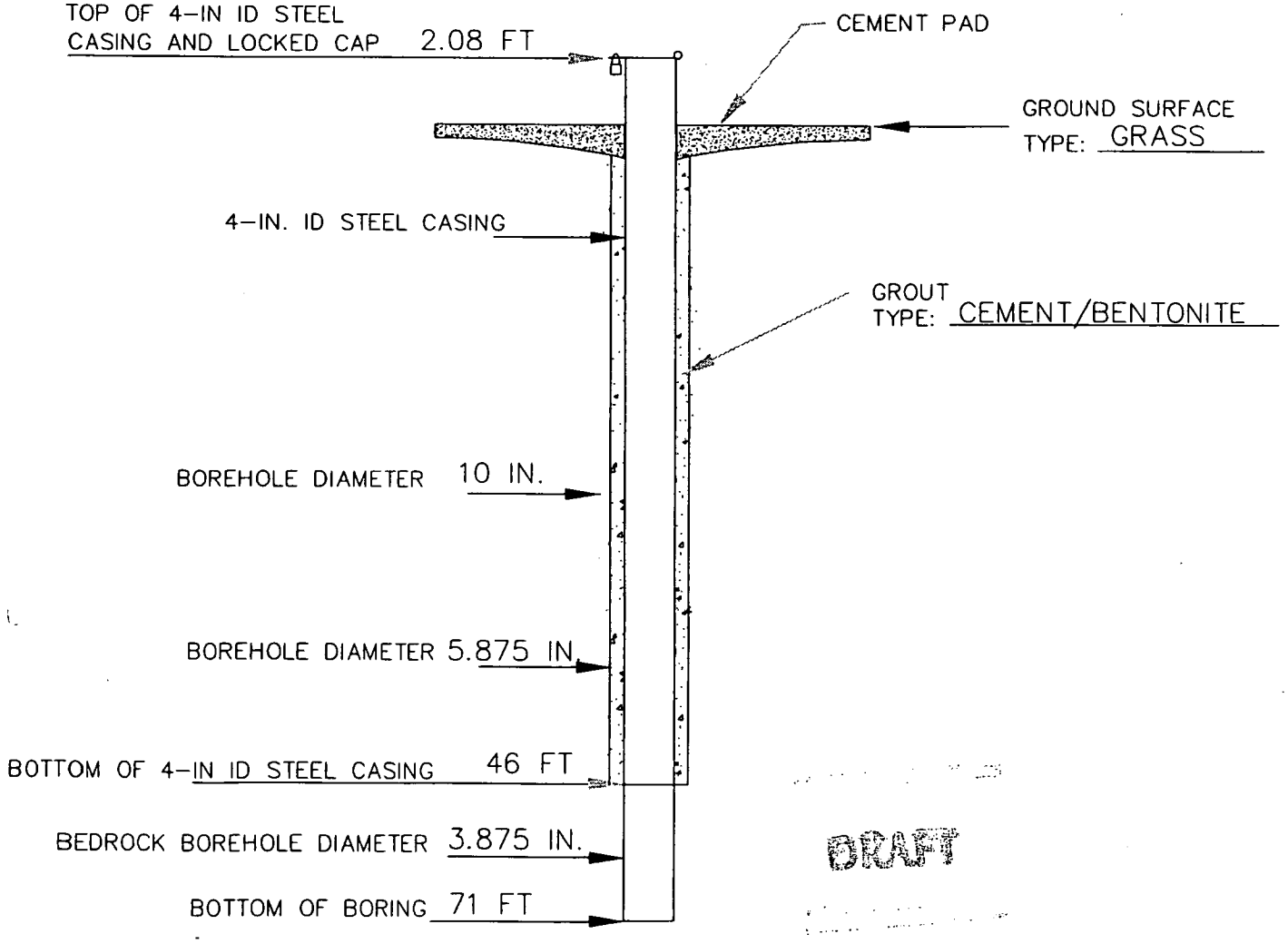
MONITORING WELL CONSTRUCTION

MW02-03R

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE	
DATE INSTALLED: 7/19/00	PROJECT No. 29600.96.3201
ELEVATION OF GROUND SURFACE: 39.33 MSL ELEVATION TOP OF WELL RISER: 41.11 MSL	COORDINATES: N: 194378.98 E: 521036.11
DEPTH TO WATER: 17.81 (BELOW TOP OF RISER) DATE/TIME 7/27/00 1036	EA INSPECTOR: R. CLARK
DRILLING METHOD & DEPTH: 6.25 IN. ID HOLLOW STEM AUGER TO 42.5 FT 5.875-IN. ID ROLLERBIT TO 46 FT 3.875-IN. ID ROLLERBIT TO 71 FT	



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MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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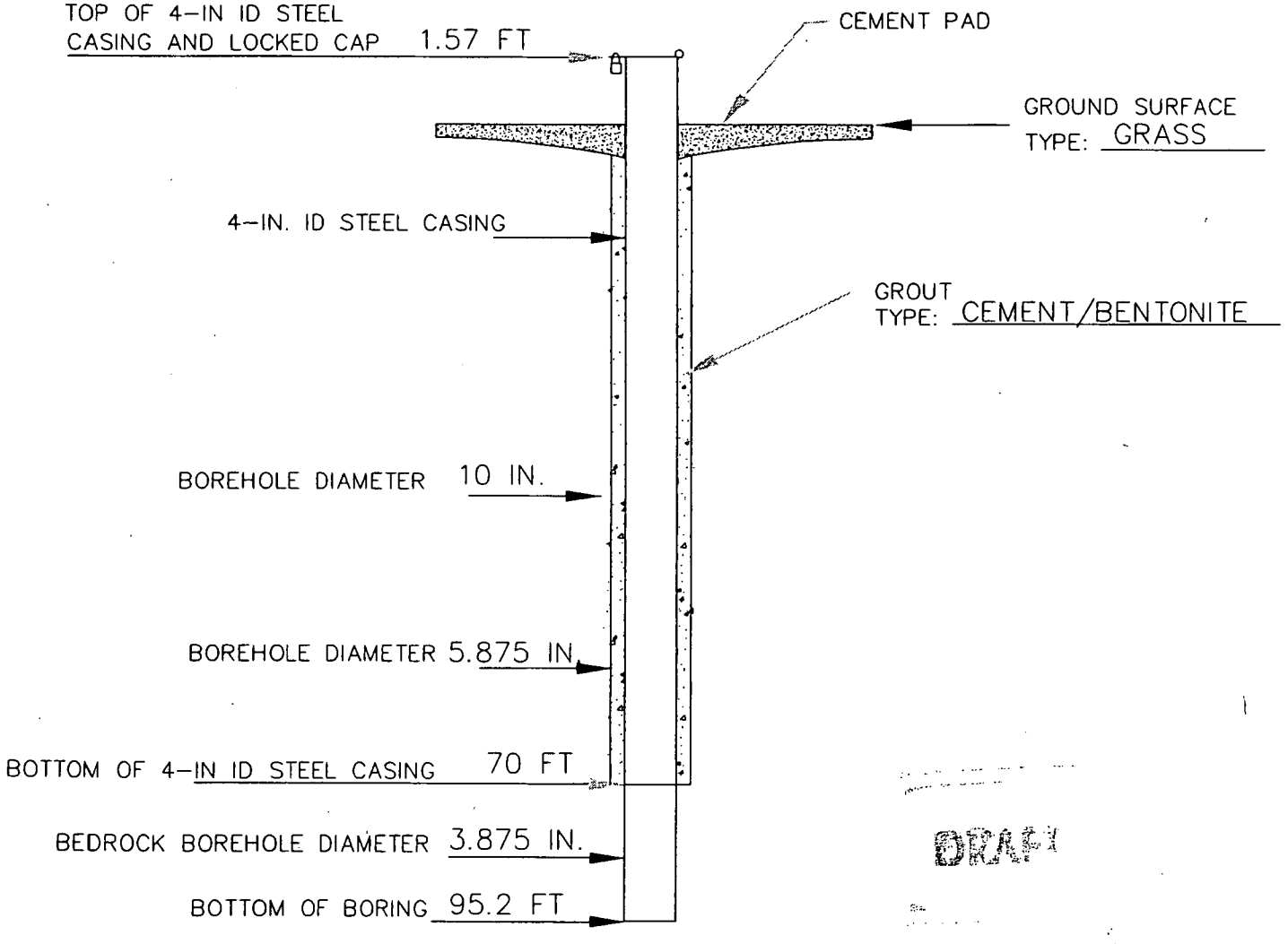
MONITORING WELL CONSTRUCTION

MW03-03R

CLIENT/SITE NAME: NORDIV, NAVFAC NCBC DAVISVILLE	
DATE INSTALLED: 7/20/00	PROJECT No. 29600.96.3201
ELEVATION OF GROUND SURFACE: 36.94 MSL ELEVATION TOP OF WELL RISER: 38.21 MSL	COORDINATES: N: 194341.87 E: 520184.01
DEPTH TO WATER: 19.39 (BELOW TOP OF RISER) DATE/TIME 7/26/00 1545	EA INSPECTOR: R. CLARK / K. BAUM
DRILLING METHOD & DEPTH: 6.25 IN. ID HOLLOW STEM AUGER TO 67 FT 5.875-IN. ID ROLLERBIT TO 70 FT 3.875-IN. ID ROLLERBIT TO 95.2 FT	



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MONITORING WELL CONSTRUCTION
(ALL DEPTH MEASURMENTS IN FT. BELOW GROUND SURFACE)

EA ENGINEERING, SCIENCE, AND TECHNOLOGY

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WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Sam Whitin

Well No.: **EA-104R**

1. Total Riser and Screen Length (ft)	97.44
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	13.86
4. Volume of Water in Well (gal) V = (1-3)*(5)	54.33

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/11/00	7/11/00	7/11/00	7/11/00	7/11/00	7/11/00	7/11/00	7/11/00	7/11/00
Total Gallons	5.0	20.0	35.0	50.0	65.0	80.0	--	110	125
Time (hours)	1230(A)	1245(A)	1300(A)	1315(A)	1330(A)	1345(A)	1400	1415(A)	1430(A)
Temperature (°C)	11.59	11.59	11.72	11.32	11.30	11.16	--	11.14	11.11
Conductivity (mS/cm)	0.133	0.134	0.029	0.119	0.110	0.113	--	0.106	0.113
PH	6.22	6.27	6.28	6.34	6.37	6.32	--	6.31	6.29
Turbidity (NTU)	85.0	113	110	67.0	61.0	71.0	--	36.0	62.0
Dissolved Oxygen (mg/L)	0.44	0.21	0.20	0.17	0.15	0.13	--	0.14	0.14
Water Level (FT BTOC)	13.91	13.89	13.89	13.89	13.89	13.89	--	13.89	13.56

NOTES: (A)-Surged
-- = Pause in field activity.

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Sam Whitin

Well No.:
EA-104R

1. Total Riser and Screen Length (ft)	97.44
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	13.86
4. Volume of Water in Well (gal) V = (1-3)*(5)	54.33

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/11/00	7/11/00	7/11/00	7/11/00					
Total Gallons	140	155	170	185					
Time (hours)	1445(A)	1500	1515	1530					
Temperature (°C)	11.12	11.18	11.19	11.17					
Conductivity (mS/cm)	0.083	0.090	0.117	0.102					
PH	6.29	6.30	6.30	6.30					
Turbidity (NTU)	39.0	41.0	31.0	30.0					
Dissolved Oxygen (mg/L)	0.14	0.14	0.13	0.13					
Water Level (FT BTOC)	13.89	13.89	13.89	13.89					

NOTES: (A)-Surged
-- = Pause in field activity.

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Sam Whitin

Well No.:
EA-105R

1. Total Riser and Screen Length (ft)	61.92
2. Screen Internal Diameter (in.)	3 7/8"
3. Water Level Below Measuring Point (ft)	8.81
4. Volume of Water in Well (gal) V = (1-3)*(5)	34.52

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/11/00	7/11/00	7/11/00	7/11/00	7/11/00	7/11/00	7/11/00	7/11/00	7/11/00
Total Gallons	0.0	10.0	20.0	38.0	54.0	70.0	86.0	102	118
Time (hours)	1100	1115	1130	1145	1200	1215	1230	1245	1300
Temperature (°C)	10.66	10.53	10.44	10.80	10.10	10.72	10.73	10.75	10.64
Conductivity (mS/cm)	0.175	0.122	0.122	0.117	0.113	0.114	0.115	0.114	0.115
PH	6.26	5.70	5.68	5.66	5.65	5.73	5.64	5.63	5.67
Turbidity (NTU)	--	121	76.3	61.2	47.5	130	18.3	19.8	9.85
Dissolved Oxygen (mg/L)	3.07	0.49	0.34	0.52	0.73	0.84	5.14	4.62	5.54
Water Level (FT BTOC)	8.81	8.82	8.82	8.85	8.85	8.86	8.86	8.86	8.86

NOTES: Surged at 1133 with Grundfos pump and surge block
Surged: 1208, 1239, 1248, 1304

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Sam Whitin

Well No.:
EA-105R

1. Total Riser and Screen Length (ft)	61.92
2. Screen Internal Diameter (in.)	3 7/8"
3. Water Level Below Measuring Point (ft)	8.81
4. Volume of Water in Well (gal) V = (1-3)*(5)	34.52

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/11/00	7/11/00	7/11/00						
Total Gallons	134	150	166						
Time (hours)	1315	1330	1345						
Temperature (C)	10.66	10.76	10.69						
Conductivity (mS/cm)	0.114	0.116	0.115						
PH	5.63	5.64	5.73						
Turbidity (NTU)	8.12	7.02	8.21						
Dissolved Oxygen (mg/L)	3.04	5.66	4.58						
Water Level (FT BTOC)	8.87	8.87	8.87						

NOTES: Surged at 1133 with Grundfos pump and surge block
Surged: 1208, 1239, 1248, 1304

DRAFT

WELL DEVELOPMENT LOG

Client: USACE- NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.: **EA-107R**

1. Total Riser and Screen Length (ft)	80.03
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	12.98
4. Volume of Water in Well (gal) V = (1-3)*(5)	43.58

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/6/00	7/6/00	7/6/00	7/6/00	7/6/00	7/6/00	7/6/00	7/6/00	7/6/00
Total Gallons	0.0	4.0	3.0	4.0	8.0	6.0	6.0	7.0	3.0
Time (hours)	1345	1400	1415	1430	1445	1500	1515	1530	0830
Temperature (°C)	11.51	12.59	13.66	13.06	13.77	13.33	14.29	14.69	12.90
Conductivity (mS/cm)	0.301	0.281	0.297	0.294	0.289	0.285	0.287	0.289	0.303
PH	8.53	8.82	8.84	8.85	9.00	9.13	9.19	9.06	7.25
Turbidity (NTU)	189	217	205	170	152	143	164	179	160
Dissolved Oxygen (mg/L)	1.73	1.22	0.95	0.73	0.31	0.31	0.41	3.42	5.95
Water Level (FT BTOC)	12.98	21.04	22.16	29.66	48.59	54.93	61.91	69.00	42.72

NOTES: 1247-1324 bailed
Purged with Grundfos pump 1436, 1450
1530- well dry, waiting for recharge
1545-DTW 68.11; 1600-DTW 67.26

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC contamination at Former PR. 58 Site
Project No.: 60957.56.0003
Staff:

Well No.: **EA-107R**

1. Total Riser and Screen Length (ft)	80.03
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	12.98
4. Volume of Water in Well (gal) V = (1-3)*(5)	43.58

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/7/00	7/7/00	7/7/00	7/7/00	7/10/00	7/10/00	7/10/00	7/10/00	7/10/00
Total Gallons	4.0	4.0	4.0	4.0	3.0	3.0	3.0	3.0	15.0
Time (hours)	0845	0900	0915	0930	1640	1655	1710	1725	1740
Temperature (°C)	13.62	14.03	14.73	14.81	16.44	12.52	12.64	13.93	13.45
Conductivity (mS/cm)	0.265	0.310	0.048	0.307	0.283	0.298	0.327	0.207	0.317
PH	7.28	7.36	7.41	7.43	9.54	9.34	9.43	9.49	9.76
Turbidity (NTU)	59.1	96.0	88.8	66.8	38.0	68.0	73.0	67.0	48.0
Dissolved Oxygen (mg/L)	4.14	3.79	3.56	3.30	2.20	0.43	0.50	0.38	0.29
Water Level (FT BTOC)	50.12	56.00	60.52	68.09	13.18	13.99	14.60	15.62	21.52

NOTES: 0935 well dry
Surged at: 1640, 1655, 1710, 1725, 1740
1730 increase flow

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC contamination at Former PR. 58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/ Sam Whitin

Well No.: **EA-107R**

1. Total Riser and Screen Length (ft)	80.03
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	12.98
4. Volume of Water in Well (gal) V = (1-3)*(5)	43.58

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/10/00	7/10/00	7/10/00	7/10/00	7/10/00	7/25/00	7/25/00	7/25/00	7/25/00
Total Gallons	15.0	15.0	15.0	15.0	15.0	--	15.0	30.0	30.0
Time (hours)	1755	1810	1825	1840	1855	1540	1555	1610	1625
Temperature (°C)	14.01	14.02	11.51	12.87	15.26	11.22	12.08	12.75	16.25
Conductivity (mS/cm)	0.308	0.184	0.331	0.325	0.310	0.282	0.282	0.274	0.267
PH	9.92	10.12	9.36	9.52	9.57	8.53	8.74	9.57	9.18
Turbidity (NTU)	47.0	49.0	68.0	50.0	100	80.0	41.0	106	146
Dissolved Oxygen (mg/L)	0.308	0.184	0.331	0.325	0.310	0.94	1.21	0.88	0.87
Water Level (FT BTOC)	28.82	39.48	48.05	61.54	67.72	15.31	21.29	47.28	53.06

NOTES: Surged at: 1755, 1810, 1840, 1855
1825 pump caught on casing (~50) lowered to bottom
Total gallons removed-159

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.: **EA-108R**

1. Total Riser and Screen Length (ft)	59.55
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00
Total Gallons	5	25	45	65	80	100	120	140	160
Time (hours)	1030	1045	1100	1115	1130	1145	1200	1215	1230
Temperature (°C)	11.97	12.12	12.41	12.42	12.51	12.31	12.36	12.36	12.34
Conductivity (mS/cm)	0.239	0.234	0.228	0.225	0.223	0.227	0.222	0.22	0.219
PH	7.11	7.00	6.95	6.92	6.89	6.93	6.89	6.90	6.88
Turbidity (NTU)	101	64.5	57.8	59.5	39.7	50.1	46.0	81.8	65.6
Dissolved Oxygen (mg/L)	1.91	0.51	0.35	0.36	0.29	0.28	0.26	0.28	0.27
Water Level (FT BTOC)	13.21	21.92	25.5	28.51	28.66	32.25	33.51	35.66	35.77

NOTES: Surged with Grundfos pump: 1104, 1202

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.: **EA-108R**

1. Total Riser and Screen Length (ft)	59.55
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/7/00	7/7/00	7/7/00	7/7/00					
Total Gallons	180	200	220	240					
Time (hours)	1245	1300	1315	1330					
Temperature (°C)	12.43	12.36	12.39	12.39					
Conductivity (mS/cm)	0.218	0.217	0.220	0.217					
PH	6.86	6.85	6.84	6.78					
Turbidity (NTU)	55.6	33.6	54.5	23.7					
Dissolved Oxygen (mg/L)	0.25	6.39	7.81	7.86					
Water Level (FT BTOC)	35.14	36.18	37.43	34.22					

NOTES: Surged with Grundfos pump: 1249, 1305
1300-constant stream of air bubbles from well

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WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.: **EA-112R2**

1. Total Riser and Screen Length (ft)	159.1
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	22.98
4. Volume of Water in Well (gal) V = (1-3)*(5)	88.48

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00
Total Gallons	--	15.0	30.0	45.0	60.0	90.0	100	130	145
Time (hours)	0930(A)	1945(A)	1000(A)	10 15	1030(A)	1200(A)	1215(A)	1245 (A)(B)	1300(A)
Temperature (°C)	11.19	11.43	11.37	11.47	11.81	11.21	10.2	12.20	12.48
Conductivity (mS/cm)	0.254	0.110	0.021	0.167	0.246	0.162	0.154	0.192	0.179
PH	9.64	9.69	9.70	9.67	9.21	8.08	7.96	8.01	8.18
Turbidity (NTU)	103	158	150	145	156	172	176	137	128
Dissolved Oxygen (mg/L)	0.66	0.17	0.19	0.13	0.12	0.78	1.07	0.15	0.15
Water Level (FT BTOC)	65.52	71.89	74.91	84.22	91.10	--	--	--	--

NOTES: (A) Surged after reading
(B) 1215-1230 not measured; pump shut off due to clogging

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.:
EA-112R2

1. Total Riser and Screen Length (ft)	159.1
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	22.98
4. Volume of Water in Well (gal) V = (1-3)*(5)	88.48

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00				
Total Gallons	155	165	175	185	195				
Time (hours)	1315(A)	1330(A)	1345(A)	1400(A)	1415(A)				
Temperature (°C)	12.88	12.31	12.81	12.40	12.70				
Conductivity (mS/cm)	0.079	0.242	0.249	0.272	0.297				
PH	8.29	8.92	9.37	9.85	10.11				
Turbidity (NTU)	97.0	99.0	107.0	86.0	74.0				
Dissolved Oxygen (mg/L)	0.19	0.16	0.23	0.53	0.13				
Water Level (FT BTOC)	--	--	--	--	--				

NOTES:

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WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.:
EA-113R

1. Total Riser and Screen Length (ft)	81.54
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00
Total Gallons	5	10	20	30	45	60	75	90	105
Time (hours)	1430	1445	1500	1515	1530	1545	1600	1615	1630
Temperature (°C)	10.33	11.40	10.45	11.00	10.84	10.85	10.84	10.81	10.83
Conductivity (mS/cm)	0.214	0.212	0.209	0.209	0.206	0.204	0.204	0.205	0.203
PH	7.69	8.20	8.25	8.13	7.98	7.97	7.94	7.92	7.90
Turbidity (NTU)	161	342	135	84.0	31.0	55.0	23.0	35.0	13.0
Dissolved Oxygen (mg/L)	1.84	0.21	0.17	1.05	0.40	0.14	0.08	0.32	0.10
Water Level (FT BTOC)	--	7.52	8.55	9.56	11.26	11.32	11.33	11.33	11.33

NOTES:

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.: **EA-113R**

1. Total Riser and Screen Length (ft)	81.54
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/13/00	7/13/00	7/13/00	7/13/00					
Total Gallons	120	135	150	165					
Time (hours)	1645	1700	1715	1730					
Temperature (°C)	10.86	10.85	10.82	10.83					
Conductivity (mS/cm)	0.204	0.204	0.206	0.203					
PH	7.91	7.80	7.87	7.86					
Turbidity (NTU)	19.0	11.0	5.96	6.15					
Dissolved Oxygen (mg/L)	0.40	0.03	0.03	0.02					
Water Level (FT BTOC)	11.33	11.33	11.33	11.33					

NOTES:

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WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.: **EA-114D**

1. Total Riser and Screen Length (ft)	26.06
2. Screen Internal Diameter (in.)	2
3. Water Level Below Measuring Point (ft)	8.77
4. Volume of Water in Well (gal) V = (1-3)*(5)	11.24

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00
Total Gallons	--	10.0	20	30	40	45	50	60	70
Time (hours)	0955	1010	1025	1040	1055	1110	1125	1140	1155
Temperature (°C)	12.22	12.66	12.57	12.56	12.36	12.69	12.55	12.42	12.39
Conductivity (mS/cm)	0.258	0.121	0.106	0.100	0.095	0.094	0.094	0.090	0.089
PH	7.09	6.04	5.95	5.94	5.89	5.91	5.91	5.87	5.87
Turbidity (NTU)	--	20.7	13.4	38.6	57.2	15.0	34.1	24.7	5.74
Dissolved Oxygen (mg/L)	2.31	0.40	0.39	0.44	0.39	0.33	2.25	2.26	1.02
Water Level (FT BTOC)	8.93	11.96	12.15	12.11	12.22	12.12	11.82	12.23	12.28

NOTES: Starting DTW 8.77, bailed 0917-0944
Surged: 1043, 1112, 1128, 1158

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.: **EA-114D**

1. Total Riser and Screen Length (ft)
2. Screen Internal Diameter (in.)
3. Water Level Below Measuring Point (ft)
4. Volume of Water in Well (gal) V = (1-3)*(5)

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/17/00								
Total Gallons	70	90	100	110					
Time (hours)	1210	1225	1240	1255					
Temperature (°C)	12.41	12.48	12.43	12.40					
Conductivity (mS/cm)	.086	.086	0.86	.085					
PH	5.84	5.84	5.88	5.84					
Turbidity (NTU)	36.4	24.6	10.8	7.61					
Dissolved Oxygen (mg/L)	0.51	0.45	0.73	0.501					
Water Level (FT BTOC)	12.26	12.31	12.38	12.36					

NOTES:

DRAFT

WELL DEVELOPMENT LOG

Client: USASE, NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Sam Whitin/Kevin Baum

Well No.: **EA-114R**

1. Total Riser and Screen Length (ft)	44.52
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	8.99
4. Volume of Water in Well (gal) V = (1-3)*(5)	23.09

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00
Total Gallons	--	10	20	30	40	50	60	70	80
Time (hours)	1000	1015	1030	1045	1100	1115	11301	1145	1200
Temperature (°C)	10.81	11.08	11.44	11.43	11.21	11.30	11.33	11.29	11.34
Conductivity (mS/cm)	0.200	0.157	0.141	0.129	0.132	0.133	0.125	0.127	0.124
PH	8.39	7.15	6.90	6.68	6.68	6.66	6.61	6.59	6.57
Turbidity (NTU)	271	204	194	50.0	49.0	40.0	15.0	15.0	9.0
Dissolved Oxygen (mg/L)	1.05	0.13	0.22	0.53	0.42	0.44	0.52	0.55	0.61
Water Level (FT BTOC)	16.62	17.03	17.61	19.42	--	--	--	--	--

NOTES: surged after each reading

DRAFT

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 16, Remedial Investigation
Project No.: 29600.97.3201
Staff: Sam Whitin/Kevin Baum

Well No.: **EA-114R**

1. Total Riser and Screen Length (ft)	44.52
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	8.99
4. Volume of Water in Well (gal) V = (1-3)*(5)	23.09

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/17/00								
Total Gallons	90								
Time (hours)	1215								
Temperature (°C)	11.27								
Conductivity (mS/cm)	0.124								
PH	6.54								
Turbidity (NTU)	4.0								
Dissolved Oxygen (mg/L)	0.64								
Water Level (FT BTOC)	--								

NOTES: surged after each reading

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.: **EA-116D**

1. Total Riser and Screen Length (ft)	95.56
2. Screen Internal Diameter (in.)	2
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/12/00	7/12/00	7/12/00	7/12/00	7/12/00	7/12/00	7/12/00	7/12/00	7/12/00
Total Gallons	--	20	30	40	50	60	70	80	90
Time (hours)	1445	1500	1515	1530	1545	1600	1615	1630	1645
Temperature (°C)	10.61	10.94	11.15	11.11	11.11	11.10	11.19	11.29	11.27
Conductivity (mS/cm)	0.352	0.265	0.193	0.176	0.205	0.225	0.223	0.216	0.215
PH	7.07	7.20	6.75	6.72	6.63	6.57	6.57	6.51	6.58
Turbidity (NTU)	--	83.7	258	265	205	186	43.9	199	49.1
Dissolved Oxygen (mg/L)	0.72	0.24	0.15	0.20	0.07	0.07	0.05	0.06	0.07
Water Level (FT BTOC)	22.85	33.11	33.87	31.46	31.46	33.19	32.93	32.71	32.98

NOTES: Surged with Grundfos pump: 1550, 1618

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.:
EA-116D

1. Total Riser and Screen Length (ft)	95.56
2. Screen Internal Diameter (in.)	2
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/12/00	7/12/00	7/12/00	7/12/00					
Total Gallons	100	110	120	130					
Time (hours)	1700	1745	1800	1815					
Temperature (°C)	11.29	10.82	11.06	11.06					
Conductivity (mS/cm)	0.210	0.219	0.205	0.203					
PH	6.47	6.53	6.45	6.43					
Turbidity (NTU)	225	156	64.0	34.0					
Dissolved Oxygen (mg/L)	0.04	0.94	0.24	0.20					
Water Level (FT BTOC)	32.85	33.13	33.62	33.64					

NOTES: Surged at: 1648
1715-1740 dumped water drums-no pumping

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.: **EA-116R**

1. Total Riser and Screen Length (ft)	118.31
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00	7/13/00
Total Gallons	--	15	30	45	60	75	90	105	120
Time (hours)	0900	0915	0930	0945	1000	1015	1030	1045	1100
Temperature (°C)	10.16	10.33	10.58	10.61	10.53	10.61	10.82	10.75	10.76
Conductivity (mS/cm)	0.249	0.210	0.202	0.198	0.200	0.197	0.199	0.196	0.196
PH	10.01	7.53	6.94	6.55	6.99	6.52	6.56	6.52	6.53
Turbidity (NTU)	175	36.0	27.2	9.96	52.2	8.60	45.4	14.78	7.46
Dissolved Oxygen (mg/L)	2.40	0.34	2.36	0.64	1.10	2.71	1.04	0.28	0.17
Water Level (FT BTOC)	22.35	22.35	22.36	22.35	22.35	22.35	22.35	22.35	22.35

NOTES: Surged with Grundfos pump : 0920, 0952, 1022, 1051

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.: **EA-116R**

1. Total Riser and Screen Length (ft)	118.31
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/13/00	7/13/00	7/13/00						
Total Gallons	135	150	165						
Time (hours)	1115	1130	1145						
Temperature (°C)	10.78	10.75	10.77						
Conductivity (mS/cm)	0.196	0.196	0.197						
PH	6.54	6.55	6.55						
Turbidity (NTU)	3.48	6.21	3.99						
Dissolved Oxygen (mg/L)	0.40	0.22	0.07						
Water Level (FT BTOC)	22.35	22.35	--						

NOTES: Surged with Grundfos pump: 1104

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Sam Whitin

Well No.: **EA-116R2**

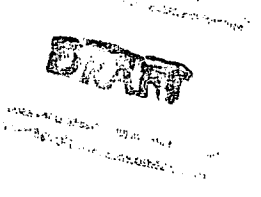
1. Total Riser and Screen Length (ft)	143.84
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	23.51
4. Volume of Water in Well (gal) V = (1-3)*(5)	78.21

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/12/00	7/12/00	7/12/00	7/12/00	7/12/00	7/12/00	7/12/00	7/12/00	7/12/00
Total Gallons	--	30	60	90	110	130	150	170	190
Time (hours)	1450	1505	1520	1535	1550	1605	1620	1635	1650
Temperature (°C)	10.81	10.72	10.78	10.80	10.90	10.86	10.87	10.86	10.93
Conductivity (mS/cm)	2.26	.869	.810	.707	.643	.446	.480	.603	.598
PH	12.22	11.94	11.90	11.87	11.84	11.68	11.70	11.80	11.78
Turbidity (NTU)	166	188	102	250	191	182	123	86	76
Dissolved Oxygen (mg/L)	0.44	0.17	0.31	0.32	0.31	0.26	0.32	0.27	0.27
Water Level (FT BTOC)	--	35.70	36.52	36.04	35.81	35.77	30.28	28.72	29.96

NOTES: (A) check pH with other meter; both readings match
Purged after each reading unless indicated with (B)
1700-1745 dumping drums; no readings taken



WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Sam Whitin

Well No.:
EA-116R2

1. Total Riser and Screen Length (ft)	143.84
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	23.51
4. Volume of Water in Well (gal) V = (1-3)*(5)	78.21

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/12/00	7/12/00	7/12/00	7/12/00	7/12/00				
Total Gallons	210	230	250	270	290				
Time (hours)	1705	1720	1800	1815	1830				
Temperature (°C)	10.88	10.85	10.75	10.76	10.75				
Conductivity (mS/cm)	.561	.556	.556	.522	.540				
PH	11.74	11.72	11.75	11.76	11.71				
Turbidity (NTU)	54	61	49	33	33				
Dissolved Oxygen (mg/L)	0.25	0.18	0.26	0.25	0.27				
Water Level (FT BTOC)	30.15	30.05	31.64	31.68	31.69				

NOTES: (A) check pH with other meter; both readings match
Purged after each reading unless indicated with (B)
1700-1745 dumping drums; no readings taken

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Sam Whitin

Well No.: **MW03-11R**

1. Total Riser and Screen Length (ft)	56.69
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	9.06
4. Volume of Water in Well (gal) V = (1-3)*(5)	30.96

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/10/00	7/10/00	7/10/00	7/10/00	7/10/00	7/10/00	7/10/00	7/10/00	7/10/00
Total Gallons	--	15.0	30.0	45.0	60.0	75.0	85.0	95.0	110
Time (hours)	1240(A)	1255(A)	1310(A)	1325(A)	1340(A)	1355(A)	1405(B)	1425(A)	1440(A)
Temperature (°C)	10.59	10.90	10.97	10.86	10.85	10.83	--	10.83	12.86
Conductivity (mS/cm)	0.153	0.141	0.139	0.140	0.146	0.146	--	0.139	0.122
PH	6.06	6.11	6.12	6.21	6.19	6.22	--	6.30	6.34
Turbidity (NTU)	265	160	110	80.0	45.0	50.0	--	32.0	53.0
Dissolved Oxygen (mg/L)	0.76	0.52	0.51	0.45	0.42	0.39	--	0.70	0.41
Water Level (FT BTOC)	9.21	9.26	9.27	9.27	9.26	9.25	--	9.24	9.25

NOTES: (A)-surge/purge event
(B)-Water quality meter out of batteries, no readings taken.
Rate 0.5 g/min. from 1405-1425

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Sam Whitin

Well No.:
MW03-11R

1. Total Riser and Screen Length (ft)	56.69
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	9.06
4. Volume of Water in Well (gal) V = (1-3)*(5)	30.96

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/10/00	7/10/00	7/10/00	7/10/00					
Total Gallons	125	140	155	170					
Time (hours)	1455	1510	1525	1540					
Temperature (°C)	10.78	10.79	10.75	10.76					
Conductivity (mS/cm)	0.137	0.138	0.138	0.138					
PH	6.21	6.23	6.24	6.51					
Turbidity (NTU)	28.0	16.0	13.0	21.0					
Dissolved Oxygen (mg/L)	0.35	0.38	0.32	0.45					
Water Level (FT BTOC)	9.26	9.27	9.27	9.29					

NOTES: (A)-surge/purge event
(B)-Water quality meter out of batteries, no readings taken.
Rate 0.5 g/min. from 1405-1425

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.: **MW03-14R2**

1. Total Riser and Screen Length (ft)	94.79
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00	7/17/00
Total Gallons	--	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0
Time (hours)	1500	1515	1530	1545	1600	1615	1630	1645	1700
Temperature (°C)	11.43	12.47	12.12	12.38	12.52	12.52	12.81	12.39	12.97
Conductivity (mS/cm)	4.00	3.96	0.651	0.001	0.979	1.71	0.165	2.95	3.06
PH	12.38	12.38	12.41	12.41	12.41	12.40	12.37	12.32	12.31
Turbidity (NTU)	168	220	38.7	76.1	34.9	26.8	21.7	22.4	21.4
Dissolved Oxygen (mg/L)	0.25	0.12	0.13	1.22	0.31	0.11	0.11	0.11	0.11
Water Level (FT BTOC)	10.33	18.15	23.92	30.95	37.60	46.47	52.20	61.39	63.04

NOTES: Surged at 1534, 1605, 1635

DRAFT

WELL DEVELOPMENT LOG

Client: USACE-NED
Project Title: Characterization of CVOC Contamination at Former PR-58 Site
Project No.: 60957.56.0003
Staff: Kevin Baum/Sam Whitin

Well No.: **MW03-14R2**

1. Total Riser and Screen Length (ft)	94.79
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/17/00	7/17/00	7/17/00	7/17/00					
Total Gallons	45.0	50.0	52.0	55.0					
Time (hours)	1715	1730	1745	1800					
Temperature (°C)	13.25	13.30	12.81	12.55					
Conductivity (mS/cm)	2.97	2.44	0.897	1.26					
PH	12.30	12.28	11.95	11.95					
Turbidity (NTU)	23.3	41.4	12.7	--					
Dissolved Oxygen (mg/L)	0.12	0.17	0.10	0.10					
Water Level (FT BTOC)	63.97	64.38	70.38	72.9					

NOTES:

DRAFT

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 03, Remedial Investigation
Project No.: 29600.96.3201
Staff: Sam Whitin

Well No.:
MW01-10R

1. Total Riser and Screen Length (ft)	117.37
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/20/00	7/20/00	7/20/00	7/20/00	7/20/00	7/20/00	7/20/00	7/20/00	7/20/00
Total Gallons	--	10.0	25.0	40.0	55.0	70.0	85.0	100.0	115.0
Time (hours)	0900	0915	0930	0945	1000	1015	1030	1045	1100
Temperature (°C)	13.04	12.85	13.26	13.19	12.89	12.89	12.86	12.92	12.85
Conductivity (mS/cm)	0.199	0.195	0.195	0.193	0.191	0.191	0.192	0.192	0.192
PH	7.83	7.76	7.71	7.73	7.71	7.69	7.66	7.64	7.61
Turbidity (NTU)	108	97.0	63.0	31.0	24.0	19.0	14.0	10.0	8.0
Dissolved Oxygen (mg/L)	0.35	0.34	0.33	0.38	0.35	0.29	0.26	0.29	0.22
Water Level (FT BTOC)	28.12	29.93	29.94	30.98	32.48	32.64	32.89	33.18	33.08

NOTES:

DRAFT

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 03, Remedial Investigation
Project No.: 29600.96.3201
Staff: Sam Whitin

Well No.:
MW01-10R

1. Total Riser and Screen Length (ft)	117.37
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/20/00	7/20/00	7/20/00	7/20/00					
Total Gallons	130	145	160	175					
Time (hours)	1115	1130	1145	1200					
Temperature (°C)	12.86	12.63	12.66	12.64					
Conductivity (mS/cm)	0.192	0.193	0.195	0.194					
PH	7.61	7.60	7.66	7.62					
Turbidity (NTU)	8.0	28.0	16.0	12.0					
Dissolved Oxygen (mg/L)	0.25	0.29	0.25	0.25					
Water Level (FT BTOC)	33.04	33.10	33.21	33.28					

NOTES: Setup at MW01-13R
DTW:12.72
PID:0.0

DRAFT

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 03, Remedial Investigation
Project No.: 29600.96.3201
Staff: Sam Whitin

Well No.:
MW01-13R

1. Total Riser and Screen Length (ft)	107.04
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/20/00	7/20/00	7/20/00	7/20/00	7/20/00	7/20/00	7/20/00	7/20/00	7/20/00
Total Gallons	--	15.0	30.0	45.0	60.0	75.0	90.0	105	120
Time (hours)	1300	1315	1330	1345	1400	1415	1430	1445	1500
Temperature (°C)	11.63	12.28	12.21	12.28	12.28	12.12	12.22	12.45	12.55
Conductivity (mS/cm)	0.170	0.170	0.172	0.172	0.172	0.171	0.172	0.172	0.170
PH	7.30	7.38	7.46	7.56	7.42	7.40	7.43	7.43	7.37
Turbidity (NTU)	262	206	189	230	149	102	75.0	94.0	84.0
Dissolved Oxygen (mg/L)	0.56	0.35	0.33	0.37	0.42	0.52	0.43	0.95	0.43
Water Level (FT BTOC)	19.98	24.69	29.03	29.42	29.52	35.87	36.72	34.13	35.22

NOTES:

DRAFT

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 03, Remedial Investigation
Project No.: 29600.96.3201
Staff: Sam Whitin

Well No.: **MW01-13R**

1. Total Riser and Screen Length (ft)	107.04
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/20/00	7/20/00	7/20/00	7/20/00					
Total Gallons	135	150	165	180					
Time (hours)	1515	1530	1545	1600					
Temperature (°C)	12.49	12.36	12.33	12.27					
Conductivity (mS/cm)	0.170	0.172	0.172	0.169					
PH	7.34	7.34	7.34	7.35					
Turbidity (NTU)	63.0	54.0	48.0	43.0					
Dissolved Oxygen (mg/L)	0.46	0.44	0.42	0.39					
Water Level (FT BTOC)	36.98	39.47	39.76	39.99					

NOTES: Take down WQ setup

DRAFT

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 03, Remedial Investigation
Project No.: 29600.96.3201
Staff: Kevin Baum/Sam Whitin

Well No.: **MW01-15R**

1. Total Riser and Screen Length (ft)	81.00
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/25/00	7/25/00	7/25/00	7/25/00	7/25/00	7/25/00	7/25/00	7/25/00	7/25/00
Total Gallons	--	2.0	15.0	25.0	30.0	40.0	50.0	60.0	73.0
Time (hours)	0945	1000	1015	1030	1045	1100	1115	1130	1145
Temperature (°C)	12.69	13.64	13.78	13.93	14.00	14.08	14.15	14.06	13.96
Conductivity (mS/cm)	0.200	0.203	0.211	0.224	0.228	0.230	0.146	0.232	0.197
PH	8.74	8.91	8.96	8.95	9.64	8.59	8.48	8.41	8.13
Turbidity (NTU)	141	179	177	158	124	116	64.3	60.6	45.3
Dissolved Oxygen (mg/L)	1.02	0.61	0.56	0.61	0.54	0.54	3.28	0.57	0.93
Water Level (FT BTOC)	18.6	20.29	23.0	23.06	23.07	23.41	25.82	27.59	31.71

NOTES: DTW 1608-0935
Surged: 1104, 1133

DRAFT

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 03, Remedial Investigation
Project No.: 29600.96.3201
Staff: Kevin Baum/Sam Whitin

Well No.: **MW01-15R**

1. Total Riser and Screen Length (ft)	81.00
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/25/00	7/25/00	7/25/00	7/25/00	7/25/00				
Total Gallons	85.0	90.0	102	115	125				
Time (hours)	1200	1215	1230	1245	1300				
Temperature (°C)	14.00	13.79	14.08	14.18	14.18				
Conductivity (mS/cm)	0.232	0.241	0.241	0.243	0.239				
PH	7.84	9.11	8.30	8.74	8.41				
Turbidity (NTU)	36.9	53.2	33.5	32.1	29.3				
Dissolved Oxygen (mg/L)	4.62	1.88	1.44	0.83	1.38				
Water Level (FT BTOC)	33.63	38.07	38.03	38.14	38.31				

NOTES: Surged: 1203

DRAFT

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 03, Remedial Investigation
Project No.: 29600.96.3201
Staff: Sam Whitin

Well No.:
MW02-03R

1. Total Riser and Screen Length (ft)	73.08
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/25/00	7/25/00	7/25/00	7/25/00	7/25/00	7/25/00	7/25/00	7/25/00	7/25/00
Total Gallons	–	15.0	30.0	45.0	60.0	75.0	90.0	105	120
Time (hours)	1020	1035	1050	1105	1120	1135	1150	1205	1220
Temperature (°C)	14.51	14.30	14.85	14.63	14.35	14.25	14.11	14.15	14.16
Conductivity (mS/cm)	0.172	0.247	0.185	0.184	0.182	0.183	0.184	0.184	0.184
PH	7.99	7.84	7.29	7.13	6.95	6.77	6.72	6.66	6.65
Turbidity (NTU)	297	195	133	42.0	26.0	21.0	80.0	32.0	26.0
Dissolved Oxygen (mg/L)	2.48	1.25	0.98	1.02	0.37	1.15	0.69	0.28	0.16
Water Level (FT BTOC)	23.42	23.71	23.92	23.79	23.92	23.91	23.91	23.97	24.04

NOTES:

DRAFT

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 03, Remedial Investigation
Project No.: 29600.96.3201
Staff: Sam Whitin

Well No.: **MW02-03R**

1. Total Riser and Screen Length (ft)	73.08
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/25/00	7/25/00	7/25/00	7/25/00					
Total Gallons	135	150	165	180					
Time (hours)	1235	1250	1305	1320					
Temperature (°C)	14.15	14.09	14.18	14.12					
Conductivity (mS/cm)	0.186	0.183	0.185	0.184					
PH	6.64	6.63	6.62	6.63					
Turbidity (NTU)	20.0	14.0	14.0	14.0					
Dissolved Oxygen (mg/L)	0.15	0.18	0.21	0.17					
Water Level (FT BTOC)	24.06	24.07	24.06	24.06					

NOTES: 1320-MW02-03R Time Out

DRAFT

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 03, Remedial Investigation
Project No.: 29600.96.3201
Staff: Kevin Baum/Sam Whitin

Well No.: **MW03-03R**

1. Total Riser and Screen Length (ft)	94.07
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/24/00	7/24/00	7/24/00	7/24/00	7/24/00	7/24/00	7/24/00	7/24/00	7/24/00
Total Gallons	0.0	10.0	23.0	38.0	50.0	62.0	74.0	86.0	98.0
Time (hours)	1030	1045	1100	1115	1130	1145	1200	1215	1230
Temperature (°C)	13.80	13.87	13.83	13.81	13.74	13.72	13.74	13.69	13.71
Conductivity (mS/cm)	0.246	0.178	0.172	0.176	0.170	0.171	0.171	0.172	0.170
PH	7.12	6.76	6.78	6.79	6.64	6.65	6.81	6.67	6.67
Turbidity (NTU)	52.7	67.8	27.5	17.9	15.4	14.2	17.8	9.10	9.58
Dissolved Oxygen (mg/L)	1.21	0.49	0.37	0.45	0.31	0.29	0.36	0.28	0.27
Water Level (FT BTOC)	15.69	16.72	16.73	16.73	16.73	16.73	16.73	16.73	16.73

NOTES: Surged at 1102, 1117

DRAFT

WELL DEVELOPMENT LOG

Client: NORDIV, NAVFAC
Project Title: NCBC Davisville, IR Program Site 03, Remedial Investigation
Project No.: 29600.96.3201
Staff: Kevin Baum/Sam Whitin

Well No.: **MW03-03R**

1. Total Riser and Screen Length (ft)	94.07
2. Screen Internal Diameter (in.)	3 7/8
3. Water Level Below Measuring Point (ft)	NA
4. Volume of Water in Well (gal) V = (1-3)*(5)	NA

Screen ID	5. Volume/Ft (gal/ft)
1 in.	0.04
2 in.	0.16
4 in.	0.65
6 in.	1.47
8 in.	2.61

Parameters

Date	7/24/00	7/24/00							
Total Gallons	110	122							
Time (hours)	1245	1300							
Temperature (°C)	13.69	13.68							
Conductivity (mS/cm)	0.171	0.168							
PH	6.64	6.63							
Turbidity (NTU)	5.89	3.93							
Dissolved Oxygen (mg/L)	0.27	0.27							
Water Level (FT BTOC)	16.73	16.73							

NOTES:

DRAFT

PACKER TEST FORM

Project Name: CVOC Characterization Former Nike PR-58 Site and Adjacent Navy NCBC Davisville Site 03					Hole No.	EA-114R
Project Number: 60957.56.0003					Test No.	1
Client: U.S. Army Corps of Engineers – New England District					Location:	NIKE PR-58 Site
Contractor: Dragin Drilling					Date:	6/19/00
	Packer System	Water Meter	Water Gauge	Surge Chamber	Driller:	George Henner
Type	2 bask-01	Cubic feet 0.75 in.	0.25 in. 300 psi	Vertical Baffle	Inspector:	R. Clark
Mfg.	DRAGIN Drilling	Sensus	WalRick	DRAGIN Drilling	Hole Size:	3 7/8 in.
Model No.	DRP-1	50817202	1712541	N/A	Length of Section:	5 ft

GPmax = (0.566 to 1.0) x H1 38.3

Computed Max Gauge Pressure: (GPmax) 19.4

Computed Internal Friction

Rock Type phyllite/quartzite

Recovery 96 in.

RQD (%) 87.5%

Depths: (all distances measured from ground surface in feet)

To Top of Rock 17.6

To Bottom of Boring 42.7

To Water (H2) 4.2 ft

To Top Lower Packer 43.2 ft

To Bottom Upper Packer (H1) 38.3

Height of Water Pressure Gauge Above Ground Surface (H3) 1.5

GPmax = [(H1 + H3) (1 psi/ft)] - Ps (28.3 + 1.5) - 10.4 = 19.4

Minimum Inflation Pressure (MIP) 90

Static Pressure Head (Ps) = (H1 - H2) x 0.43 psi/ft 10.4

Packer Inflation Pressure (PIP) = (MIP + Ps + GPmax) 90 + 10.4 + 19.4 = 119.8

Maximum Water Pressure (Pmax) 28.3

Time	Elapsed Time (min)	Packer Pressure (psi)	Gauge Pressure (psi)	Meter Reading (gal)	Volume of Flow (gal/min)	Remarks
0	0	120	10		10	No water loss
0.5	0.5	120	10		10	No water loss
1	1	120	10		10	No water loss
1.5	1.5	120	10		10	No water loss
2	2	120	10		10	No water loss
2.5	2.5	120	10		10	No water loss
3	3	120	10		10	No water loss
3.5	3.5	120	10		10	No water loss
4	4	120	10		10	No water loss
4.5	4.5	120	10		10	No water loss
5	5	120	10		10	No water loss
1	1	120	20		10	No water loss
2	2	120	20		10	No water loss
3	3	120	20		10	No water loss
4	4	120	20		10	No water loss
5	5	120	20		10	No water loss

DRAFT

PACKER TEST LOG

Project Name: CVOC Characterization Former Nike PR-58 Site and Adjacent Navy NCBC Davisville Site 03	Hole No. EA-114R
Project Number: 60957.56.0003	Test No. 2
Client: U.S. Army Corps of Engineers – New England District	Location: NIKE PR-58 Site
Contractor: Dragin Drilling	Date: 6/19/00
	Driller: George Henner
	Inspector: R. Clark
	Hole Size: 3 7/8 in.
	Length of Section: 5 ft

	Packer System	Water Meter	Water Gauge	Surge Chamber
Type	2 bask-01	Cubic feet 0.75 in.	0.25 in. 300 psi	Vertical Baffle
Mfg.	DRAGIN Drilling	Sensus	WalRick	DRAGIN Drilling
Model No.	DRP-1	50817202	1712541	N/A

GPmax = (0.566 to 1.0) × H1: 81.3

Computed Max Gauge Pressure: (GPmax): 21.5

Computed Internal Friction:

Rock Type: quartzite/phyllite

Recovery: 100

RQD (%): 85

Depths: (all distances measured from ground surface in feet)

To Top of Rock: 17.6

To Bottom of Boring: 42.7

To Water (H2): 4.2

To Top Lower Packer: 90

To Bottom Upper Packer (H1): 81.3

Height of Water Pressure Gauge Above Ground Surface (H3): 1.5 ft.

GPmax = [(H1 + H3) (1 psi/ft)] - Ps: 21.5

Minimum Inflation Pressure (MIP): 90

Static Pressure Head (Ps) = (H1 - H2) × 0.43 psi/ft: 11.9

Packer Inflation Pressure (PIP) = (MIP + Ps + GPmax): 123.4

Maximum Water Pressure (Pmax): 120

Time	Elapsed Time (min)	Packer Pressure (psi)	Gauge Pressure (psi)	Meter Reading (gal)	Volume of Flow (gal/min)	Remarks
	0	120	10		10	Time (in seconds) it takes to recover 5 gallons water:
	1	120	10		10	35
	2	120	10		10	38
	3	120	10		10	39
	4	120	10		10	36
	5	120	10		10	39
	1	120	20		10	38
	2	120	20		10	39
	3	120	20		10	37
	4	120	20		10	38
	5	120	20		10	38
	1	120	40		10	30
	2	120	40		10	31
	3	120	40		10	31
	4	120	40		10	31
	5	120	40		10	33

DRAFT

Project Name: CVOC Characterization Former Nike PR-58 Site and Adjacent Navy NCBC Davisville Site 03					Hole No. EA-114R
Project Number: 60957.56.0003					Test No. 3
Client: U.S. Army Corps of Engineers – New England District					Location: NIKE PR-58 Site
Contractor: Dragin Drilling					Date: 6/19/00
	Packer System	Water Meter	Water Gauge	Surge Chamber	Driller: George Henner
Type	2 bask-01	Cubic feet 0.75 in.	0.25 in. 300 psi	Vertical Baffle	Inspector: R. Clark
Mfg.	DRAGIN Drilling	Sensus	WalRick	DRAGIN Drilling	Hole Size: 3 7/8 in.
Model No.	DRP-1	50817202	1712541	N/A	Length of Section: 5 ft

GPmax = (0.566 to 1.0) × H1	26.9	Rock Type	quartzite
Computed Max Gauge Pressure: (GPmax)	18.6	Recovery	100
Computed Internal Friction		RQD (%)	77.5

Depths: (all distances measured from ground surface in feet)

To Top of Rock	17.6	To Top Lower Packer	33.1
To Bottom of Boring	42.7	To Bottom Upper Packer (H1)	26.9
To Water (H2)	4.2		

Height of Water Pressure Gauge Above Ground Surface (H3)	1.5
GPmax = [(H1 + H3) (1 psi/ft)] - Ps	18.6
Minimum Inflation Pressure (MIP)	90
Static Pressure Head (Ps) = (H1 - H2) × 0.43 psi/ft	9.8
Packer Inflation Pressure (PIP) = (MIP + Ps + GPmax)	118.4
Maximum Water Pressure (Pmax)	

Time	Elapsed Time (min)	Packer Pressure (psi)	Gauge Pressure (psi)	Meter Reading (gal)	Volume of Flow (gal/min)	Remarks
	0					Time (in seconds) it takes to recover 5 gallons water:
	1	120	9	35 seconds = 5 gallons		37
	2	120	9			35
	3	120	9			35
	4	120	9			35
	5	120	9			35
	1	120	18			35
	2	120	18			34
	3	120	18			36
	4	120	18			35
	5	120	18			35
	1	120	38			36
	2	120	38			34
	3	120	38			33
	4	120	38			35
	5	120	38			34

DRAFT

Project Name: CVOC Characterization Former Nike PR-58 Site and Adjacent Navy NCBC Davisville Site 03					Hole No. EA-114R
Project Number: 60957.56.0003					Test No. 4
Client: U.S. Army Corps of Engineers – New England District					Location: NIKE PR-58 Site
Contractor: Dragin Drilling					Date: 6/19/00
	Packer System	Water Meter	Water Gauge	Surge Chamber	Driller: George Henner
Type	2 bask-01	Cubic feet 0.75 in.	0.25 in. 300 psi	Vertical Baffle	Inspector: R. Clark
Mfg.	DRAGIN Drilling	Sensus	WalRick	DRAGIN Drilling	Hole Size: 3 7/8 in.
Model No.	DRP-1	50817202	1712541	N/A	Length of Section: 5 ft

GPmax = (0.566 to 1.0) × H1: 21.9
Computed Max Gauge Pressure: (GPmax): 15.8
Computed Internal Friction:
Rock Type: quartzite/phyllite
Recovery: 100
RQD (%): 63

Depths: (all distances measured from ground surface in feet)

To Top of Rock: 17.6
To Bottom of Boring: 42.7
To Water (H2): 4.2
To Top Lower Packer: 28.1
To Bottom Upper Packer (H1): 21.9

Height of Water Pressure Gauge Above Ground Surface (H3): 1.5
GPmax = [(H1 + H3) (1 psi/ft)] - Ps: 15.8
Minimum Inflation Pressure (MIP): 90
Static Pressure Head (Ps) = (H1 - H2) × 0.43 psi/ft: 7.6
Packer Inflation Pressure (PIP) = (MIP + Ps + GPmax): 113.4
Maximum Water Pressure (Pmax):

Time	Elapsed Time (min)	Packer Pressure (psi)	Gauge Pressure (psi)	Meter Reading (gal)	Volume of Flow (gal/min)	Remarks
	0	120			5 gallons = 35 seconds	Time (in seconds) it takes to recover 5 gallons water:
	1	120	8			37
	2	120	8			37
	3	120	8			37
	4	120	8			37
	5	120	8			37
	1	120	16			35
	2	120	16			38
	3	120	16			37
	4	120	16			38
	5	120	16			36
	1	120	36			37
	2	120	36			37
	3	120	36			37
	4	120	36			37
	5	120	36			36

DRAFT

Project Name: CVOC Characterization Former Nike PR-58 Site and Adjacent Navy NCBC Davisville Site 03					Hole No. EA-114R
Project Number: 60957.56.0003					Test No. 5
Client: U.S. Army Corps of Engineers – New England District					Location: NIKE PR-58 Site
Contractor: Dragin Drilling					Date: 6/19/00
	Packer System	Water Meter	Water Gauge	Surge Chamber	Driller: George Henner
Type	2 bask-01	Cubic feet 0.75 in.	0.25 in. 300 psi	Vertical Baffle	Inspector: R. Clark
Mfg.	DRAGIN Drilling	Sensus	WalRick	DRAGIN Drilling	Hole Size: 3 7/8 in.
Model No.	DRP-1	50817202	1712541	N/A	Length of Section: 5 ft

GPmax = (0.566 to 1.0) × H1: 16.9
Computed Max Gauge Pressure: (GPmax): 12.9
Computed Internal Friction:
Rock Type: quartzite
Recovery: 85
RQD (%): 63.5

Depths: (all distances measured from ground surface in feet)

To Top of Rock: 17.6
To Bottom of Boring: 42.7
To Water (H2): 4.2
To Top Lower Packer: 23.1
To Bottom Upper Packer (H1): 16.9

Height of Water Pressure Gauge Above Ground Surface (H3): 1.5
GPmax = [(H1 + H3) (1 psi/ft)] - Ps: 12.9
Minimum Inflation Pressure (MIP): 90
Static Pressure Head (Ps) = (H1 - H2) × 0.43 psi/ft: 5.5
Packer Inflation Pressure (PIP) = (MIP + Ps + GPmax): 108.4
Maximum Water Pressure (Pmax):

Time	Elapsed Time (min)	Packer Pressure (psi)	Gauge Pressure (psi)	Meter Reading (gal)	Volume of Flow (gal/min)	Remarks
	0				35 seconds = 5 gallons	Time (in seconds) it takes to recover 5 gallons water:
	1	120	7			39
	2	120	7			39
	3	120	7			39
	4	120	7			37
	5	120	7			38
	1	120	14			38
	2	120	14			38
	3	120	14			37
	4	120	14			37
	5	120	14			37
	1	120	34			37
	2	120	34			38
	3	120	34			37
	4	120	34			37
	5	120	34			38

DRAFT

PACKER TEST FORM

Project Name: CVOC Characterization Former Nike PR-58 Site and Adjacent Navy NCBC Davisville Site 03	Hole No. MW03-14R2
Project Number: 60957.56.0003	Test No. 1
Client: U.S. Army Corps of Engineers – New England District	Location: NIKE PR-58 Site
Contractor: Dragin Drilling	Date: 6/22/00

	Packer System	Water Meter	Water Gauge	Surge Chamber	
Type	2 bask-01	Cubic feet 0.75 in.	0.25 in. 300 psi	Vertical Baffle	Driller: George Henner
Mfg.	DRAGIN Drilling	Sensus	WalRick	DRAGIN Drilling	Inspector: R. Clark
Model No.	DRP-1	50817202	1712541	N/A	Hole Size: 3 7/8 in.
					Length of Section: 5 ft

GPmax = (0.566 to 1.0) x H1	88	Rock Type	quartzite
Computed Max Gauge Pressure: (GPmax)	57.8	Recovery	100
Computed Internal Friction		RQD (%)	92

Depths: (all distances measured from ground surface in feet)

To Top of Rock	37 ft	To Top Lower Packer	93 ft
To Bottom of Boring	93 ft	To Bottom Upper Packer (H1)	88 ft
To Water (H2)	13.4 ft		

Height of Water Pressure Gauge Above Ground Surface (H3)	1.8
GPmax = [(H1 + H3) (1 psi/ft)] - Ps	57.8
Minimum Inflation Pressure (MIP)	90
Static Pressure Head (Ps) = (H1 - H2) x 0.43 psi/ft	32
Packer Inflation Pressure (PIP) = (MIP + Ps + GPmax)	179.8
Maximum Water Pressure (Pmax)	

Time	Elapsed Time (min)	Packer Pressure (psi)	Gauge Pressure (psi)	Meter Reading (gal)	Volume of Flow (gal/min)	Remarks
	0					Time (in seconds) it takes to recover 5 gallons water:
	1	160	30		10	35
	2	160	30		10	35
	3	160	30		10	35
	4	160	30		10	35
	5	160	30		10	35
	1	160	60		10	50
	2	160	60		10	50
	3	160	60		10	50
	4	160	60		10	50
	5	160	60		10	50
	1	200	80		10	75
	2	200	80		10	60
	3	200	80		10	60
	4	200	80		10	60
	5	200	80		10	60

DRAFT

PACKER TEST LOG

Project Name: CVOC Characterization Former Nike PR-58 Site and Adjacent Navy NCBC Davisville Site 03	Hole No. MW03-14R
Project Number: 60957.56.0003	Test No. 2
Client: U.S. Army Corps of Engineers – New England District	Location: NIKE PR-58 Site
Contractor: Dragin Drilling	Date: 6/22/00

	Packer System	Water Meter	Water Gauge	Surge Chamber	
Type	2 bask-01	Cubic feet 0.75 in.	0.25 in. 300 psi	Vertical Baffle	Driller: George Henner
Mfg.	DRAGIN Drilling	Sensus	WalRick	DRAGIN Drilling	Inspector: R. Clark
Model No.	DRP-1	50817202	1712541	N/A	Hole Size: 3 7/8 in.
					Length of Section: 5 ft

GPmax = (0.566 to 1.0) × H1 83

Computed Max Gauge Pressure: (GPmax) 54.9

Computed Internal Friction

Rock Type quartzite/phyllite

Recovery 100

RQD (%) 100

Depths: (all distances measured from ground surface in feet)

To Top of Rock 37 ft

To Bottom of Boring 93 ft

To Water (H2) 13.4

To Top Lower Packer 88

To Bottom Upper Packer (H1) 83

Height of Water Pressure Gauge Above Ground Surface (H3) 1.8 ft.

GPmax = [(H1 + H3) (1 psi/ft)] - Ps 54.9

Minimum Inflation Pressure (MIP) 90

Static Pressure Head (Ps) = (H1 - H2) × 0.43 psi/ft 29.9

Packer Inflation Pressure (PIP) = (MIP + Ps + GPmax) 174.8

Maximum Water Pressure (Pmax)

Time	Elapsed Time (min)	Packer Pressure (psi)	Gauge Pressure (psi)	Meter Reading (gal)	Volume of Flow (gal/min)	Remarks
	0					Time (in seconds) it takes to recover 5 gallons water:
	1	200	27		10	30
	2	200	27		10	35
	3	200	27		10	35
	4	200	27		10	35
	5	200	27		10	35
	1	200	55		10	38
	2	200	55		10	38
	3	200	55		10	40
	4	200	55		10	40
	5	200	55		10	40
	1	200	75		10	40
	2	200	75		10	45
	3	200	75		10	46
	4	200	75		10	46
	5	200	75		10	46

DRAFT

Project Name: CVOC Characterization Former Nike PR-58 Site and Adjacent Navy NCBC Davisville Site 03					Hole No. MW03-14R2
Project Number: 60957.56.0003					Test No. 3
Client: U.S. Army Corps of Engineers – New England District					Location: NIKE PR-58 Site
Contractor: Dragin Drilling					Date: 6/22/00
	Packer System	Water Meter	Water Gauge	Surge Chamber	Driller: George Henner
Type	2 bask-01	Cubic feet 0.75 in.	0.25 in. 300 psi	Vertical Baffle	Inspector: R. Clark
Mfg.	DRAGIN Drilling	Sensus	WalRick	DRAGIN Drilling	Hole Size: 3 7/8 in.
Model No.	DRP-1	50817202	1712541	N/A	Length of Section: 5 ft

GPmax = (0.566 to 1.0) x H1: 73
Computed Max Gauge Pressure: (GPmax): 49.2
Computed Internal Friction:
Rock Type: phyllite/quartzite
Recovery: 100
RQD (%): 94

Depths: (all distances measured from ground surface in feet)

To Top of Rock: 37 ft
To Bottom of Boring: 93 ft
To Water (H2): 13.4 ft
To Top Lower Packer: 78
To Bottom Upper Packer (H1): 73

Height of Water Pressure Gauge Above Ground Surface (H3): 1.8
GPmax = [(H1 + H3) (1 psi/ft)] - Ps: 49.2
Minimum Inflation Pressure (MIP): 90
Static Pressure Head (Ps) = (H1 - H2) x 0.43 psi/ft: 25.6
Packer Inflation Pressure (PIP) = (MIP + Ps + GPmax): 164.8
Maximum Water Pressure (Pmax):

Time	Elapsed Time (min)	Packer Pressure (psi)	Gauge Pressure (psi)	Meter Reading (gal)	Volume of Flow (gal/min)	Remarks
	0					Time (in seconds) it takes to recover 5 gallons water:
	1	200	25		10	30
	2	200	25		10	30
	3	200	25		10	30
	4	200	25		10	30
	5	200	25		10	30
	1	200	50		10	30
	2	200	50		10	33
	3	200	50		10	32
	4	200	50		10	33
	5	200	50		10	30
	1	200	75		10	36
	2	200	75		10	36
	3	200	75		10	35
	4	200	75		10	36
	5	200	75		10	34

DRAFT

Project Name: CVOC Characterization Former Nike PR-58 Site and Adjacent Navy NCBC Davisville Site 03					Hole No. MW03-14R2
Project Number: 60957.56.0003					Test No. 4
Client: U.S. Army Corps of Engineers – New England District					Location: NIKE PR-58 Site
Contractor: Dragin Drilling					Date: 6/22/00
	Packer System	Water Meter	Water Gauge	Surge Chamber	Driller: George Henner
Type	2 bask-01	Cubic feet 0.75 in.	0.25 in. 300 psi	Vertical Baffle	Inspector: R. Clark
Mfg.	DRAGIN Drilling	Sensus	WalRick	DRAGIN Drilling	Hole Size: 3 7/8 in.
Model No.	DRP-1	50817202	1712541	N/A	Length of Section: 5 ft

GPmax = (0.566 to 1.0) × H1: 68
Computed Max Gauge Pressure: (GPmax): 46.3
Computed Internal Friction:
Rock Type: quartzite/phyllite
Recovery: 88
RQD (%): 83

Depths: (all distances measured from ground surface in feet)

To Top of Rock: 37 ft
To Bottom of Boring: 93 ft
To Water (H2): 13.4
To Top Lower Packer: 73
To Bottom Upper Packer (H1): 68

Height of Water Pressure Gauge Above Ground Surface (H3): 1.8
GPmax = [(H1 + H3) (1 psi/ft)] - Ps: 46.3
Minimum Inflation Pressure (MIP): 90
Static Pressure Head (Ps) = (H1 - H2) × 0.43 psi/ft: 23.5
Packer Inflation Pressure (PIP) = (MIP + Ps + GPmax): 159.8
Maximum Water Pressure (Pmax):

Time	Elapsed Time (min)	Packer Pressure (psi)	Gauge Pressure (psi)	Meter Reading (gal)	Volume of Flow (gal/min)	Remarks
	0					Time (in seconds) it takes to recover 5 gallons water:
	1	160	25		10	34
	2	160	25		10	33
	3	160	25		10	31
	4	160	25		10	32
	5	160	25		10	32
	1	160	50		10	30
	2	160	50		10	33
	3	160	50		10	34
	4	160	50		10	35
	5	160	50		10	35
	1	160	70		10	34
	2	160	70		10	36
	3	160	70		10	36
	4	160	70		10	36
	5	160	70		10	37

DRAFT

Project Name: CVOC Characterization Former Nike PR-58 Site and Adjacent Navy NCBC Davisville Site 03					Hole No. EA-114R
Project Number: 60957.56.0003					Test No. 5
Client: U.S. Army Corps of Engineers – New England District					Location: NIKE PR-58 Site
Contractor: Dragin Drilling					Date: 6/19/00
	Packer System	Water Meter	Water Gauge	Surge Chamber	Driller: George Henner
Type	2 bask-01	Cubic feet 0.75 in.	0.25 in. 300 psi	Vertical Baffle	Inspector: R. Clark
Mfg.	DRAGIN Drilling	Sensus	WalRick	DRAGIN Drilling	Hole Size: 3 7/8 in.
Model No.	DRP-1	50817202	1712541	N/A	Length of Section: 5 ft

GPmax = (0.566 to 1.0) x H1: 16.9
Computed Max Gauge Pressure: (GPmax): 12.9
Computed Internal Friction:
Rock Type: quartzite
Recovery: 85
RQD (%): 63.5

Depths: (all distances measured from ground surface in feet)

To Top of Rock: 37 ft
To Bottom of Boring: 93 ft
To Water (H2): 4.2
To Top Lower Packer: 23.1
To Bottom Upper Packer (H1): 16.9

Height of Water Pressure Gauge Above Ground Surface (H3): 1.5
GPmax = [(H1 + H3) (1 psi/ft)] - Ps: 12.9
Minimum Inflation Pressure (MIP): 90
Static Pressure Head (Ps) = (H1 - H2) x 0.43 psi/ft: 5.5
Packer Inflation Pressure (PIP) = (MIP + Ps + GPmax): 108.4
Maximum Water Pressure (Pmax):

Time	Elapsed Time (min)	Packer Pressure (psi)	Gauge Pressure (psi)	Meter Reading (gal)	Volume of Flow (gal/min)	Remarks
	0				35 seconds = 5 gallons	Time (in seconds) it takes to recover 5 gallons water:
	1	120	7			39
	2	120	7			39
	3	120	7			39
	4	120	7			37
	5	120	7			38
	1	120	14			38
	2	120	14			38
	3	120	14			37
	4	120	14			37
	5	120	14			37
	1	120	34			37
	2	120	34			38
	3	120	34			37
	4	120	34			37
	5	120	34			38

DRAFT

SLUG TEST ANALYSIS USING HVORSLEV METHOD

WELL IDENTIFICATION:	EA-114D #1
SITE NAME:	NCBC Davisiville
TEST DATE:	18-Jul-00
TIME:	1030
RISING/FALLING HEAD:	Rising (Slug out)
INITIAL WATER LEVEL:	

WELL SPECIFIC DATA

Well Parameter	Description	Value	Units
r	radius of well	0.083	ft
L	Length of screen	10	ft
R	Screen diameter	0.083	ft
To	Time at 37% drawdown	0.0001	seconds

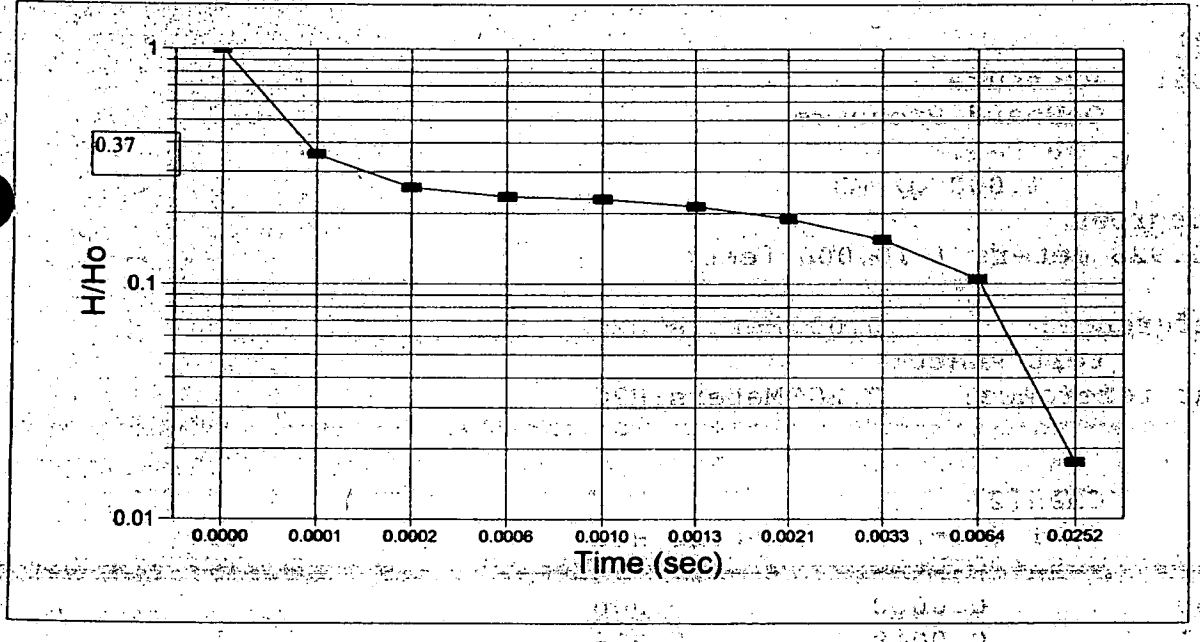
DRAWDOWN DATA

ELAPSED TIME (SECONDS)		HEAD CHANGE (ft)	
Time (Minutes)		Head Change	H/Ho
0	0.0000	2.092	1
0.0048	0.0001	0.744	0.36
0.01	0.0002	0.537	0.26
0.035	0.0006	0.49	0.23
0.06	0.0010	0.479	0.23
0.075	0.0013	0.446	0.21
0.1255	0.0021	0.395	0.19
0.195	0.0033	0.323	0.15
0.3813	0.0064	0.219	0.10
1.513	0.0252	0.0364	0.02

HYDRAULIC CONDUCTIVITY

K Value	Units
1.426E+00	ft/day
1.650E-05	ft/sec
5.031E-04	cm/sec

DRAWDOWN PLOT WITH TIME



DRAFT

In-Situ Inc. MiniTroll Pro

Report generated: 12/19/0012:14:05
Report from file: \\Corporate_fp\boston\PROJECTS\60957.56\0003 MW Drilling\S
DataMgr Version 3.11

Serial number: 00001460
Firmware Version 1.04
Unit name: miniTROLL

Test name: PR58,EA114D,#1

Test defined on: 07/18/0010:28:13
Test started on: 07/18/0010:34:50
Test stopped on: 07/18/0010:36:28
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 0.0500 Minutes.
Number of data samples: 73

TOTAL DATA SAMPLES 73

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI.
Density: 1.000 g/cm3
Latitude: 45 degrees
Elevation: 185.928 meters (610.000 feet)
Mode: TOC
User-defined reference: 0.000Meters H2O
Referenced on: test start
Pressure head at reference: 2.286Meters H2O

Date	Time	Chan[2] ET (min)	Meters H2O
7/18/00	10:34:50	0.0000	0.000
7/18/00	10:34:51	0.0048	0.016
7/18/00	10:34:51	0.0098	0.022
7/18/00	10:34:51	0.0150	2.092
7/18/00	10:34:51	0.0198	0.774
7/18/00	10:34:52	0.0250	0.537
7/18/00	10:34:52	0.0300	0.524
7/18/00	10:34:52	0.0350	0.512
7/18/00	10:34:53	0.0398	0.505
7/18/00	10:34:53	0.0450	0.497
7/18/00	10:34:53	0.0500	0.490
7/18/00	10:34:54	0.0550	0.488
7/18/00	10:34:54	0.0600	0.482
7/18/00	10:34:54	0.0648	0.487
7/18/00	10:34:54	0.0700	0.480
7/18/00	10:34:55	0.0750	0.479

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07/18/00	10:34:55	0.0798	0.454
07/18/00	10:34:55	0.0850	0.446
07/18/00	10:34:56	0.0900	0.446
07/18/00	10:34:56	0.0950	0.437
07/18/00	10:34:56	0.1000	0.434
07/18/00	10:34:57	0.1058	0.428
07/18/00	10:34:57	0.1118	0.421
07/18/00	10:34:57	0.1185	0.416
07/18/00	10:34:58	0.1255	0.408
07/18/00	10:34:58	0.1327	0.402
07/18/00	10:34:59	0.1405	0.395
07/18/00	10:34:59	0.1488	0.387
07/18/00	10:35:00	0.1578	0.380
07/18/00	10:35:00	0.1670	0.360
07/18/00	10:35:01	0.1770	0.350
07/18/00	10:35:02	0.1875	0.341
07/18/00	10:35:02	0.1985	0.332
07/18/00	10:35:03	0.2100	0.323
07/18/00	10:35:04	0.2225	0.313
07/18/00	10:35:04	0.2358	0.305
07/18/00	10:35:05	0.2498	0.295
07/18/00	10:35:06	0.2647	0.286
07/18/00	10:35:07	0.2803	0.276
07/18/00	10:35:08	0.2970	0.267
07/18/00	10:35:09	0.3145	0.258
07/18/00	10:35:10	0.3333	0.248
07/18/00	10:35:11	0.3532	0.239
07/18/00	10:35:13	0.3740	0.228
07/18/00	10:35:14	0.3963	0.219
07/18/00	10:35:15	0.4198	0.209
07/18/00	10:35:17	0.4445	0.199
07/18/00	10:35:18	0.4695	0.189
07/18/00	10:35:20	0.4963	0.180
07/18/00	10:35:22	0.5247	0.170
07/18/00	10:35:24	0.5547	0.161
07/18/00	10:35:25	0.5862	0.151
07/18/00	10:35:28	0.6213	0.142
07/18/00	10:35:30	0.6580	0.133
07/18/00	10:35:32	0.6963	0.124
07/18/00	10:35:35	0.7380	0.112
07/18/00	10:35:37	0.7813	0.103
07/18/00	10:35:40	0.8278	0.094
07/18/00	10:35:43	0.8762	0.086
07/18/00	10:35:46	0.9278	0.079
07/18/00	10:35:49	0.9778	0.073
07/18/00	10:35:52	1.0278	0.067
07/18/00	10:35:55	1.0780	0.062
07/18/00	10:35:58	1.1280	0.058
07/18/00	10:36:01	1.1780	0.054
07/18/00	10:36:04	1.2280	0.051
07/18/00	10:36:07	1.2780	0.047
07/18/00	10:36:10	1.3280	0.044
07/18/00	10:36:13	1.3780	0.041
07/18/00	10:36:16	1.4280	0.037
07/18/00	10:36:19	1.4780	0.036
07/18/00	10:36:22	1.5280	0.034

DRAFT

SLUG TEST ANALYSIS USING HVORSLEV METHOD

WELL IDENTIFICATION:	EA-114D #2
SITE NAME:	NCBC Davisville
TEST DATE:	18-Jul-00
TIME:	1040
RISING/FALLING HEAD:	Rising (Slug out)
INITIAL WATER LEVEL:	

WELL SPECIFIC DATA

Well Parameter	Description	Value	Units
r	radius of well	0.083	ft
L	Length of screen	10	ft
R	Screen diameter	0.083	ft
To	Time at 37% drawdown	0.00017	seconds

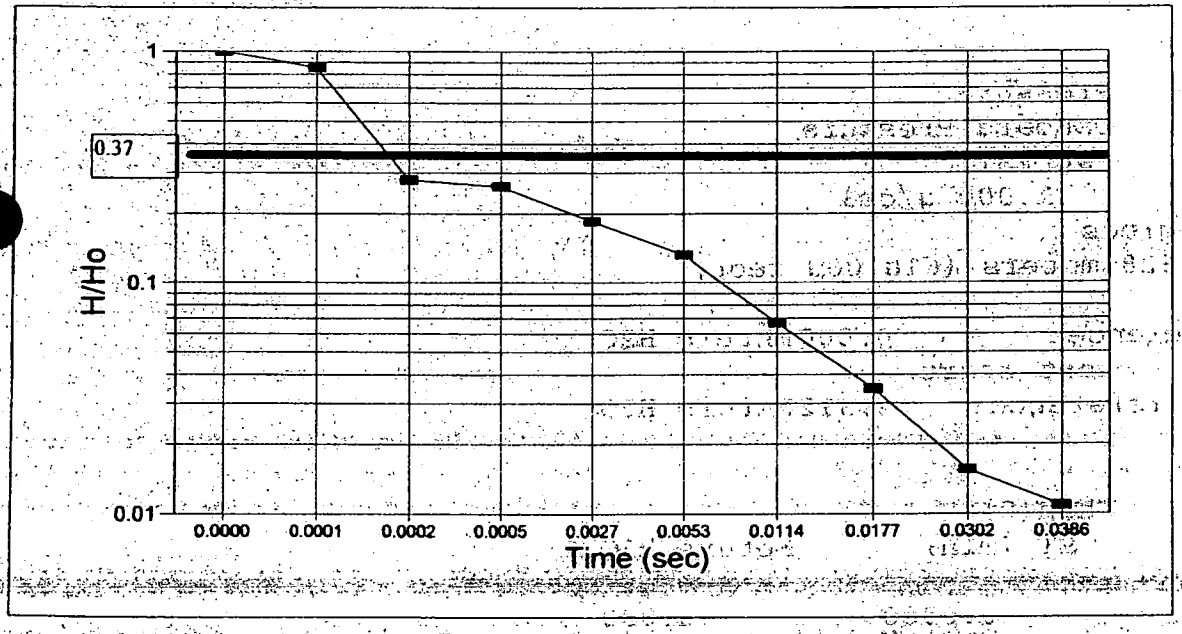
DRAWDOWN DATA

ELAPSED TIME (SECONDS)		HEAD CHANGE (ft)	
Time (Minutes)		Head Change	H/Ho
0	0.0000	1.937	1
0.0048	0.0001	1.649	0.85
0.01	0.0002	0.539	0.28
0.03	0.0005	0.505	0.26
0.162	0.0027	0.357	0.18
0.3183	0.0053	0.255	0.13
0.6813	0.0114	0.129	0.07
1.063	0.0177	0.067	0.03
1.813	0.0302	0.03	0.02
2.313	0.0386	0.021	0.01

HYDRAULIC CONDUCTIVITY

K Value	Units
2.424E+00	ft/day
2.806E-05	ft/sec
8.552E-04	cm/sec

DRAWDOWN PLOT WITH TIME



DRAFT

In-Situ Inc. MiniTroll Pro

Report generated: 12/19/0012:14:27
Report from file: \\Corporate_fp\boston\PROJECTS\60957.56\0003 MW Drilling\S
DataMgr Version 3.11

Serial number: 00001460
Firmware Version 1.04
Unit name: miniTROLL

Test name: PR58,EA114D,#2

Test defined on: 07/18/0010:42:05
Test started on: 07/18/0010:42:40
Test stopped on: 07/18/0010:45:01
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 0.0500 Minutes.
Number of data samples: 88

TOTAL DATA SAMPLES 88

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI
Density: 1.000 g/cm3
Latitude: 45 degrees
Elevation: 185.928 meters (610.000 feet)
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 2.312 Meters H2O

Date	Time	Chan[2] ET (min)	Meters H2O
7/18/00	10:42:40	0.0000	0.000
7/18/00	10:42:41	0.0048	0.017
7/18/00	10:42:41	0.0098	0.022
7/18/00	10:42:41	0.0150	1.937
7/18/00	10:42:41	0.0198	1.649
7/18/00	10:42:42	0.0250	0.539
7/18/00	10:42:42	0.0300	0.529
7/18/00	10:42:42	0.0350	0.519
7/18/00	10:42:43	0.0398	0.512
7/18/00	10:42:43	0.0450	0.505
7/18/00	10:42:43	0.0500	0.493
7/18/00	10:42:44	0.0550	0.489
7/18/00	10:42:44	0.0600	0.485
7/18/00	10:42:44	0.0648	0.475
7/18/00	10:42:44	0.0700	0.472
7/18/00	10:42:45	0.0750	0.466

DRAFT

07/18/00 10:42:45	0.0798	0.459
07/18/00 10:42:45	0.0850	0.457
07/18/00 10:42:46	0.0900	0.448
07/18/00 10:42:46	0.0950	0.443
07/18/00 10:42:46	0.1000	0.441
07/18/00 10:42:47	0.1058	0.433
07/18/00 10:42:47	0.1118	0.428
07/18/00 10:42:47	0.1185	0.420
07/18/00 10:42:48	0.1255	0.413
07/18/00 10:42:48	0.1327	0.407
07/18/00 10:42:49	0.1405	0.401
07/18/00 10:42:49	0.1488	0.394
07/18/00 10:42:50	0.1578	0.386
07/18/00 10:42:50	0.1670	0.367
07/18/00 10:42:51	0.1770	0.357
07/18/00 10:42:52	0.1875	0.347
07/18/00 10:42:52	0.1985	0.338
07/18/00 10:42:53	0.2100	0.329
07/18/00 10:42:54	0.2225	0.320
07/18/00 10:42:54	0.2358	0.311
07/18/00 10:42:55	0.2498	0.301
07/18/00 10:42:56	0.2647	0.293
07/18/00 10:42:57	0.2803	0.284
07/18/00 10:42:58	0.2970	0.273
07/18/00 10:42:59	0.3145	0.264
07/18/00 10:43:00	0.3333	0.255
07/18/00 10:43:01	0.3532	0.246
07/18/00 10:43:03	0.3740	0.235
07/18/00 10:43:04	0.3963	0.226
07/18/00 10:43:05	0.4198	0.216
07/18/00 10:43:07	0.4445	0.206
07/18/00 10:43:08	0.4695	0.196
07/18/00 10:43:10	0.4963	0.186
07/18/00 10:43:12	0.5247	0.177
07/18/00 10:43:14	0.5547	0.166
07/18/00 10:43:15	0.5862	0.158
07/18/00 10:43:18	0.6213	0.147
07/18/00 10:43:20	0.6580	0.138
07/18/00 10:43:22	0.6963	0.129
07/18/00 10:43:25	0.7380	0.117
07/18/00 10:43:27	0.7813	0.108
07/18/00 10:43:30	0.8278	0.099
07/18/00 10:43:33	0.8762	0.091
07/18/00 10:43:36	0.9278	0.085
07/18/00 10:43:39	0.9778	0.078
07/18/00 10:43:42	1.0278	0.073
07/18/00 10:43:45	1.0780	0.067
07/18/00 10:43:48	1.1280	0.064
07/18/00 10:43:51	1.1780	0.060
07/18/00 10:43:54	1.2280	0.056
07/18/00 10:43:57	1.2780	0.052
07/18/00 10:44:00	1.3280	0.049
07/18/00 10:44:03	1.3780	0.046
07/18/00 10:44:06	1.4280	0.043
07/18/00 10:44:09	1.4780	0.041
07/18/00 10:44:12	1.5280	0.039

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07/18/00	10:44:15	1.5780	0.038
07/18/00	10:44:18	1.6280	0.036
07/18/00	10:44:21	1.6780	0.034
07/18/00	10:44:24	1.7280	0.032
07/18/00	10:44:27	1.7780	0.031
07/18/00	10:44:30	1.8280	0.030
07/18/00	10:44:33	1.8780	0.028
07/18/00	10:44:36	1.9280	0.028
07/18/00	10:44:39	1.9780	0.027
07/18/00	10:44:42	2.0280	0.025
07/18/00	10:44:45	2.0780	0.025
07/18/00	10:44:48	2.1280	0.024
07/18/00	10:44:51	2.1780	0.022
07/18/00	10:44:54	2.2280	0.022
07/18/00	10:44:57	2.2780	0.022
07/18/00	10:45:00	2.3280	0.021

DRAFT

SLUG TEST ANALYSIS USING HVORSLEV METHOD

WELL IDENTIFICATION:	EA-114D, #3
SITE NAME:	NCBC Davisville
TEST DATE:	18-Jul-00
TIME:	1050
RISING/FALLING HEAD:	Rising (Slug out)
INITIAL WATER LEVEL:	

WELL SPECIFIC DATA

Well Parameter	Description	Value	Units
r	radius of well	0.083	ft
L	Length of screen	10	ft
R	Screen diameter	0.083	ft
To	Time at 37% drawdown	0.0025	seconds

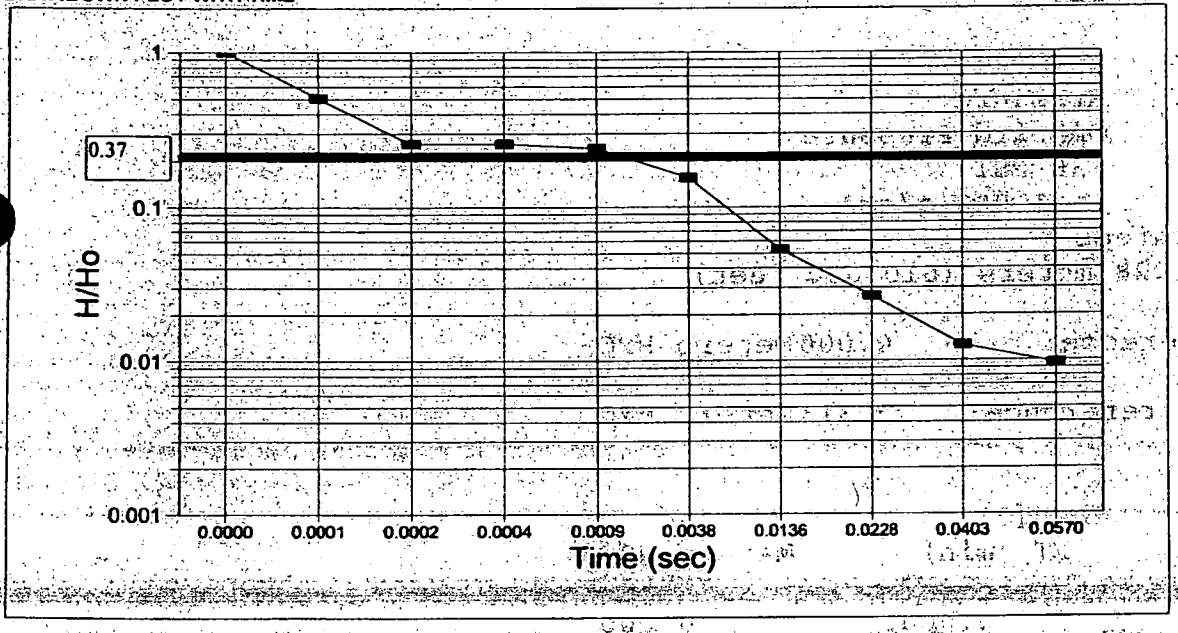
DRAWDOWN DATA

ELAPSED TIME (SECONDS)		HEAD CHANGE (ft)	
Time (Minutes)		Head Change	H/Ho
0	0.0000	1.988	1
0.0052	0.0001	1.003	0.50
0.01	0.0002	0.509	0.26
0.0252	0.0004	0.51	0.26
0.055	0.0009	0.475	0.24
0.226	0.0038	0.308	0.15
0.818	0.0136	0.105	0.05
1.3682	0.0228	0.052	0.03
2.4182	0.0403	0.025	0.01
3.4182	0.0570	0.019	0.01

HYDRAULIC CONDUCTIVITY

K Value	Units
3.565E+01	ft/day
4.126E-04	ft/sec
1.258E-02	cm/sec

DRAWDOWN PLOT WITH TIME



DRAFT

In-Situ Inc. MiniTroll Pro

Report generated: 12/19/00 12:14:42
Report from file: \\Corporate_fp\boston\PROJECTS\60957.56\0003 MW Drilling\S
DataMgr Version 3.11

Serial number: 00001460
Firmware Version 1.04
Unit name: miniTROLL

Test name: PR58 EA114D,#3

Test defined on: 07/18/00 10:47:30
Test started on: 07/18/00 10:51:18
Test stopped on: 07/18/00 10:54:47
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 0.0500 Minutes.
Number of data samples: 110

TOTAL DATA SAMPLES 110

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI
Density: 1.000 g/cm3
Latitude: 45 degrees
Elevation: 185.928 meters (610.000 feet)
Mode: TOC
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 2.313 Meters H2O

Date	Time	Chan[2] ET (min)	Meters H2O
7/18/00	10:51:18	0.0000	0.000
7/18/00	10:51:19	0.0048	0.016
7/18/00	10:51:19	0.0098	1.988
7/18/00	10:51:19	0.0150	1.003
7/18/00	10:51:20	0.0198	0.509
7/18/00	10:51:20	0.0250	0.524
7/18/00	10:51:20	0.0300	0.517
7/18/00	10:51:21	0.0350	0.510
7/18/00	10:51:21	0.0398	0.499
7/18/00	10:51:21	0.0450	0.497
7/18/00	10:51:21	0.0500	0.487
7/18/00	10:51:22	0.0550	0.482
7/18/00	10:51:22	0.0600	0.478
7/18/00	10:51:22	0.0648	0.475
7/18/00	10:51:23	0.0700	0.466
7/18/00	10:51:23	0.0750	0.461

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07/18/00	10:51:23	0.0798	0.459
07/18/00	10:51:24	0.0850	0.461
07/18/00	10:51:24	0.0900	0.445
07/18/00	10:51:24	0.0950	0.439
07/18/00	10:51:24	0.1000	0.434
07/[redacted]00	10:51:25	0.1058	0.428
07/[redacted]00	10:51:25	0.1118	0.422
07/18/00	10:51:26	0.1185	0.416
07/18/00	10:51:26	0.1255	0.410
07/18/00	10:51:26	0.1327	0.404
07/18/00	10:51:27	0.1405	0.397
07/18/00	10:51:27	0.1488	0.393
07/18/00	10:51:28	0.1578	0.386
07/18/00	10:51:29	0.1670	0.366
07/18/00	10:51:29	0.1770	0.356
07/18/00	10:51:30	0.1875	0.347
07/18/00	10:51:30	0.1985	0.338
07/18/00	10:51:31	0.2100	0.326
07/18/00	10:51:32	0.2225	0.317
07/18/00	10:51:33	0.2358	0.308
07/18/00	10:51:33	0.2498	0.299
07/18/00	10:51:34	0.2647	0.290
07/18/00	10:51:35	0.2803	0.282
07/18/00	10:51:36	0.2970	0.272
07/18/00	10:51:37	0.3145	0.264
07/18/00	10:51:38	0.3333	0.254
07/18/00	10:51:40	0.3532	0.245
07/18/00	10:51:41	0.3740	0.235
07/[redacted]00	10:51:42	0.3963	0.225
07/[redacted]00	10:51:44	0.4198	0.216
07/18/00	10:51:45	0.4445	0.207
07/18/00	10:51:47	0.4695	0.198
07/18/00	10:51:48	0.4963	0.189
07/18/00	10:51:50	0.5247	0.179
07/18/00	10:51:52	0.5547	0.169
07/18/00	10:51:54	0.5862	0.159
07/18/00	10:51:56	0.6213	0.150
07/18/00	10:51:58	0.6580	0.141
07/18/00	10:52:00	0.6963	0.132
07/18/00	10:52:03	0.7380	0.122
07/18/00	10:52:05	0.7813	0.114
07/18/00	10:52:08	0.8278	0.105
07/18/00	10:52:11	0.8762	0.097
07/18/00	10:52:14	0.9278	0.090
07/18/00	10:52:17	0.9778	0.083
07/18/00	10:52:20	1.0278	0.078
07/18/00	10:52:23	1.0780	0.073
07/18/00	10:52:26	1.1280	0.068
07/18/00	10:52:29	1.1780	0.064
07/18/00	10:52:32	1.2280	0.059
07/18/00	10:52:35	1.2780	0.056
07/[redacted]00	10:52:38	1.3280	0.053
07/[redacted]00	10:52:41	1.3780	0.052
07/18/00	10:52:44	1.4280	0.049
07/18/00	10:52:47	1.4780	0.047
07/18/00	10:52:50	1.5280	0.043

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07/18/00	10:52:53	1.5780	0.041
07/18/00	10:52:56	1.6280	0.040
07/18/00	10:52:59	1.6780	0.038
07/18/00	10:53:02	1.7280	0.037
07/18/00	10:53:05	1.7780	0.035
07/18/00	10:53:08	1.8280	0.034
07/18/00	10:53:11	1.8780	0.034
07/18/00	10:53:14	1.9280	0.031
07/18/00	10:53:17	1.9780	0.031
07/18/00	10:53:20	2.0280	0.030
07/18/00	10:53:23	2.0780	0.029
07/18/00	10:53:26	2.1280	0.028
07/18/00	10:53:29	2.1780	0.028
07/18/00	10:53:32	2.2280	0.026
07/18/00	10:53:35	2.2780	0.026
07/18/00	10:53:38	2.3280	0.025
07/18/00	10:53:41	2.3780	0.025
07/18/00	10:53:44	2.4280	0.025
07/18/00	10:53:47	2.4780	0.024
07/18/00	10:53:50	2.5280	0.024
07/18/00	10:53:53	2.5780	0.023
07/18/00	10:53:56	2.6280	0.023
07/18/00	10:53:59	2.6780	0.022
07/18/00	10:54:02	2.7280	0.022
07/18/00	10:54:05	2.7780	0.022
07/18/00	10:54:08	2.8280	0.022
07/18/00	10:54:11	2.8780	0.021
07/18/00	10:54:14	2.9280	0.020
07/18/00	10:54:17	2.9780	0.021
07/18/00	10:54:20	3.0280	0.020
07/18/00	10:54:23	3.0780	0.020
07/18/00	10:54:26	3.1280	0.020
07/18/00	10:54:29	3.1780	0.020
07/18/00	10:54:32	3.2280	0.019
07/18/00	10:54:35	3.2780	0.019
07/18/00	10:54:38	3.3280	0.019
07/18/00	10:54:41	3.3780	0.019
07/18/00	10:54:44	3.4280	0.019

DRAFT

SLUG TEST ANALYSIS USING HVORSLEV METHOD

WELL IDENTIFICATION:	EA-116D #1
SITE NAME:	NCBC Davisville
TEST DATE:	18-Jul-00
TIME:	1445
RISING/FALLING HEAD:	Falling (Slug in)
INITIAL WATER LEVEL:	

WELL SPECIFIC DATA

Well Parameter	Description	Value	Units
r	radius of well	0.083	ft
L	Length of screen	10	ft
R	Screen diameter	0.083	ft
To	Time at 37% drawdown	0.0005	seconds

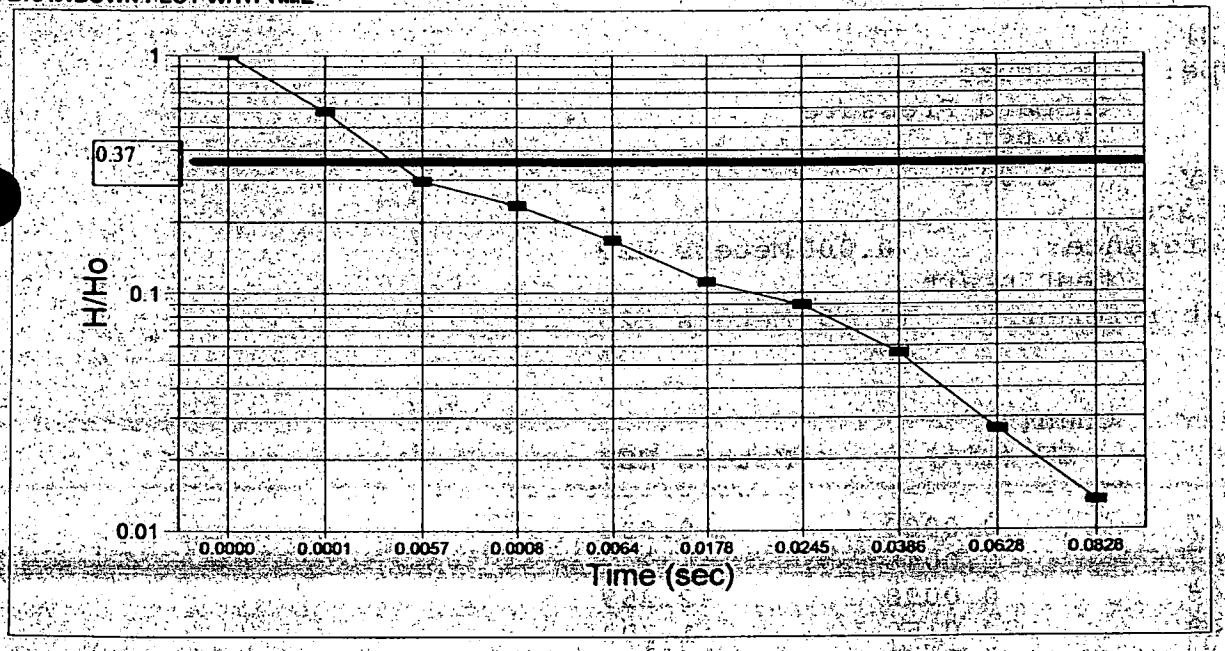
DRAWDOWN DATA

ELAPSED TIME (SECONDS)		HEAD CHANGE (ft)	
Time (Minutes)		Head Change	H/Ho
0	0.0000	2.259	1
0.0052	0.0001	1.308	0.58
0.3402	0.0057	0.666	0.29
0.0502	0.0008	0.527	0.23
0.3865	0.0064	0.376	0.17
1.0682	0.0178	0.251	0.11
1.4682	0.0245	0.201	0.09
2.3182	0.0386	0.126	0.06
3.7682	0.0628	0.06	0.03
4.9682	0.0828	0.03	0.01

HYDRAULIC CONDUCTIVITY

K Value	Units
7.130E+00	ft/day
8.252E-05	ft/sec
2.515E-03	cm/sec

DRAWDOWN PLOT WITH TIME



DRAFT

In-Situ Inc. MiniTroll Pro

Report generated: 12/19/0012:15:02
Report from file: \\Corporate_fp\boston\PROJECTS\60957.56\0003 MW Drilling\S
DataMgr Version 3.11

Serial number: 00001460
Firmware Version 1.04
Unit name: miniTROLL

Test name: PR58,EA116D,#1

Test defined on: 07/18/0014:37:46
Test started on: 07/18/0014:50:47
Test stopped on: 07/18/0014:55:48
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 0.0500 Minutes.
Number of data samples: 141

TOTAL DATA SAMPLES 141

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI
Specific gravity: 1.000
Mode: Surface
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 10.199 Meters H2O

Date	Time	Chan[2] ET (min)	Meters H2O
7/18/00	14:50:47	0.0000	0.000
7/18/00	14:50:47	0.0048	-1.347
7/18/00	14:50:48	0.0098	-2.259
7/18/00	14:50:48	0.0150	-1.308
7/18/00	14:50:48	0.0198	-0.212
7/18/00	14:50:49	0.0250	-0.176
7/18/00	14:50:49	0.0300	-0.376
7/18/00	14:50:49	0.0350	-0.666
7/18/00	14:50:50	0.0398	-0.647
7/18/00	14:50:50	0.0450	-0.464
7/18/00	14:50:50	0.0500	-0.435
7/18/00	14:50:50	0.0550	-0.504
7/18/00	14:50:51	0.0600	-0.527
7/18/00	14:50:51	0.0648	-0.492
7/18/00	14:50:51	0.0700	-0.477
7/18/00	14:50:52	0.0750	-0.488
7/18/00	14:50:52	0.0798	-0.491
7/18/00	14:50:52	0.0850	-0.485

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07/18/00 14:50:53	0.0900	-0.479
07/18/00 14:50:53	0.0950	-0.480
07/18/00 14:50:53	0.1000	-0.479
07/18/00 14:50:54	0.1058	-0.477
07/18/00 14:50:54	0.1118	-0.475
07/18/00 14:50:54	0.1185	-0.485
07/18/00 14:50:55	0.1255	-0.455
07/18/00 14:50:55	0.1327	-0.469
07/18/00 14:50:56	0.1405	-0.463
07/18/00 14:50:56	0.1488	-0.459
07/18/00 14:50:57	0.1578	-0.458
07/18/00 14:50:57	0.1670	-0.445
07/18/00 14:50:58	0.1770	-0.440
07/18/00 14:50:58	0.1875	-0.436
07/18/00 14:50:59	0.1985	-0.431
07/18/00 14:51:00	0.2100	-0.428
07/18/00 14:51:01	0.2225	-0.422
07/18/00 14:51:01	0.2358	-0.419
07/18/00 14:51:02	0.2498	-0.414
07/18/00 14:51:03	0.2647	-0.410
07/18/00 14:51:04	0.2803	-0.405
07/18/00 14:51:05	0.2970	-0.401
07/18/00 14:51:06	0.3145	-0.396
07/18/00 14:51:07	0.3333	-0.391
07/18/00 14:51:08	0.3532	-0.387
07/18/00 14:51:10	0.3740	-0.381
07/18/00 14:51:11	0.3963	-0.376
07/18/00 14:51:12	0.4198	-0.370
07/18/00 14:51:14	0.4445	-0.365
07/18/00 14:51:15	0.4695	-0.359
07/18/00 14:51:17	0.4963	-0.353
07/18/00 14:51:19	0.5247	-0.347
07/18/00 14:51:20	0.5547	-0.341
07/18/00 14:51:22	0.5862	-0.334
07/18/00 14:51:24	0.6213	-0.327
07/18/00 14:51:27	0.6580	-0.319
07/18/00 14:51:29	0.6963	-0.313
07/18/00 14:51:31	0.7380	-0.305
07/18/00 14:51:34	0.7813	-0.297
07/18/00 14:51:37	0.8278	-0.289
07/18/00 14:51:40	0.8762	-0.281
07/18/00 14:51:43	0.9278	-0.273
07/18/00 14:51:46	0.9778	-0.265
07/18/00 14:51:49	1.0278	-0.258
07/18/00 14:51:52	1.0780	-0.251
07/18/00 14:51:55	1.1280	-0.244
07/18/00 14:51:58	1.1780	-0.237
07/18/00 14:52:01	1.2280	-0.231
07/18/00 14:52:04	1.2780	-0.224
07/18/00 14:52:07	1.3280	-0.218
07/18/00 14:52:10	1.3780	-0.212
07/18/00 14:52:13	1.4280	-0.206
07/18/00 14:52:16	1.4780	-0.201
07/18/00 14:52:19	1.5280	-0.196
07/18/00 14:52:22	1.5780	-0.190
07/18/00 14:52:25	1.6280	-0.185

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07/18/00 14:52:28	1.6780	-0.180
07/18/00 14:52:31	1.7280	-0.174
07/18/00 14:52:34	1.7780	-0.170
07/18/00 14:52:37	1.8280	-0.166
07/18/00 14:52:40	1.8780	-0.161
07/18/00 14:52:43	1.9280	-0.156
07/18/00 14:52:46	1.9780	-0.153
07/18/00 14:52:49	2.0280	-0.149
07/18/00 14:52:52	2.0780	-0.145
07/18/00 14:52:55	2.1280	-0.141
07/18/00 14:52:58	2.1780	-0.137
07/18/00 14:53:01	2.2280	-0.134
07/18/00 14:53:04	2.2780	-0.130
07/18/00 14:53:07	2.3280	-0.126
07/18/00 14:53:10	2.3780	-0.123
07/18/00 14:53:13	2.4280	-0.120
07/18/00 14:53:16	2.4780	-0.117
07/18/00 14:53:19	2.5280	-0.114
07/18/00 14:53:22	2.5780	-0.111
07/18/00 14:53:25	2.6280	-0.108
07/18/00 14:53:28	2.6780	-0.105
07/18/00 14:53:31	2.7280	-0.102
07/18/00 14:53:34	2.7780	-0.099
07/18/00 14:53:37	2.8280	-0.097
07/18/00 14:53:40	2.8780	-0.095
07/18/00 14:53:43	2.9280	-0.092
07/18/00 14:53:46	2.9780	-0.090
07/18/00 14:53:49	3.0280	-0.087
07/18/00 14:53:52	3.0780	-0.086
07/18/00 14:53:55	3.1280	-0.084
07/18/00 14:53:58	3.1780	-0.081
07/18/00 14:54:01	3.2280	-0.080
07/18/00 14:54:04	3.2780	-0.077
07/18/00 14:54:07	3.3280	-0.075
07/18/00 14:54:10	3.3780	-0.073
07/18/00 14:54:13	3.4280	-0.071
07/18/00 14:54:16	3.4780	-0.070
07/18/00 14:54:19	3.5280	-0.068
07/18/00 14:54:22	3.5780	-0.067
07/18/00 14:54:25	3.6280	-0.064
07/18/00 14:54:28	3.6780	-0.063
07/18/00 14:54:31	3.7280	-0.061
07/18/00 14:54:34	3.7780	-0.060
07/18/00 14:54:37	3.8280	-0.058
07/18/00 14:54:40	3.8780	-0.057
07/18/00 14:54:43	3.9280	-0.055
07/18/00 14:54:46	3.9780	-0.054
07/18/00 14:54:49	4.0280	-0.053
07/18/00 14:54:52	4.0780	-0.048
07/18/00 14:54:55	4.1280	-0.047
07/18/00 14:54:58	4.1780	-0.046
07/18/00 14:55:01	4.2280	-0.045
07/18/00 14:55:04	4.2780	-0.044
07/18/00 14:55:07	4.3280	-0.043
07/18/00 14:55:10	4.3780	-0.041
07/18/00 14:55:13	4.4280	-0.040

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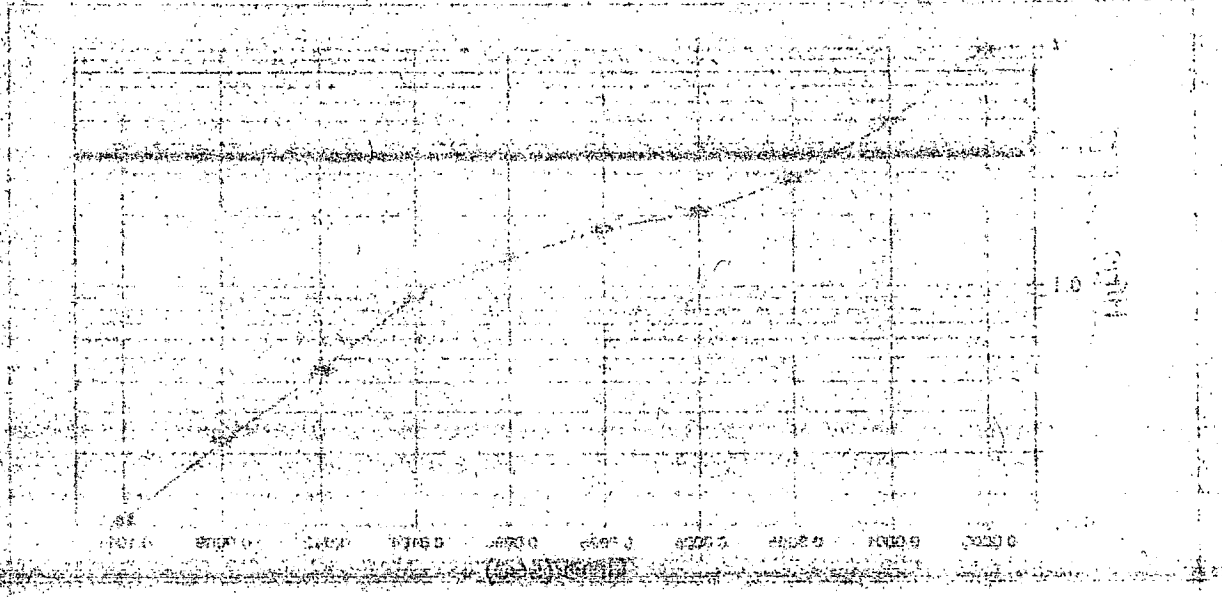
07/18/00	14:55:16	4.4780	-0.038
07/18/00	14:55:19	4.5280	-0.039
07/18/00	14:55:22	4.5780	-0.037
07/18/00	14:55:25	4.6280	-0.037
07/18/00	14:55:28	4.6780	-0.036
07/18/00	14:55:31	4.7280	-0.035
07/18/00	14:55:34	4.7780	-0.034
07/18/00	14:55:37	4.8280	-0.034
07/18/00	14:55:40	4.8780	-0.032
07/18/00	14:55:43	4.9280	-0.031
07/18/00	14:55:46	4.9780	-0.030



DRAFT

SLUG TEST ANALYSIS USING HVORSLEV METHOD

WELL IDENTIFICATION:	EA-116D, #2
SITE NAME:	NCBC Davisville
TEST DATE:	18-Jul-00
TIME:	1500
RISING/FALLING HEAD:	Falling (Slug in)
INITIAL WATER LEVEL:	

WELL SPECIFIC DATA

Well Parameter	Description	Value	Units
r	radius of well	0.083	ft
L	Length of screen	10	ft
R	Screen diameter	0.083	ft
To	Time at 37% drawdown	0.0003	seconds

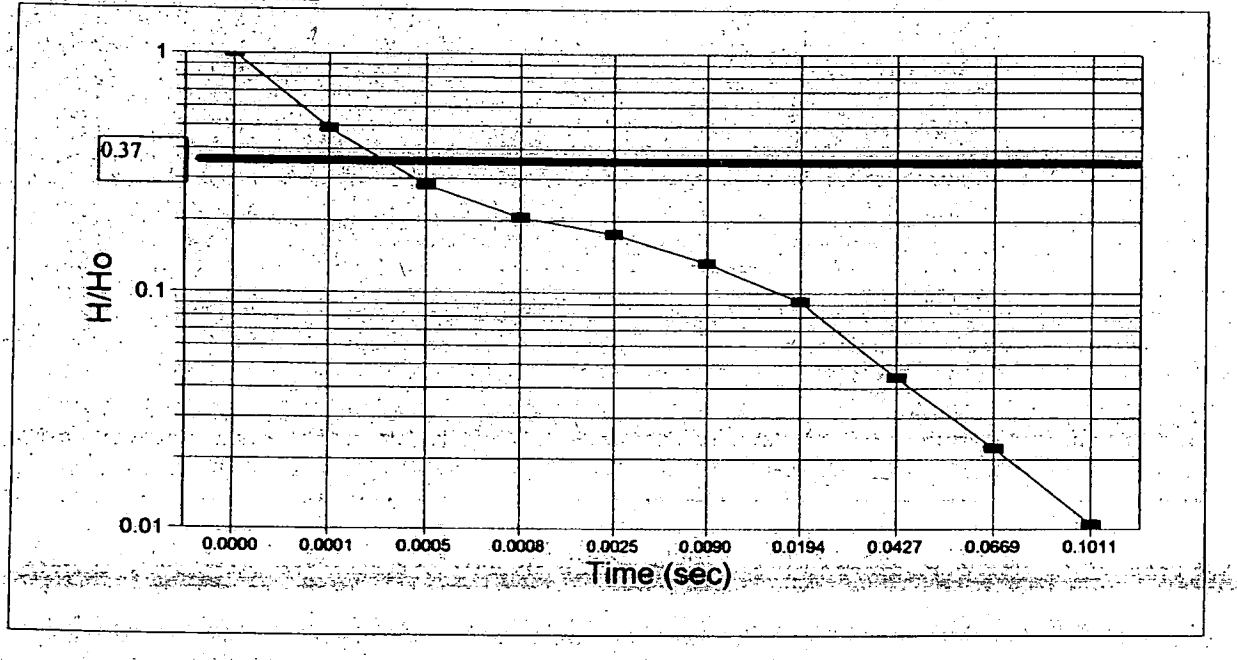
DRAWDOWN DATA

ELAPSED TIME (SECONDS)		HEAD CHANGE (ft)	
Time (Minutes)		Head Change	H/Ho
0	0.0000	-2.285	1
0.0048	0.0001	-1.112	0.49
0.03	0.0005	-0.642	0.28
0.0498	0.0008	-0.469	0.21
0.152	0.0025	-0.4	0.18
0.5397	0.0090	-0.304	0.13
1.163	0.0194	-0.211	0.09
2.563	0.0427	-0.101	0.04
4.013	0.0669	-0.051	0.02
6.063	0.1011	-0.024	0.01

HYDRAULIC CONDUCTIVITY

K Value	Units
4.278E+00	ft/day
4.951E-05	ft/sec
1.509E-03	cm/sec

DRAWDOWN PLOT WITH TIME



DRAFT

In-Situ Inc. MiniTroll Pro

Report generated: 12/19/0012:15:12
Report from file: \\Corporate_fp\boston\PROJECTS\60957.56\0003 MW Drilling\S
DataMgr Version 3.11

Serial number: 00001460
Firmware Version 1.04
Unit name: miniTROLL

Test name: PR58,EA116D,#2

Test defined on: 07/18/0014:58:22
Test started on: 07/18/0015:06:42
Test stopped on: 07/18/0015:12:47
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 0.0500 Minutes.
Number of data samples: 163

TOTAL DATA SAMPLES 163

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: Surface
User-defined reference: 0.000 Meters H2O
Referenced on: test start
Pressure head at reference: 10.202 Meters H2O

Date	Time	Chan[2] ET (min)	Meters H2O
07/18/00	15:06:42	0.0000	0.000
07/18/00	15:06:42	0.0048	-0.209
07/18/00	15:06:42	0.0098	-1.903
07/18/00	15:06:43	0.0150	-2.285
07/18/00	15:06:43	0.0198	-1.112
07/18/00	15:06:43	0.0250	-0.189
07/18/00	15:06:43	0.0300	-0.151
07/18/00	15:06:44	0.0350	-0.299
07/18/00	15:06:44	0.0398	-0.532
07/18/00	15:06:44	0.0450	-0.642
07/18/00	15:06:45	0.0500	-0.491
07/18/00	15:06:45	0.0550	-0.386
07/18/00	15:06:45	0.0600	-0.414
07/18/00	15:06:46	0.0648	-0.469
07/18/00	15:06:46	0.0700	-0.465
07/18/00	15:06:46	0.0750	-0.435
07/18/00	15:06:46	0.0798	-0.430
07/18/00	15:06:47	0.0850	-0.438

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07/18/00	15:06:47	0.0900	-0.441
07/18/00	15:06:47	0.0950	-0.437
07/18/00	15:06:48	0.1000	-0.430
07/18/00	15:06:48	0.1058	-0.429
07/18/00	15:06:48	0.1118	-0.429
07/18/00	15:06:49	0.1185	-0.427
07/18/00	15:06:49	0.1255	-0.422
07/18/00	15:06:50	0.1327	-0.422
07/18/00	15:06:50	0.1405	-0.418
07/18/00	15:06:51	0.1488	-0.416
07/18/00	15:06:51	0.1578	-0.413
07/18/00	15:06:52	0.1670	-0.400
07/18/00	15:06:52	0.1770	-0.396
07/18/00	15:06:53	0.1875	-0.393
07/18/00	15:06:54	0.1985	-0.388
07/18/00	15:06:54	0.2100	-0.385
07/18/00	15:06:55	0.2225	-0.381
07/18/00	15:06:56	0.2358	-0.378
07/18/00	15:06:57	0.2498	-0.373
7/18/00	15:06:58	0.2647	-0.369
7/18/00	15:06:58	0.2803	-0.365
7/18/00	15:06:59	0.2970	-0.360
7/18/00	15:07:01	0.3145	-0.356
7/18/00	15:07:02	0.3333	-0.351
7/18/00	15:07:03	0.3532	-0.346
7/18/00	15:07:04	0.3740	-0.342
7/18/00	15:07:05	0.3963	-0.337
7/18/00	15:07:07	0.4198	-0.331
7/18/00	15:07:08	0.4445	-0.326
7/18/00	15:07:10	0.4695	-0.321
7/18/00	15:07:11	0.4963	-0.316
7/18/00	15:07:13	0.5247	-0.310
7/18/00	15:07:15	0.5547	-0.304
7/18/00	15:07:17	0.5862	-0.298
7/18/00	15:07:19	0.6213	-0.292
7/18/00	15:07:21	0.6580	-0.289
7/18/00	15:07:23	0.6963	-0.283
7/18/00	15:07:26	0.7380	-0.275
7/18/00	15:07:29	0.7813	-0.269
7/18/00	15:07:31	0.8278	-0.261
/18/00	15:07:34	0.8762	-0.256
/18/00	15:07:37	0.9278	-0.243
/18/00	15:07:40	0.9778	-0.236
/18/00	15:07:43	1.0278	-0.230
/18/00	15:07:46	1.0780	-0.223
/18/00	15:07:49	1.1280	-0.217
/18/00	15:07:52	1.1780	-0.211
/18/00	15:07:55	1.2280	-0.206
/18/00	15:07:58	1.2780	-0.200
/18/00	15:08:01	1.3280	-0.194
/18/00	15:08:04	1.3780	-0.188
18/00	15:08:07	1.4280	-0.184
18/00	15:08:10	1.4780	-0.179
18/00	15:08:13	1.5280	-0.174
18/00	15:08:16	1.5780	-0.170
18/00	15:08:19	1.6280	-0.165

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07/18/00	15:08:22	1.6780	-0.161
07/18/00	15:08:25	1.7280	-0.157
07/18/00	15:08:28	1.7780	-0.153
07/18/00	15:08:31	1.8280	-0.149
07/18/00	15:08:34	1.8780	-0.144
07/[redacted]00	15:08:37	1.9280	-0.141
07/[redacted]00	15:08:40	1.9780	-0.138
07/18/00	15:08:43	2.0280	-0.134
07/18/00	15:08:46	2.0780	-0.131
07/18/00	15:08:49	2.1280	-0.127
07/18/00	15:08:52	2.1780	-0.123
07/18/00	15:08:55	2.2280	-0.120
07/18/00	15:08:58	2.2780	-0.117
07/18/00	15:09:01	2.3280	-0.115
07/18/00	15:09:04	2.3780	-0.111
07/18/00	15:09:07	2.4280	-0.109
07/18/00	15:09:10	2.4780	-0.106
07/18/00	15:09:13	2.5280	-0.104
07/18/00	15:09:16	2.5780	-0.101
07/18/00	15:09:19	2.6280	-0.098
07/18/00	15:09:22	2.6780	-0.096
07/18/00	15:09:25	2.7280	-0.093
07/18/00	15:09:28	2.7780	-0.092
07/18/00	15:09:31	2.8280	-0.090
07/18/00	15:09:34	2.8780	-0.087
07/18/00	15:09:37	2.9280	-0.085
07/18/00	15:09:40	2.9780	-0.083
07/18/00	15:09:43	3.0280	-0.083
07/[redacted]00	15:09:46	3.0780	-0.079
07/[redacted]00	15:09:49	3.1280	-0.077
07/18/00	15:09:52	3.1780	-0.075
07/18/00	15:09:55	3.2280	-0.074
07/18/00	15:09:58	3.2780	-0.072
07/18/00	15:10:01	3.3280	-0.070
07/18/00	15:10:04	3.3780	-0.069
07/18/00	15:10:07	3.4280	-0.068
07/18/00	15:10:10	3.4780	-0.067
07/18/00	15:10:13	3.5280	-0.064
07/18/00	15:10:16	3.5780	-0.063
07/18/00	15:10:19	3.6280	-0.061
07/18/00	15:10:22	3.6780	-0.060
07/18/00	15:10:25	3.7280	-0.059
07/18/00	15:10:28	3.7780	-0.058
07/18/00	15:10:31	3.8280	-0.057
07/18/00	15:10:34	3.8780	-0.055
07/18/00	15:10:37	3.9280	-0.055
07/18/00	15:10:40	3.9780	-0.053
07/18/00	15:10:43	4.0280	-0.051
07/18/00	15:10:46	4.0780	-0.057
07/18/00	15:10:49	4.1280	-0.049
07/18/00	15:10:52	4.1780	-0.049
07/[redacted]00	15:10:55	4.2280	-0.048
07/[redacted]00	15:10:58	4.2780	-0.047
07/18/00	15:11:01	4.3280	-0.046
07/18/00	15:11:04	4.3780	-0.045
07/18/00	15:11:07	4.4280	-0.044

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07/18/00	15:11:10	4.4780	-0.043
07/18/00	15:11:13	4.5280	-0.041
07/18/00	15:11:16	4.5780	-0.041
07/18/00	15:11:19	4.6280	-0.040
07/18/00	15:11:22	4.6780	-0.040
07/18/00	15:11:25	4.7280	-0.039
07/18/00	15:11:28	4.7780	-0.038
07/18/00	15:11:31	4.8280	-0.038
07/18/00	15:11:34	4.8780	-0.037
07/18/00	15:11:37	4.9280	-0.035
07/18/00	15:11:40	4.9780	-0.034
07/18/00	15:11:43	5.0280	-0.034
07/18/00	15:11:46	5.0780	-0.034
07/18/00	15:11:49	5.1280	-0.034
07/18/00	15:11:52	5.1780	-0.033
07/18/00	15:11:55	5.2280	-0.031
07/18/00	15:11:58	5.2780	-0.032
07/18/00	15:12:01	5.3280	-0.031
07/18/00	15:12:04	5.3780	-0.031
07/18/00	15:12:07	5.4280	-0.030
07/18/00	15:12:10	5.4780	-0.029
07/18/00	15:12:13	5.5280	-0.028
07/18/00	15:12:16	5.5780	-0.028
07/18/00	15:12:19	5.6280	-0.028
07/18/00	15:12:22	5.6780	-0.027
07/18/00	15:12:25	5.7280	-0.026
07/18/00	15:12:28	5.7780	-0.026
07/18/00	15:12:31	5.8280	-0.026
07/18/00	15:12:34	5.8780	-0.025
07/18/00	15:12:37	5.9280	-0.025
07/18/00	15:12:40	5.9780	-0.025
07/18/00	15:12:43	6.0280	-0.024
07/18/00	15:12:46	6.0780	-0.024

DRAFT

SLUG TEST ANALYSIS USING HVORSLEV METHOD

WELL IDENTIFICATION:	EA-116D, #3
SITE NAME:	NCBC Davisville
TEST DATE:	18-Jul-00
TIME:	1530
RISING/FALLING HEAD:	Falling (Slug in)
INITIAL WATER LEVEL:	

WELL SPECIFIC DATA

Well Parameter	Description	Value	Units
r	radius of well	0.083	ft
L	Length of screen	10	ft
R	Screen diameter	0.083	ft
To	Time at 37% drawdown	0.0007	seconds

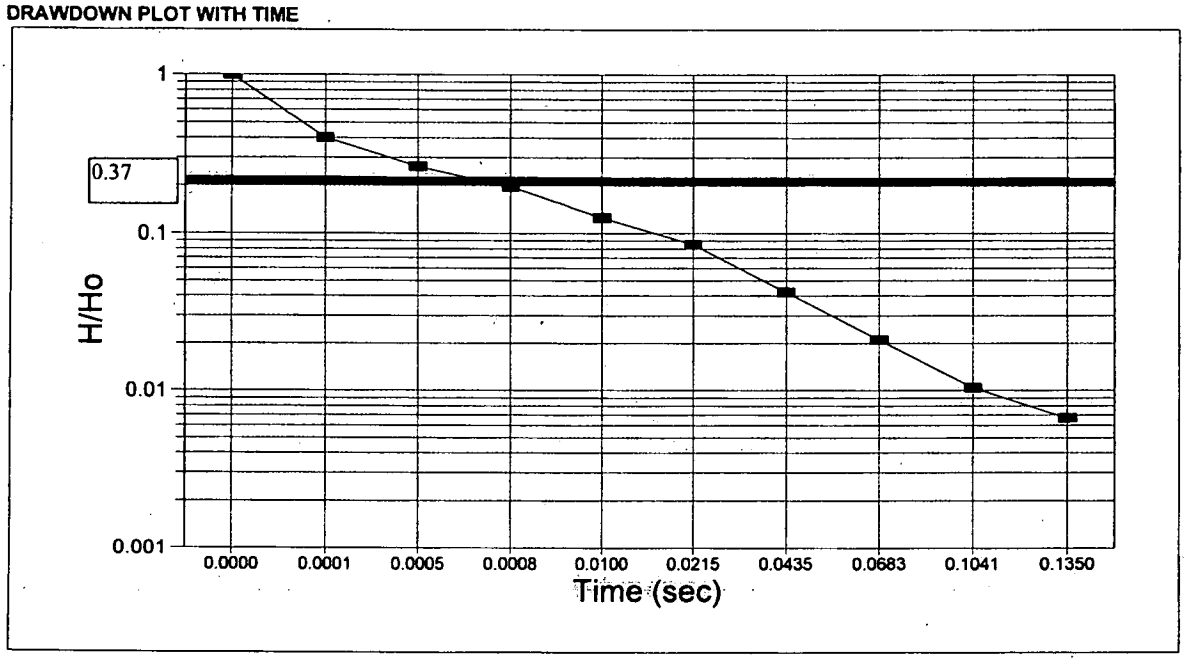
DRAWDOWN DATA

ELAPSED TIME (SECONDS)		HEAD CHANGE (ft)	
Time (Minutes)		Head Change	H/Ho
0	0.0000	-2.399	1
0.0052	0.0001	-0.958	0.40
0.0302	0.0005	-0.631	0.26
0.0502	0.0008	-0.472	0.20
0.6015	0.0100	-0.3	0.13
1.2915	0.0215	-0.203	0.08
2.6099	0.0435	-0.101	0.04
4.0999	0.0683	-0.05	0.02
6.2432	0.1041	-0.025	0.01
8.0999	0.1350	-0.016	0.01

HYDRAULIC CONDUCTIVITY

K Value	Units
9.982E+00	ft/day
1.155E-04	ft/sec
3.521E-03	cm/sec

DRAWDOWN PLOT WITH TIME



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In-Situ Inc. MiniTroll Pro

Report generated: 12/19/0012:15:22
Report from file: \\Corporate_fp\boston\PROJECTS\60957.56\0003 MW Drilling\S
DataMgr Version 3.11

Serial number: 00001460
Firmware Version 1.04
Unit name: miniTROLL

Test name: PR58,EA116D,#3

Test defined on: 07/18/0015:14:59
Test started on: 07/18/0015:22:06
Test stopped on: 07/18/0015:30:17
Test extracted on: N/A

Data gathered using Logarithmic testing
Maximum time between data points: 0.1667 Minutes.
Number of data samples: 111

TOTAL DATA SAMPLES 111

Channel number [2]
Measurement type: Pressure
Channel name: OnBoard Pressure
Sensor Range: 30 PSI.
Specific gravity: 1.000
Mode: Surface
User-defined reference: 0.000Meters H2O
Referenced on: test start
Pressure head at reference: 10.202Meters H2O

Date	Time	Chan[2] ET (min)	Meters H2O
07/18/00	15:22:06	0.0000	0.000
07/18/00	15:22:06	0.0048	-0.013
07/18/00	15:22:06	0.0098	-0.528
07/18/00	15:22:07	0.0150	-1.686
07/18/00	15:22:07	0.0198	-2.399
07/18/00	15:22:07	0.0250	-0.958
07/18/00	15:22:08	0.0300	-0.185
07/18/00	15:22:08	0.0350	-0.170
07/18/00	15:22:08	0.0398	-0.330
07/18/00	15:22:09	0.0450	-0.549
07/18/00	15:22:09	0.0500	-0.631
07/18/00	15:22:09	0.0550	-0.479
07/18/00	15:22:09	0.0600	-0.392
07/18/00	15:22:10	0.0648	-0.422
07/18/00	15:22:10	0.0700	-0.472
07/18/00	15:22:10	0.0750	-0.464
07/18/00	15:22:11	0.0798	-0.437
07/18/00	15:22:11	0.0850	-0.434

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07/18/00	15:22:11	0.0900	-0.442
07/18/00	15:22:12	0.0950	-0.442
07/18/00	15:22:12	0.1000	-0.437
07/18/00	15:22:12	0.1058	-0.432
07/18/00	15:22:13	0.1118	-0.433
07/18/00	15:22:13	0.1185	-0.431
07/18/00	15:22:13	0.1255	-0.429
07/18/00	15:22:14	0.1327	-0.425
07/18/00	15:22:14	0.1405	-0.422
07/18/00	15:22:15	0.1488	-0.420
07/18/00	15:22:15	0.1578	-0.418
07/18/00	15:22:16	0.1670	-0.404
07/18/00	15:22:16	0.1770	-0.400
07/18/00	15:22:17	0.1875	-0.396
07/18/00	15:22:18	0.1985	-0.393
07/18/00	15:22:18	0.2100	-0.389
07/18/00	15:22:19	0.2225	-0.385
07/18/00	15:22:20	0.2358	-0.381
07/18/00	15:22:21	0.2498	-0.377
07/18/00	15:22:22	0.2647	-0.373
07/18/00	15:22:23	0.2803	-0.369
07/18/00	15:22:24	0.2970	-0.365
07/18/00	15:22:25	0.3145	-0.361
07/18/00	15:22:26	0.3333	-0.356
07/18/00	15:22:27	0.3532	-0.352
07/18/00	15:22:28	0.3740	-0.348
07/18/00	15:22:30	0.3963	-0.342
07/18/00	15:22:31	0.4198	-0.337
07/18/00	15:22:32	0.4445	-0.332
07/18/00	15:22:34	0.4695	-0.327
07/18/00	15:22:36	0.4963	-0.322
07/18/00	15:22:37	0.5247	-0.317
07/18/00	15:22:39	0.5547	-0.311
07/18/00	15:22:41	0.5862	-0.305
07/18/00	15:22:43	0.6213	-0.300
07/18/00	15:22:45	0.6580	-0.293
07/18/00	15:22:48	0.6963	-0.286
07/18/00	15:22:50	0.7380	-0.280
07/18/00	15:22:53	0.7813	-0.273
07/18/00	15:22:55	0.8278	-0.265
07/18/00	15:22:58	0.8762	-0.258
07/18/00	15:23:01	0.9278	-0.250
07/18/00	15:23:05	0.9830	-0.242
07/18/00	15:23:08	1.0413	-0.234
07/18/00	15:23:12	1.1030	-0.227
07/18/00	15:23:16	1.1678	-0.219
07/18/00	15:23:20	1.2380	-0.211
07/18/00	15:23:24	1.3113	-0.203
07/18/00	15:23:29	1.3895	-0.194
07/18/00	15:23:34	1.4728	-0.185
07/18/00	15:23:39	1.5613	-0.176
07/18/00	15:23:45	1.6547	-0.169
07/18/00	15:23:51	1.7530	-0.159
07/18/00	15:23:57	1.8580	-0.151
07/18/00	15:24:04	1.9678	-0.143
07/18/00	15:24:11	2.0845	-0.134

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07/18/00	15:24:18	2.2097	-0.126
07/18/00	15:24:26	2.3412	-0.117
07/18/00	15:24:35	2.4812	-0.109
07/18/00	15:24:44	2.6297	-0.101
07/18/00	15:24:53	2.7863	-0.093
07/18/00	15:25:03	2.9530	-0.085
07/18/00	15:25:13	3.1197	-0.080
07/18/00	15:25:23	3.2863	-0.073
07/18/00	15:25:33	3.4530	-0.068
07/18/00	15:25:43	3.6197	-0.063
07/18/00	15:25:53	3.7863	-0.058
07/18/00	15:26:03	3.9530	-0.054
07/18/00	15:26:13	4.1197	-0.050
07/18/00	15:26:23	4.2863	-0.047
07/18/00	15:26:33	4.4530	-0.043
07/18/00	15:26:43	4.6197	-0.040
07/18/00	15:26:53	4.7863	-0.038
07/18/00	15:27:03	4.9530	-0.036
07/18/00	15:27:13	5.1197	-0.034
07/18/00	15:27:23	5.2863	-0.031
07/18/00	15:27:33	5.4530	-0.030
07/18/00	15:27:43	5.6197	-0.028
07/18/00	15:27:53	5.7863	-0.027
07/18/00	15:28:03	5.9530	-0.025
07/18/00	15:28:13	6.1197	-0.024
07/18/00	15:28:23	6.2863	-0.025
07/18/00	15:28:33	6.4530	-0.024
07/18/00	15:28:43	6.6197	-0.022
07/18/00	15:28:53	6.7863	-0.022
07/18/00	15:29:03	6.9530	-0.020
07/18/00	15:29:13	7.1197	-0.019
07/18/00	15:29:23	7.2863	-0.019
07/18/00	15:29:33	7.4530	-0.019
07/18/00	15:29:43	7.6197	-0.018
07/18/00	15:29:53	7.7863	-0.017
07/18/00	15:30:03	7.9530	-0.016
07/18/00	15:30:13	8.1197	-0.016

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/3/00

Well/Sample ID: EA-101 Personnel: SK/SW Start Time: 1220 Finish Time: 1345

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 28.5 Depth to Water 8.48 (ft)
Depth of screened interval or open borehole interval 23.5-33.5 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-101	HCl
Manganese	500 ml, Plastic	EA-101	HNO_3
Nitrate	125 ml, Plastic	EA-101	H_2SO_4
Sulfide	250 ml, Plastic	EA-101	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-101	--------
Methane	3 x 40 ml vial	EA-101	HCl
Ferrous Iron (Field Analyzed):	2.55 mg/L		

Equipment Decon

P = Purge	S = Sample	Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.0	2.5	3.0
Time	1225	1230	1235	1210	1245	1250	1255
Temperature (°C)	-	13.04	13.06	13.12	13.14	13.16	13.36
pH	-	5.91	5.89	5.89	5.87	5.87	5.87
Conductivity (S/cm)	-	0.200	0.199	0.199	0.200	0.199	0.199
DO (mg/L)	-	3.75	2.52	2.39	1.54	1.53	1.31
Turbidity (NTUs)	-	6.2	2.0	2.6	2.0	2.0	2.0
Eh (mV)	-	145.5	140.6	138.6	129.3	126.0	125.3
Water Level (ft. from TOR)	8.55	8.55	8.55	8.55	8.55	8.55	8.55
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	1300	1305	1310	1315	1320	1325	1330
Temperature (°C)	13.43	13.36	13.39	13.58	13.48	13.44	13.29
pH	5.87	5.88	5.88	5.88	5.88	5.88	5.87
Conductivity (S/cm)	0.200	0.200	0.199	0.200	0.200	0.201	0.200
DO (mg/L)	1.26	1.19	1.09	1.03	0.98	0.90	0.84
Turbidity (NTUs)	1.5	1.5	1.5	1.0	1.0	1.0	1.0
Eh (mV)	124.2	122.8	120.8	118.9	117.9	114.3	111.3
Water Level (ft. from TOR)	8.55	8.55	8.55	8.55	8.55	8.55	8.55
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/3/00

Well/Sample ID: EA-101 Personnel: SK/SW Start Time: 1220 Finish Time: 1345

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.0	7.5	8.0				
Time	1335	1340	1345				
Temperature (°C)	13.36	13.34	13.36				
pH	5.87	5.87	5.87				
Conductivity (S/cm)	0.200	0.201	0.200				
DO (mg/L)	0.80	0.80	0.79				
Turbidity (NTUs)	1.0	1.0	1.0				
Eh (mV)	109.0	109.1	108.0				
Water Level (ft. from TOR)	8.55	8.55	8.55				
Flow Rate (mL/min.)	100	100	100				

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/3/00

Well/Sample ID: EA-102 Personnel: SW Start Time: 1225 Finish Time: 1350
1350

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Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 36.9 Depth to Water 9.30 (ft)
Depth of screened interval or open borehole interval 21.9-31.9 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-102	HCl
Manganese	500 ml, Plastic	EA-102	HNO_3
Nitrate	125 ml, Plastic	EA-102	H_2SO_4
Sulfide	250 ml, Plastic	EA-102	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-102	--------
Methane	3 x 40 ml vial	EA-102	HCl
Ferrous Iron (Field Analyzed):	0.20 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	1.0	2.0	3.0	4.0	5.0	6.0
Time	1225	1230	1235	1240	1245	1250	1255
Temperature (°C)	13.77	13.65	13.03	12.54	12.31	12.60	13.23
pH	5.83	5.65	5.60	5.59	5.58	5.59	5.60
Conductivity (S/cm)	0.118	0.116	0.114	0.114	0.113	0.114	0.114
DO (mg/L)	9.39	3.31	1.59	1.00	0.83	0.77	0.88
Turbidity (NTUs)	19	6.3	2.7	2.1	2.5	2.8	2.6
Eh (mV)	205	167.2	157.8	148.9	142.8	137.3	135
Water Level (ft. from TOR)	9.30	9.30	9.30	9.30	9.30	9.30	9.30
Flow Rate (mL/min.)	200	200	200	200	200	200	200

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	7.0	8.0	9.0	10.0	11.0	12.0	13.0
Time	1300	1305	1310	1315	1320	1325	1330
Temperature (°C)	12.71	12.63	12.90	13.38	14.49	13.14	13.09
pH	5.60	5.59	5.60	5.60	5.60	5.59	5.60
Conductivity (S/cm)	0.113	0.113	0.113	0.113	0.115	0.113	0.114
DO (mg/L)	0.74	0.70	0.68	0.70	0.71	0.76	0.70
Turbidity (NTUs)	2.2	1.8	2.0	1.9	2.0	2.5	2.9
Eh (mV)	134.0	132.1	129.5	128.7	125.4	124.6	123.8
Water Level (ft. from TOR)	9.30	9.30	9.30	9.30	9.30	9.30	9.30
Flow Rate (mL/min.)	200	200	200	200	200	200	200

NOTES:

Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/3/00

Well/Sample ID: EA-102 Personnel: SW Start Time: 1225 Finish Time: 1350

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	14.0	15.0	16.0	17.0			
Time	1335	1340	1345	1350			
Temperature (°C)	12.98	12.74	12.80	12.72			
pH	5.59	5.59	5.59	5.59			
Conductivity (S/cm)	0.113	0.113	0.113	0.113			
DO (mg/L)	0.65	0.63	0.62	0.60			
Turbidity (NTUs)	2.5	2.8	2.7	2.5			
Eh (mV)	121.2	120.5	119.8	118.2			
Water Level (ft. from TOR)	9.30	9.30	9.30	9.30			
Flow Rate (mL/min.)	200	200	200	200			

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/4/00

Well/Sample ID: EA-103 Personnel: SW/SK Start Time: 1310 Finish Time: 1335

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/__Peristaltic
Pump Intake Depth (ft. below TOR) 30.5 Depth to Water 11.65(ft)
Depth of screened interval or open borehole interval 25.5-35.5 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-103	HCl
Manganese	500 ml, Plastic	EA-103	HNO_3
Nitrate	125 ml, Plastic	EA-103	H_2SO_4
Sulfide	250 ml, Plastic	EA-103	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-103	--------
Methane	3 x 40 ml vial	EA-103	HCl
Ferrous Iron (Field Analyzed): ____ mg/L			

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	1.0	2.0	3.0	4.0	5.0	
Time	1310	1315	1320	1325	1330	1335	
Temperature (°C)	11.81	12.21	12.31	12.72	12.76	12.77	
pH	6.05	5.73	5.75	5.75	5.74	5.73	
Conductivity (S/cm)	0.157	0.154	0.154	0.153	0.153	0.153	
DO (mg/L)	2.26	0.92	0.94	0.89	0.91	0.93	
Turbidity (NTUs)	11	3.9	2.8	0.9	0.9	0.4	
Eh (mV)	269.8	262.9	261.2	258.4	259.6	261.2	
Water Level (ft. from TOR)	12.67	11.65	11.65	11.65	11.65	11.65	
Flow Rate (mL/min.)	200	200	200	200	200	200	

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/30/00

Well/Sample ID: EA-104 Personnel: TB Start Time: 1340 Finish Time: 1530

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 59 Depth to Water 14.21 (ft)
Depth of screened interval or open borehole interval 56-66 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-104	HCl
TAL Metals, Hg, Manganese	500 ml, Plastic	EA-104	HNO_3
Nitrate	125 ml, Plastic	EA-104	H_2SO_4
Sulfide	250 ml, Plastic	EA-104	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-104	--------
Methane	3 x 40 ml vial	EA-104	HCl
Ferrous Iron (Field Analyzed):	0 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0.5	1.0	1.5	2.0	2.5	3.0	3.5
Time	1345	1350	1355	1400	1405	1410	1415
Temperature (°C)	15.85	13.05	12.74	13.47	12.70	12.06	11.70
pH	6.60	5.71	5.64	5.62	5.60	5.58	5.56
Conductivity (S/cm)	90	81	83	85	83	81	81
DO (mg/L)	4.67	3.49	2.70	2.53	1.73	1.47	1.37
Turbidity (NTUs)	16	50	23	26	26	24	21
Eh (mV)	*	*	*	*	*	*	*
Water Level (ft. from TOR)	14.21	14.21	14.21	14.21	14.21	14.21	14.21
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	4.0	4.5	5.0	5.5	6.0	6.5	7.0
Time	1420	1425	1430	1435	1440	1445	1450
Temperature (°C)	11.60	11.64	11.52	11.42	11.46	11.49	11.50
pH	5.56	5.55	5.54	5.53	5.53	5.54	5.54
Conductivity (S/cm)	80	80	80	80	80	80	80
DO (mg/L)	0.78	0.85	0.72	0.49	0.51	0.49	0.38
Turbidity (NTUs)	18	16	16	11	10	8	7
Eh (mV)	*	*	*	*	*	*	*
Water Level (ft. from TOR)	14.21	14.21	14.21	14.21	14.21	14.21	14.21
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: *ORP fluctuating widely – probe appears defective

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/30/00

Well/Sample ID: EA-104 Personnel: TB Start Time: 1340 Finish Time: 1530

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.5	8.0	8.5				
Time	1455	1500	1505				
Temperature (°C)	11.48	11.45	11.43				
pH	5.54	5.53	5.53				
Conductivity (S/cm)	80	80	80				
DO (mg/L)	0.34	0.32	0.36				
Turbidity (NTUs)	5	5	5				
Eh (mV)	*	*	*				
Water Level (ft. from TOR)	14.21	14.21	14.21				
Flow Rate (mL/min.)	100	100	100				

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/30/00

Well/Sample ID: EA-104R Personnel: TB /SK Start Time: 1340 Finish Time: 1455

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / __ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	xElect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 74 Depth to Water 15.31 (ft)
Depth of screened interval or open borehole interval 71-96 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-104R	HCl
TAL Metals, Hg, Manganese	500 ml, Plastic	EA-104R	HNO_3
Nitrate	125 ml, Plastic	EA-104R	H_2SO_4
Sulfide	250 ml, Plastic	EA-104R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-104R	--------
Methane	3 x 40 ml vial	EA-104R	HCl
Ferrous Iron (Field Analyzed):	5.10 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.0	2.5	3.0
Time	1340	1345	1350	1355	1400	1405	1410
Temperature (°C)	-	13.93	14.24	14.87	15.32	16.02	16.42
pH	-	6.15	6.15	6.13	6.14	6.14	6.15
Conductivity (S/cm)	-	0.171	0.179	0.181	0.181	0.181	0.181
DO (mg/L)	-	1.92	1.81	1.56	1.27	1.16	1.03
Turbidity (NTUs)	-	8.91	2.83	1.41	0.50	0.50	0.73
Eh (mV)	-	-60.4	-67.6	-73.3	-75.4	-77.5	-76.8
Water Level (ft. from TOR)	15.31	15.30	15.30	15.30	15.30	15.30	15.30
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	1415	1420	1425	1430	1435	1440	1445
Temperature (°C)	16.79	13.13	12.83	12.80	12.84	12.84	12.75
pH	6.15	6.12	6.13	6.13	6.11	6.10	6.10
Conductivity (S/cm)	0.181	0.181	0.179	0.176	0.173	0.173	0.173
DO (mg/L)	0.94	1.05	0.81	0.89	0.80	0.78	0.72
Turbidity (NTUs)	1.47	0.36	0	0	0.24	0	0
Eh (mV)	-77.9	-79.5	-81.9	-82.6	-82.0	-82.0	-83.5
Water Level (ft. from TOR)	15.30	15.30	15.30	15.30	15.30	15.30	15.30
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/30/00

Well/Sample ID: EA-104R Personnel: TB /SK Start Time: 1340 Finish Time: 1455

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.0	7.5					
Time	1450	1455					
Temperature (°C)	12.72	12.75					
pH	6.12	6.13					
Conductivity (S/cm)	0.174	0.170					
DO (mg/L)	0.69	0.72					
Turbidity (NTUs)	0	0					
Eh (mV)	-85.2	-85.7					
Water Level (ft. from TOR)	15.30	15.30					
Flow Rate (mL/min.)	100	100					

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/29/00

Well/Sample ID: EA-105 Personnel: TB Start Time: 1430 Finish Time: 1630

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 25 Depth to Water 8.29 (ft)
Depth of screened interval or open borehole interval 20-30 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-105	HCl
Manganese	500 ml, Plastic	EA-105	HNO_3
Nitrate	125 ml, Plastic	EA-105	H_2SO_4
Sulfide	250 ml, Plastic	EA-105	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-105	------
Methane	3 x 40 ml vial	EA-105	HCl
Ferrous Iron (Field Analyzed):	0 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	1.5	3.0	4.5	5.0	5.5	6.0	6.5
Time	1435	1440	1445	1450	1455	1500	1505
Temperature (°C)	13.51	12.04	12.43	13.11	13.49	13.02	12.74
pH	5.67	5.40	5.38	5.39	5.38	5.38	5.35
Conductivity (S/cm)	104	93	93	93	93	93	92
DO (mg/L)	6.04	6.59	6.37	6.38	6.46	6.43	6.45
Turbidity (NTUs)	119	191	90	59	27	12	8
Eh (mV)	*	*	*	*	*	*	*
Water Level (ft. from TOR)	8.25	8.27	8.27	8.27	8.27	8.27	8.27
Flow Rate (mL/min.)	300	300	300	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	7.0	7.5	8.0	8.5	9.0	9.5	10.0
Time	1510	1515	1520	1525	1530	1535	1540
Temperature (°C)	12.70	12.76	12.94	13.11	13.29	13.17	12.48
pH	5.35	5.34	5.36	5.36	5.37	5.36	5.34
Conductivity (S/cm)	91	91	91	91	91	91	91
DO (mg/L)	6.57	6.66	6.78	6.87	6.95	7.02	7.13
Turbidity (NTUs)	9	6	6	5.5	5.3	0.6	0.4
Eh (mV)	*	*	*	*	*	*	*
Water Level (ft. from TOR)	8.27	8.27	8.27	8.27	8.27	8.27	8.27
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: * = ORP readings are inaccurate

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/29/00

Well/Sample ID: EA-105 Personnel: TB Start Time: 1430 Finish Time: 1630

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	10.5	11.0	11.5	12.0	12.5		
Time	1545	1550	1555	1600	1605		
Temperature (°C)	12.56	12.85	13.15	13.30	13.40		
pH	5.34	5.35	5.36	5.36	5.36		
Conductivity (S/cm)	91	91	91	91	91		
DO (mg/L)	7.20	7.26	7.26	7.31	7.30		
Turbidity (NTUs)	0.3	0.2	0	0	0		
Eh (mV)	*	*	*	*	*		
Water Level (ft. from TOR)	8.27	8.27	8.27	8.27	8.27		
Flow Rate (mL/min.)	100	100	100	100	100		

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: _____

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/29/00

Well/Sample ID: EA-105R Personnel: TB/SK Start Time: 1355 Finish Time: 1545

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ ___ Peristaltic
Pump Intake Depth (ft. below TOR) 39 Depth to Water 8.60 (ft)
Depth of screened interval or open borehole interval 33-60 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-105R	HCl
Manganese	500 ml, Plastic	EA-105R	HNO_3
Nitrate	125 ml, Plastic	EA-105R	H_2SO_4
Sulfide	250 ml, Plastic	EA-105R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-105R	--------
Methane	3 x 40 ml vial	EA-105R	HCl
Ferrous Iron (Field Analyzed):	5.10 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.0	2.5	3.0
Time	1355	1400	1405	1410	1415	1420	1425
Temperature (°C)	-	14.62	14.80	13.22	12.62	12.30	12.14
pH	-	6.03	5.85	6.34	5.66	5.65	5.65
Conductivity (S/cm)	-	0.122	0.199	0.188	0.117	0.117	0.117
DO (mg/L)	-	13.63	11.09	6.10	4.46	3.60	3.19
Turbidity (NTUs)	-	2	0.1	0	0	0.12	0
Eh (mV)	-	-26.5	-23.5	-25.2	-24.4	-26.3	-29.2
Water Level (ft. from TOR)	8.60	8.60	8.60	8.60	8.61	8.60	8.60
Flow Rate (mL/min.)	-	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	1430	1435	1440	1445	1450	1455	1500
Temperature (°C)	11.99	12.04	13.54	13.63	13.39	13.17	12.92
pH	5.64	5.64	5.64	5.64	5.63	5.63	5.63
Conductivity (S/cm)	0.117	0.117	0.118	0.118	0.118	0.117	0.117
DO (mg/L)	2.78	2.34	2.53	2.39	2.19	2.09	2.03
Turbidity (NTUs)	0	0	0.15	0.18	0	0	0
Eh (mV)	-32.1	-33.1	-33.4	-34.9	-36.5	-36.8	-36.5
Water Level (ft. from TOR)	8.60	8.60	8.60	8.55	8.58	8.59	8.59
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Project No.: 60957.56 Task: 0004 Date: 9/29/00

Well ID: EA-105R Personnel: SK/TB Start Time: 1355 Finish Time: 1545

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.0	7.5	8.0	8.5	9.0	9.5	10.0
Time	1505	1510	1515	1520	1525	1530	1535
Temperature (°C)	12.68	13.30	13.80	14.00	15.36	16.19	11.59
pH	5.64	5.62	5.64	5.62	5.62	5.71	5.60
Conductivity (S/cm)	0.117	0.117	0.118	0.117	0.117	0.117	0.116
DO (mg/L)	1.88	1.64	1.63	1.43	1.68	2.96	1.36
Turbidity (NTUs)	0	0	0	0	0.16	0	0
Eh (mV)	-36.5	-36.5	-36.5	-36.7	-37.3	-20.6	-24.8
Water Level (ft. from TOR)	8.60	8.60	8.60	8.60	8.60	8.60	8.60
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	10.5	11.0					
Time	1540	1545					
Temperature (°C)	11.46	11.44					
pH	5.60	5.59					
Conductivity (S/cm)	0.116	0.116					
DO (mg/L)	1.05	1.03					
Turbidity (NTUs)	0	0					
Eh (mV)	-31.3	-31.3					
Water Level (ft. from TOR)	8.60	8.60					
Flow Rate (mL/min.)	100	100					

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/30/00

Well/Sample ID: EA-106D Personnel: TB/SK Start Time: 0940 Finish Time: 1145

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / ___ 4-in. / ___ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR)___ Depth to Water 9.51(ft)
Depth of screened interval or open borehole interval 32-42 (ft) NA

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-106D	HCl
TAL Metals and Manganese	500 ml, Plastic	EA-106D	HNO_3
Nitrate	125 ml, Plastic	EA-106D	H_2SO_4
Sulfide	250 ml, Plastic	EA-106D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-106D	--------
Methane	3 x 40 ml vial	EA-106D	HCl
Ferrous Iron (Field Analyzed):	0.16 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.0	2.5	3.0
Time	0940	0945	0950	0955	1000	1005	1010
Temperature (°C)	-	11.23	11.24	11.24	11.34	11.24	11.15
pH	-	6.04	5.92	5.89	5.86	5.85	5.84
Conductivity (S/cm)	-	0.181	0.171	0.168	0.165	0.164	0.163
DO (mg/L)	-	3.12	3.13	2.94	2.52	2.31	2.06
Turbidity (NTUs)	-	237	199	146	100	75.4	67.2
Eh (mV)	-	143.2	156.8	164.9	168.7	175.4	181.2
Water Level (ft. from TOR)	9.51	9.51	9.55	9.55	9.58	9.58	9.56
Flow Rate (mL/min.)	-	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	1015	1020	1025	1030	1035	1040	1045
Temperature (°C)	11.05	10.99	11.00	10.95	10.92	10.98	10.98
pH	5.84	5.83	5.83	5.83	5.83	5.82	5.82
Conductivity (S/cm)	0.163	0.162	0.162	0.161	0.161	0.160	0.160
DO (mg/L)	1.97	1.83	1.72	1.69	1.60	1.55	1.54
Turbidity (NTUs)	60	57.6	54.9	51.0	47.5	45.2	46.0
Eh (mV)	186.7	192.0	193.0	195.0	200.4	201.3	202.4
Water Level (ft. from TOR)	9.56	9.56	9.55	9.55	9.55	9.58	9.58
Flow Rate (mL/min.)	100	100	100	100	100	100	100

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/30/00

Well/Sample ID: EA-106D Personnel: TB/SK Start Time: 0940 Finish Time: 1145

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.0	7.5	8.0	8.5	9.0	9.5	10.0
Time	1050	1055	1100	1105	1110	1115	1120
Temperature (°C)	10.93	10.99	11.01	11.01	11.01	10.99	11.02
pH	5.83	5.83	5.82	5.82	5.82	5.82	5.80
Conductivity (S/cm)	0.160	0.159	0.159	0.159	0.159	0.159	0.159
DO (mg/L)	1.44	1.50	1.50	1.50	1.50	1.38	1.49
Turbidity (NTUs)	44.9	45.3	39.2	36.5	37.5	38.1	35.5
Eh (mV)	204.1	205.6	208.2	208.2	208.2	212.2	213.5
Water Level (ft. from TOR)	9.58	9.58	9.58	9.58	9.58	9.58	9.58
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	10.5	11.0	11.5	12.0			
Time	1125	1130	1135	1140			
Temperature (°C)	10.95	10.94	10.90	10.90			
pH	5.81	5.82	5.81	5.80			
Conductivity (S/cm)	0.158	0.158	0.158	0.158			
DO (mg/L)	1.49	1.41	1.45	1.48			
Turbidity (NTUs)	33.7	33.1	32.4	31.8			
Eh (mV)	215.1	216.0	217.4	217.9			
Water Level (ft. from TOR)	9.58	9.58	9.58	9.58			
Flow Rate (mL/min.)	100	100	100	100			

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/30/00

Well/Sample ID: EA-106R Personnel: TB Start Time: 0940 Finish Time: 1100

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 1.0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / __ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 69 Depth to Water 10.50 (ft)
Depth of screened interval or open borehole interval 59-69 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-106R	HCl
Manganese, TAL metals, Hg	500 ml, Plastic	EA-106R	HNO_3
Nitrate	125 ml, Plastic	EA-106R	H_2SO_4
Sulfide	250 ml, Plastic	EA-106R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-106R	--------
Methane	3 x 40 ml vial	EA-106R	HCl
Ferrous Iron (Field Analyzed):	0.82 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0.5	1.0	1.5	2.0	2.5	3.0	3.5
Time	0945	0.950	0955	1000	1005	1010	1015
Temperature (°C)	12.61	12.74	13.41	13.57	13.68	13.81	13.62
pH	7.27	7.18	7.25	7.20	7.19	7.20	7.21
Conductivity (S/cm)	189	189	197	200	199	197	196
DO (mg/L)	1.63	1.57	1.40	1.07	1.17	1.21	1.20
Turbidity (NTUs)	3	2	2	0.9	0	0	0
Eh (mV)	160	*	*	*	*	*	*
Water Level (ft. from TOR)	10.50	10.55	10.55	10.55	10.55	10.55	10.55
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

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NOTES: * = ORP read fluctuating widely

Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site 03 Project No.: 60957.56 Task: 0004 Date: 9/27/00

Well/Sample ID: EA-107 Personnel: Tom Biolsi Start Time: 0945 Finish Time: 1130

Air Monitoring
Equipment Used: QED Model 400 Ambient Air Reading: 0.0 ppm
Calibration Information: see Cal Sheets Well Headspace Reading: 0.0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / __ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used:
Pump Intake Depth (ft. below TOR 36 Depth to Water 8.30 (ft)
Depth of screened interval or open borehole interval 31-41 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-107	HCl
Manganese	500 ml, Plastic	EA-107	HNO_3
Nitrate	125 ml, Plastic	EA-107	H_2SO_4
Sulfide	250 ml, Plastic	EA-107	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-107	--------
Methane	3 x 40 ml vial	EA-107	HCl
Ferrous Iron (Field Analyzed):	0.00 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0.5	1.0	1.5	2.0	2.5	3.0	3.5
Time	0950	0955	1000	1005	1010	1015	1020
Temperature (°C/F)	13.61	13.69	13.13	13.09	12.81	12.64	12.43
pH	5.70	5.63	5.59	5.57	5.55	5.52	5.51
Conductivity (S/cm)	116	102	100	94	93	92	91
DO (mg/L)	8.53	7.83	6.97	6.87	6.89	6.97	7.31
Turbidity (NTUs)	3.7	1.8	0.44	0.34	0.43	0.84	1.03
Eh (mV)	304	385	463	495	595	660	740
Water Level (ft. from TOR)	8.32	8.32	8.32	8.32	8.32	8.32	8.33
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	4.0	4.5	5.0	5.5	6.0	6.5	
Time	1025	1030	1035	1040	1045	1050	
Temperature (°C)	12.31	12.25	12.21	12.14	12.15	12.11	
pH	5.51	5.50	5.51	5.51	5.51	5.51	
Conductivity (S/cm)	91	91	91	90	90	90	
DO (mg/L)	7.55	7.84	8.01	8.15	8.51	8.70	
Turbidity (NTUs)	1.2	0.52	0.32	0.06	0.09	0.12	
Eh (mV)	760	795	805	815	820	815	
Water Level (ft. from TOR)	8.33	8.33	8.33	8.33	8.33	8.33	
Flow Rate (mL/min.)	100	100	100	100	100	100	

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site 03 Project No.: 60957.56 Task: 0004 Date: 9/27/00

Well/Sample ID: EA-107R Personnel: SK, TB Start Time: 0930 Finish Time: 1205

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0.0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0.0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: ___PVC / ___ SS / Other Steel
Protective Casing Secure x Yes __ No Well Diameter: ___2-in. / x 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 53 Depth to Water 8.32 (ft)
Depth of screened interval or open borehole interval 43-68.4 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-107R	HCl
Manganese	500 ml, Plastic	EA-107R	HNO_3
Nitrate	125 ml, Plastic	EA-107R	H_2SO_4
Sulfide	250 ml, Plastic	EA-107R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-107R	--------
Methane	3 x 40 ml vial	EA-107R	HCl
Ferrous Iron (Field Analyzed):	1.09 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0.5	1.0	1.5	2.0	2.5	3.0	3.5
Time	1041	1046	1050	1055	1100	1105	1110
Temperature (°C/F)	1041	12.02	11.91	11.82	11.77	11.72	11.57
pH	1041	8.34	8.37	8.38	8.38	8.39	8.42
Conductivity (S/cm)	1041	0.286	0.286	0.286	0.286	0.286	0.286
DO (mg/L)	1041	8.48	9.92	8.19	6.18	2.52	2.30
Turbidity (NTUs)	1041	20.6	9.23	9.27	8.12	6.90	6.23
Salinity (%)	-	-	-	-	-	-	-
Eh (mV)	1041	-402.8	-415.3	-415.6	-416.9	-422.8	-423.6
Water Level (ft. from TOR)	8.32	8.95	11.01	12.20	14.98	16.80	18.93
Flow Rate (mL/min.)	100ml	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	4.0	4.5	5.0	5.5	6.0	6.5	7.0
Time	1115	1120	1125	1130	1135	1140	1145
Temperature (°C)	11.63	11.63	12.84	12.53	12.53	12.55	12.49
pH	8.41	8.42	8.42	8.40	8.42	8.35	8.42
Conductivity (S/cm)	0.286	0.286	0.287	0.287	0.287	0.286	0.286
DO (mg/L)	5.31	5.21	1.45	5.52	1.52	1.37	1.44
Turbidity (NTUs)	6.20	6.21	6.22	6.20	6.20	6.20	7.38
Eh (mV)	-424.0	-426.0	-418.5	-415.8	-417.9	-405.1	-417.9
Water Level (ft. from TOR)	20.0	21.62	22.60	22.90	23.40	24.0	24.6
Flow Rate (mL/min.)	100ml/m	100	100	100	100	100	100

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0003 Date: 9/27/00

Well ID: EA-107R Personnel: SK/TB Start Time: 0930 Finish Time: 1205

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.5	8.0	8.5	9.0			
Time	1150	1155	1200	1205			
Temperature (°C)	12.44	13.00	13.00	13.00			
pH	8.40	8.39	8.39	8.38			
Conductivity (S/cm)	0.285	0.285	0.286	0.285			
DO (mg/L)	1.69	1.73	1.76	1.64			
Turbidity (NTUs)	7.00	7.00	7.12	7.08			
Eh (mV)	-414.3	-412.2	-407.3	-405.4			
Water Level (ft. from TOR)	25.1	25.35	25.4	25.52			
Flow Rate (mL/min.)	100	100	100	100			

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C/F)							
pH							
Conductivity (m_/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/27/00

Well/Sample ID: EA-108 Personnel: TB Start Time: 1500 Finish Time: 1555

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 70 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 24.25 Depth to Water 8.77(ft)
Depth of screened interval or open borehole interval 19.25-29.25(ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-108	HCl
Manganese	500 ml, Plastic	EA-108	HNO_3
Nitrate	125 ml, Plastic	EA-108	H_2SO_4
Sulfide	250 ml, Plastic	EA-108	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-108	--------
Methane	3 x 40 ml vial	EA-108	HCl
Ferrous Iron (Field Analyzed):	0.04 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0.5	1.0	1.5	2.0	2.5	3.0	3.5
Time	1505	1510	1515	1520	1525	1530	1535
Temperature (°C)	16.91	14.78	14.89	15.10	15.91	16.35	15.40
pH	5.32	5.18	5.18	5.21	5.25	5.23	5.23
Conductivity (S/cm)	92	89	91	91	91	91	90
DO (mg/L)	6.58	6.95	6.95	6.84	7.01	7.11	6.87
Turbidity (NTUs)	2.2	1.2	1.2	0.4	0.6	0.6	0.5
Eh (mV)	296	517	585	570	**	**	**
Water Level (ft. from TOR)	8.77	8.77	8.77	8.77	8.77	8.77	8.77
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	4.0	4.5	5.0	5.5			
Time	1540	1545	1550	1555			
Temperature (°C)	14.61	14.58	14.63	14.66			
pH	5.21	5.26	5.28	5.29			
Conductivity (S/cm)	85	89	91	92			
DO (mg/L)	6.45	5.92	5.88	5.83			
Turbidity (NTUs)	0.5	0.7	0.8	0.8			
Eh (mV)	**	**	**	**			
Water Level (ft. from TOR)	8.77	8.77	8.77	8.77			
Flow Rate (mL/min.)	100	100	100	100			

NOTES: ** = ORP probe not functioning properly

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site 03 Project No 60957.56 Task: 0004 Date: 9/27/00

Well/Sample ID: EA-108R Personnel: SK/TB Start Time: 1340 Finish Time: 1535

Air Monitoring
Equipment Used: Photovac/ORAE Ambient Air Reading: 0.0 ppm
Calibration Information: ISO/Methane Well Headspace Reading: 0.0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: __ PVC / __ SS / Other: Steel
Protective Casing Secure x Yes __ No Well Diameter: __ 2-in. / __ 4-in. / x 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: __ Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 4.0 Depth to Water 9.0 (ft)
Depth of screened interval or open borehole interval 33-58' (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA108R	HCl
Manganese	500 ml, Plastic	EA108R	HNO_3
Nitrate	125 ml, Plastic	EA108R	H_2SO_4
Sulfide	250 ml, Plastic	EA108R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA108R	--------
Methane	3 x 40 ml vial	EA108R	HCl
Ferrous Iron (Field Analyzed):	2.14 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0.5	1.0	1.5	2.0	2.5	3.0	3.5
Time	1350	1355	1400	1405	1410	1415	1420
Temperature (°C/F)		14.88	14.89	14.79	14.75	14.71	14.68
pH		7.05	7.15	7.15	7.17	7.13	7.12
Conductivity (S/cm)		0.267	0.266	0.265	0.265	0.264	0.264
DO (mg/L)		6.65	5.07	6.02	4.52	6.02	4.89
Turbidity (NTUs)		30.8	39.5	56.9	46.4	41.2	53.9
Eh (mV)		-249.5	-255.0	-253.6	-254.7	-247.0	
Water Level (ft. from TOR)	9.0	9.28	9.38	9.40	9.45	9.50	9.52
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	4.0	4.5	5.0	5.5	6.0	6.5	7.0
Time	1425	1430	1435	1440	1445	1450	1455
Temperature (°C)	14.59	14.53	14.63	14.45	14.45	14.43	14.45
pH	7.10	7.09	7.08	7.06	7.05	7.02	7.02
Conductivity (S/cm)	0.263	0.263	0.262	0.261	0.261	0.260	0.259
DO (mg/L)	5.32	3.42	4.42	4.34	2.65	4.67	3.50
Turbidity (NTUs)	34.1	33.4	30.9	25.4	21.7	21.6	21.3
Eh (mV)	-240.0	-235.1	-236.4	-233.2	-228.4	-225.2	-222.0
Water Level (ft. from TOR)	9.54	9.58	9.59	9.60	9.64	9.64	9.64
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: _____

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/27/00

Well ID: EA-108R Personnel: SK/TB Start Time: 1340 Finish Time: 1535

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.5	8.0	8.5	9.0	9.5	10.0	10.5
Time	1500	1505	1510	1515	1520	1525	1530
Temperature (°C)	14.45	14.58	14.58	14.45	14.50	14.50	14.51
pH	7.00	6.97	6.97	6.96	6.95	6.93	6.90
Conductivity (S/cm)	0.258	0.257	0.256	0.256	0.255	0.254	0.253
DO (mg/L)	3.12	3.10	3.10	3.01	3.06	3.01	3.06
Turbidity (NTUs)	19.2	16.7	13.9	11.3	10.6	8.2	8.3
Eh (mV)	-217.5	-213.3	-211.3	-205.9	-205.7	-202.3	-196.7
Water Level (ft. from TOR)	9.64	9.64	9.64	9.65	9.65	9.65	9.65
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	11.0						
Time	1535						
Temperature (°C/F)	14.51						
pH	6.90						
Conductivity (m_/cm)	0.253						
DO (mg/L)	3.07						
Turbidity (NTUs)	8.0						
Eh (mV)	-196.0						
Water Level (ft. from TOR)	9.65						
Flow Rate (mL/min.)	100						

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site 03 Project No: 60957.56 Task: 0004 Date: 10/3/00

Well/Sample ID: EA-109 Personnel: SK/SN Start Time: 1527 Finish Time: 1720

Air Monitoring
Equipment Used: Photovac Isobutylere Ambient Air Reading: 0.0 ppm
Calibration Information: _____ Well Headspace Reading: 0.0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / __ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe
		Water Sampling Pump Used:	

Pump Intake Depth (ft. below TOR) 29 Depth to Water 9.21 (ft)
Depth of screened interval or open borehole interval 26.36 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-109	HCl
Manganese	500 ml, Plastic	EA-109	HNO_3
Nitrate	125 ml, Plastic	EA-109	H_2SO_4
Sulfide	250 ml, Plastic	EA-109	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-109	--------
Methane	3 x 40 ml vial	EA-109	HCl
Ferrous Iron (Field Analyzed):	10.0 mg/L	EA-109	

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters		1.0	2.0	3.0	4.0	5.0	6.0
Time	1530	1535	1540	1545	1550	1555	1600
Temperature (°C/F)	16.12	14.90	14.59	14.89	15.02	14.69	15.35
pH	6.07	5.98	6.00	6.01	6.01	6.01	6.09
Conductivity (S/cm)	0.164	0.185	0.187	0.190	0.191	0.193	0.195
DO (mg/L)	5.46	1.86	1.24	1.27	0.80	0.72	0.74
Turbidity (NTUs)	160	90	444	372	128	41.2	46.2
Salinity (%)	-	-	-	-	-	-	-
Eh (mV)	108.1	-34.1	-38.9	-40.2	-45.8	-49.5	-46.1
Water Level (ft. from TOR)	9.39	9.23	9.23	9.23	9.23	9.23	9.23
Flow Rate (mL/min.)	200	200	200	200	200	200	200

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	7.0	8.0	9.0	10.0	11.0	12.0	13.0
Time	1605	1610	1615	1620	1625	1630	1635
Temperature (°C)	14.27	14.24	14.32	14.42	14.63	14.98	15.38
pH	6.03	6.03	6.04	6.04	6.04	6.05	6.05
Conductivity (S/cm)	0.195	0.196	0.196	0.197	0.197	0.197	0.197
DO (mg/L)	0.69	0.65	0.63	0.63	0.65	0.67	0.70
Turbidity (NTUs)	27.9	18.3	12.1	10.8	9.85	8.6	8.7
Eh (mV)	-50.5	-53.8	-57.7	-58.9	-60.6	-62.5	-63.3
Water Level (ft. from TOR)	9.23	9.23	9.23	9.23	9.23	9.23	9.23
Flow Rate (mL/min.)	200	200	200	200	200	200	200

NOTES: FERROUS IRON = 10.00 mg/l

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0003 Date: 10/3/00

Well ID: EA-109 Personnel: SK/SW Start Time: 1527 Finish Time: 1720

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	14.0	15.0	16.0	17.0	18.0	19.0	20.0
Time	1640	1645	1650	1655	1700	1705	1710
Temperature (°C)	14.91	14.61	14.28	14.68	14.95	14.81	14.32
pH	6.04	6.05	6.04	6.04	6.05	6.05	6.04
Conductivity (S/cm)	0.197	0.197	0.197	0.194	0.197	0.197	0.196
DO (mg/L)	0.64	0.63	0.62	0.68	0.69	0.67	0.64
Turbidity (NTUs)	8.6	7.8	6.3	5.0	5.0	5.0	5.0
Eh (mV)	-64.8	-65.2	-64.8	-58.4	-60.9	-61.0	-62.0
Water Level (ft. from TOR)	9.23	9.23	9.23	9.23	9.23	9.23	9.23
Flow Rate (mL/min.)	200	200	200	200	200	200	200

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	21.0	22.0					
Time	1715	1720					
Temperature (°C/F)	14.59	14.58					
pH	6.04	6.05					
Conductivity (m_/cm)	0.197	0.197					
DO (mg/L)	0.65	0.67					
Turbidity (NTUs)	4.8	5.0					
Eh (mV)	-63.6	-63.8					
Water Level (ft. from TOR)	9.23	9.24					
Flow Rate (mL/min.)	200	200					

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: FERROUS IRON - 10.00 mg/L

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/1/00

Well/Sample ID: EA-112D Personnel: MC Start Time: 1119 Finish Time: 1343

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked
Protective Casing Secure x Yes __ No Well Material: x PVC / __ SS / Other
Concrete Collar Intact x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 89 Depth to Water 25.80 (ft)
Depth of screened interval or open borehole interval 86-96 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-112D	HCl
Manganese, TAL Metals	500 ml, Plastic	EA-112D	HNO_3
Nitrate	125 ml, Plastic	EA-112D	H_2SO_4
Sulfide	250 ml, Plastic	EA-112D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-112D	--------
Methane	3 x 40 ml vial	EA-112D	HCl
Ferrous Iron (Field Analyzed):	11.72 mg/L (4:1 dilution)		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	1	2	3	4	5	6
Time	1135	1140	1145	1150	1155	1200	1205
Temperature (°C)	12.69	12.44	12.85	12.60	12.80	10.85	12.83
pH	6.19	6.60	6.73	6.73	6.71	6.68	6.79
Conductivity (S/cm)	0.180	0.206	0.219	0.215	0.212	0.208	0.001
DO (mg/L)	0.88	0.98	0.88	0.92	1.18	0.56	*
Turbidity (NTUs)	8.7	18	14	10	9.5	4.8	*
Eh (mV)	275.2	117.2	48.2	29.6	16.4	15.9	*
Water Level (ft. from TOR)	25.83	25.83	25.83	25.83	25.83	25.83	*
Flow Rate (mL/min.)	200	200	200	200	200	200	*

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	6	7	8	9	10		
Time	1245	1250	1255	1300	1305		
Temperature (°C)	11.59	11.83	11.90	11.95	12.05		
pH	6.58	6.56	6.55	6.54	6.53		
Conductivity (S/cm)	0.204	0.207	0.207	0.206	0.205		
DO (mg/L)	0.57	0.38	0.38	0.28	0.38		
Turbidity (NTUs)	14	5.1	1.9	1.0	0.35		
Eh (mV)	33.4	29.3	28.2	33.1	30.3		
Water Level (ft. from TOR)	25.84	25.84	25.83	25.83	25.83		
Flow Rate (mL/min.)	200	200	200	200	200		

NOTES: * = Nitrogen tank went empty

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/4/00

Well/Sample ID: EA-112R Personnel: RC/KB Start Time: 0813 Finish Time: 1000

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: __ 2-in. / __ 4-in. / __ 6-in. / Other 1.5 in.
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: Dedicated Bladder/ x Peristaltic
Pump Intake Depth (ft. below TOR) NA Depth to Water 26.15 (ft)
Depth of screened interval or open borehole interval 96.5-121.5 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-112R	HCl
TAL Metals, Hg, Manganese	500 ml, Plastic	EA-112R	HNO_3
Nitrate	125 ml, Plastic	EA-112R	H_2SO_4
Sulfide	250 ml, Plastic	EA-112R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-112R	----
Methane	3 x 40 ml vial	EA-112R	HCl
Ferrous Iron (Field Analyzed):	2.73 mg/L (4:1 dilution)		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	.75	1.5	2.25	3	3.75		
Time	0855	0900	0905	0910	0915		
Temperature (°C)	11.78	11.96	11.52	11.59	11.65		
pH	6.32	6.29	6.32	6.33	6.32		
Conductivity (S/cm)	0.189	0.191	0.190	0.191	0.190		
DO (mg/L)	-1.91	0.86	0.99	0.48	0.38		
Turbidity (NTUs)	2.5	1.8	1.3	1.8	1.2		
Eh (mV)	-76.4	-75.6	-78.8	-80.9	-81.4		
Water Level (ft. from TOR)	26.21	26.22	26.21	26.21	26.21		
Flow Rate (mL/min.)	150	150	150	150	150		

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/1/00

Well/Sample ID: EA-112R2 Personnel: TB/SK Start Time: 1110 Finish Time: 1250

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / ___ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 146 Depth to Water 24.95(ft)
Depth of screened interval or open borehole interval 130-156.6' (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-112R2 (DUP-5, MS/MSD)	HCl
TAL Metals, Hg, Manganese	500 ml, Plastic	EA-112R2 (DUP-5, MS/MSD)	HNO_3
Nitrate	125 ml, Plastic	EA-112R2 (DUP-5, MS/MSD)	H_2SO_4
Sulfide	250 ml, Plastic	EA-112R2 (DUP-5, MS/MSD)	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-112R2 (DUP-5, MS/MSD)	--------
Methane	3 x 40 ml vial	EA-112R2 (DUP-5, MS/MSD)	HCl
Ferrous Iron (Field Analyzed):	0.04 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.0	2.5	3.0
Time	1120	1125	1130	1135	1140	1145	1150
Temperature (°C)	-	11.22	11:05	11.55	11.61	12.02	11.98
pH	-	9.77	9.75	9.85	9.87	9.85	9.80
Conductivity (S/cm)	-	0.204	0.203	0.206	0.207	0.206	0.205
DO (mg/L)	-	0.34	0.28	0.39	0.41	0.46	0.43
Turbidity (NTUs)	-	21.4	8.43	6.53	7.3	7.6	5.6
Eh (mV)	-	-65.9	-84.4	-127.7	-162.0	-199.8	-200.0
Water Level (ft. from TOR)	26.1	26.1	26.3	26.4	26.6	26.65	26.70
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	
Time	1155	1200	1205	1210	1215	1220	
Temperature (°C)	12.25	12.25	12.26	12.23	12.24	12.24	
pH	9.71	9.70	9.76	9.78	9.75	9.70	
Conductivity (S/cm)	0.202	0.201	0.203	0.204	0.203	0.202	
DO (mg/L)	0.36	0.32	0.37	0.32	0.38	0.36	
Turbidity (NTUs)	5.0	4.1	3.8	3.8	3.8	3.8	
Eh (mV)	-252.1	-266.8	-289.6	-290.8	-295.8	-297.0	
Water Level (ft. from TOR)	26.75	26.80	26.90	26.92	27.00	27.00	
Flow Rate (mL/min.)	100	100	100	100	100	100	

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/2/00

Well/Sample ID: EA-113D Personnel: SK/SW Start Time: 0950 Finish Time: 1210

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 5.5 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 47.5 Depth to Water: 8.60 (ft)
Depth of screened interval or open borehole interval 4.25-5.25 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-113D	HCl
TAL Metals, Hg, Manganese	500 ml, Plastic	EA-113D	HNO_3
Nitrate	125 ml, Plastic	EA-113D	H_2SO_4
Sulfide	250 ml, Plastic	EA-113D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-113D	--------
Methane	3 x 40 ml vial	EA-113D	HCl
Ferrous Iron (Field Analyzed):	0.42 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.0	2.5	3.0
Time	1005	1010	1015	1020	1025	1030	1035
Temperature (°C)	-	11.30	10.74	10.52	10.97	11.06	11.06
pH	-	5.81	5.84	5.86	5.89	5.96	6.01
Conductivity (S/cm)	-	0.164	0.170	0.171	0.173	0.178	0.183
DO (mg/L)	-	8.99	2.11	2.29	2.27	1.76	1.56
Turbidity (NTUs)	-	34	33	29	18	19	26
Eh (mV)	-	108.0	107.9	109.6	109.1	109.0	114.0
Water Level (ft. from TOR)	8.6	9.7	12.1	11.4	10.9	11.0	11.0
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	1040	1045	1050	1055	1100	1105	1110
Temperature (°C)	11.01	11.06	11.12	11.15	11.18	11.18	11.45
pH	6.03	6.04	6.08	6.07	6.08	6.08	6.11
Conductivity (S/cm)	0.185	0.186	0.188	0.188	0.188	0.188	0.190
DO (mg/L)	1.49	1.57	1.45	1.43	1.41	1.41	1.71
Turbidity (NTUs)	29	32	39	38	37	36	36
Eh (mV)	110.0	111.7	117.8	118.0	118.2	119.1	118.6
Water Level (ft. from TOR)	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/2/00

Well/Sample ID: EA-113D Personnel: SK/SW Start Time: 0950 Finish Time: 1210

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.0	7.5	8.0	8.5	9.0	9.5	10.0
Time	1115	1120	1125	1130	1135	1140	1145
Temperature (°C)	11.33	11.47	11.62	11.41	11.40	11.47	11.51
pH	6.10	6.12	6.11	6.12	6.12	6.12	6.13
Conductivity (S/cm)	0.189	0.190	0.190	0.190	0.190	0.190	0.190
DO (mg/L)	1.17	1.06	1.18	1.18	1.14	0.78	1.04
Turbidity (NTUs)	37	33	32	30	33	32	30
Eh (mV)	138.0	140.0	142.0	140.0	139.1	140.2	154.0
Water Level (ft. from TOR)	11.0	11.0	11.1	11.1	11.1	11.1	11.1
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	10.5	11.0	11.5				
Time	1150	1155	1200				
Temperature (°C)	11.75	11.97	12.10				
pH	6.14	6.15	6.14				
Conductivity (S/cm)	0.190	0.190	0.191				
DO (mg/L)	1.05	-0.11	0.04				
Turbidity (NTUs)	30	30	28				
Eh (mV)	150.8	215.1	226.1				
Water Level (ft. from TOR)	11.15	11.20	11.20				
Flow Rate (mL/min.)	100	100	100				

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/2/00

Well/Sample ID: EA-113R Personnel: SW/SK Start Time: 0930 Finish Time: 1135

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 38.9 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder / __ Peristaltic
Pump Intake Depth (ft. below TOR) 67 Depth to Water 7.48 (ft)
Depth of screened interval or open borehole interval 53-80' (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-113R	HCl
Manganese, TAL metals, Hg	500 ml, Plastic	EA-113R	HNO_3
Nitrate	125 ml, Plastic	EA-113R	H_2SO_4
Sulfide	250 ml, Plastic	EA-113R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-113R	--------
Methane	3 x 40 ml vial	EA-113R	HCl
Ferrous Iron (Field Analyzed):	0.82 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	1.0	2.0	3.0	4.0	5.0	6.0
Time	0935	0940	0945	0950	0955	1000	1005
Temperature (°C)	11.18	10.98	10.90	10.96	10.97	10.97	10.96
pH	8.00	8.06	8.08	8.10	8.12	8.14	8.14
Conductivity (S/cm)	0.203	0.203	0.203	0.203	0.202	0.202	0.202
DO (mg/L)	1.87	1.07	0.91	0.70	0.57	0.50	0.44
Turbidity (NTUs)	27	28	29	31	27	30	31
Eh (mV)	-297	-314	-320	-323	-330	-331	-334
Water Level (ft. from TOR)	7.48	7.50	7.52	7.55	7.55	7.50	7.50
Flow Rate (mL/min.)	200	200	200	200	200	200	200

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	7.0	8.0	9.0	10.0	11.0	12.0	13.0
Time	1010	1015	1020	1025	1030	1035	1040
Temperature (°C)	10.94	10.93	10.94	10.94	10.96	10.96	10.95
pH	8.15	8.15	8.15	8.13	8.13	8.12	8.11
Conductivity (S/cm)	0.202	0.202	0.201	0.201	0.201	0.201	0.201
DO (mg/L)	0.40	0.37	0.36	0.34	0.34	0.32	0.31
Turbidity (NTUs)	33	25	24	25	23	22	24
Eh (mV)	-336	-335	-334	-332	-329	-328	-326
Water Level (ft. from TOR)	7.50	7.52	7.52	7.52	7.52	7.52	7.51
Flow Rate (mL/min.)	200	200	200	200	200	200	200

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/2/00

Well/Sample ID: EA-113R Personnel: SW/SK Start Time: 0930 Finish Time: 1135

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	14.0	15.0	16.0	17.0	18.0	19.0	20.0
Time	1045	1050	1055	1100	1105	1110	1115
Temperature (°C)	10.94	11.03	10.99	10.99	10.98	11.00	11.04
pH	8.11	8.10	8.09	8.08	8.07	8.06	8.05
Conductivity (S/cm)	0.201	0.200	0.200	0.200	0.200	0.200	0.199
DO (mg/L)	0.31	0.30	0.30	0.29	0.28	0.27	0.27
Turbidity (NTUs)	20	20	19	17	19	18	17
Eh (mV)	-325	-324	-322	-319	-317	-316	-314
Water Level (ft. from TOR)	7.52	7.52	7.52	7.52	7.52	7.52	7.52
Flow Rate (mL/min.)	200	200	200	200	200	200	200

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	21.0	22.0	23.0	24.0			
Time	1120	1125	1130	1135			
Temperature (°C)	11.05	11.16	11.13	11.13			
pH	8.04	8.04	8.04	8.04			
Conductivity (S/cm)	0.199	0.199	0.199	0.200			
DO (mg/L)	0.26	0.27	0.28	0.28			
Turbidity (NTUs)	17	16	15	15			
Eh (mV)	-313	-312	-311	-311			
Water Level (ft. from TOR)	7.52	7.52	7.52	7.52			
Flow Rate (mL/min.)	200	200	200	200			

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/4/00

Well/Sample ID: EA-114D Personnel: SK/SW Start Time: 0900 Finish Time: 0955

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 11 Depth to Water 8.91 (ft)
Depth of screened interval or open borehole interval 4.5-14.5 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-114D, DUP 6	HCl
SVOC	2 amber liter	EA-114D, DUP 6	--------
TAL Metals, Hg, Manganese	500 ml, Plastic	EA-114D, DUP 6	HNO_3
Nitrate	125 ml, Plastic	EA-114D, DUP 6	H_2SO_4
Sulfide	250 ml, Plastic	EA-114D, DUP 6	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-114D, DUP 6	--------
Methane	3 x 40 ml vial	EA-114D, DUP 6	HCl
Ferrous Iron (Field Analyzed):	1.29 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.0	2.5	3.0
Time	0900	0905	0910	0915	0920	0925	0930
Temperature (°C)	-	13.84	13.89	13.88	13.90	13.90	13.93
pH	-	5.51	5.51	5.50	5.49	5.49	5.49
Conductivity (S/cm)	-	0.096	0.096	0.095	0.094	0.093	0.093
DO (mg/L)	-	1.46	1.27	1.14	1.09	1.05	1.06
Turbidity (NTUs)	-	25	18	18	13	8	7
Eh (mV)	-	113.8	114.1	115.5	115.7	116.4	116.2
Water Level (ft. from TOR)	8.91	8.90	8.90	8.90	8.90	8.90	8.90
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5		
Time	0935	0940	0945	0950	0955		
Temperature (°C)	13.91	13.92	13.97	13.99	14.00		
pH	5.48	5.47	5.47	5.48	5.47		
Conductivity (S/cm)	0.116	0.116	0.115	0.115	0.114		
DO (mg/L)	1.01	1.01	0.99	0.99	0.98		
Turbidity (NTUs)	6.5	5.2	5	4.2	4.0		
Eh (mV)	117.8	119.0	119.3	119.3	119.4		
Water Level (ft. from TOR)	8.91	8.91	8.91	8.91	8.91		
Flow Rate (mL/min.)	100	100	100	100	100		

NOTES: _____

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/4/00

Well/Sample ID: EA-114R Personnel: SW Start Time: 0820 Finish Time: 1000

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder / __Peristaltic
Pump Intake Depth (ft. below TOR) 37 Depth to Water 8.31 (ft)
Depth of screened interval or open borehole interval 17.6-42.7' (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-114R, DUP 6, MS/MSD	HCl
SVOC	2 amber liters	EA-114R, DUP 6, MS/MSD	--------
TAL Metals, Hg, Manganese	500 ml, Plastic	EA-114R, DUP 6, MS/MSD	HNO_3
Nitrate	125 ml, Plastic	EA-114R, DUP 6, MS/MSD	H_2SO_4
Sulfide	250 ml, Plastic	EA-114R, DUP 6, MS/MSD	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-114R, DUP 6, MS/MSD	--------
Methane	3 x 40 ml vial	EA-114R, DUP 6, MS/MSD	HCl
Ferrous Iron (Field Analyzed):	___ mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	1.0	2.0	3.0	4.0	5.0	6.0
[redacted]	0820	0825	0830	0835	0840	0845	0850
Temperature (°C)	12.52	12.46	12.73	12.94	13.14	13.37	13.55
pH	6.54	6.60	6.69	6.72	6.73	6.73	6.73
Conductivity (S/cm)	0.127	0.152	0.156	0.156	0.157	0.157	0.157
DO (mg/L)	4.72	2.24	1.88	1.77	1.69	1.69	1.59
Turbidity (NTUs)	37	26	21	16	18	13	13
Eh (mV)	-18.7	-142.5	-162.0	-166.7	-174.6	-176.2	-177.2
Water Level (ft. from TOR)	8.53	8.60	8.57	8.52	8.52	8.52	8.52
Flow Rate (mL/min.)	200	200	200	200	200	200	200

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	7.0	8.0	9.0	10.0	11.0	12.0	13.0
Time	0855	0900	0905	0910	0915	0920	0925
Temperature (°C)	11.92	12.17	12.36	12.52	12.43	12.57	12.71
pH	6.78	6.83	6.84	6.81	6.85	6.86	6.86
Conductivity (S/cm)	0.156	0.156	0.156	0.156	0.156	0.156	0.156
DO (mg/L)	0.78	0.46	0.48	0.77	0.78	0.41	0.40
Turbidity (NTUs)	9.8	8.4	10	11	7	7	7
Eh (mV)	-187.8	-201.7	-202.6	-192.2	-206.4	-208.1	-208.5
[redacted]r Level (ft. from TOR)	8.52	8.52	8.52	8.52	8.52	8.52	8.52
[redacted]w Rate (mL/min.)	200	200	200	200	200	200	200

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/4/00

Well/Sample ID: EA-114R Personnel: SW Start Time: 0820 Finish Time: 1000

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	14.0	15.0	16.0	17.0	18.0	19.0	
Time	0930	0935	0940	0945	0950	1000	
Temperature (°C)	12.69	12.75	12.83	12.75	12.86	12.82	
pH	6.87	6.87	6.86	6.87	6.87	6.87	
Conductivity (S/cm)	0.155	0.155	0.155	0.155	0.155	0.155	
DO (mg/L)	0.37	0.37	0.36	0.35	0.35	0.35	
Turbidity (NTUs)	6	6	6	6	5	4	
Eh (mV)	-209.7	-210.2	-211.2	-211.7	-211.7	-211.8	
Water Level (ft. from TOR)	8.52	8.52	8.52	8.52	8.52	8.52	
Flow Rate (mL/min.)	200	200	200	200	200	200	

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/28/00

Well/Sample ID: EA-116D Personnel: RC Start Time: 1230 Finish Time: 1430

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 83.3 Depth to Water 24.55' (ft)
Depth of screened interval or open borehole interval 75.2-58.2'(ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-116D	HCl
Manganese	500 ml, Plastic	EA-116D	HNO_3
Nitrate	125 ml, Plastic	EA-116D	H_2SO_4
Sulfide	250 ml, Plastic	EA-116D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-116D	———
Methane	3 x 40 ml vial	EA-116D	HCl
Ferrous Iron (Field Analyzed):	0.33 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	1	2	3	4	6	7	8
Time	1238	1243	1248	1253	1311	1316	1321
Temperature (°C)	11.90	1222	11.93	11.72	11.61	11.62	11.56
pH	7.29	7.04	6.93	6.86	6.72	6.66	6.63
Conductivity (S/cm)	0.288	0.284	0.272	0.266	0.251	0.249	0.244
DO (mg/L)	4.48	1.89	1.23	1.59	2.08	1.15	1.11
Turbidity (NTUs)	750	>1000	>1000	>1000	>1000	>1000	>1000
Eh (mV)	-89.3	-88.4	-81.2	-64.6	-41.3	-42.2	-41.1
Water Level (ft. from TOR)	24.88	24.71	24.71	24.71	24.70	24.70	24.71
Flow Rate (mL/min.)	200	200	200	200	200	200	200

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	9	10	11				
Time	1326	1331	1336				
Temperature (°C)	11.52	11.50	11.48				
pH	6.61	6.61	6.60				
Conductivity (S/cm)	0.242	0.243	0.242				
DO (mg/L)	1.02	1.06	0.99				
Turbidity (NTUs)	>1000	>1000	>1000				
Eh (mV)	-38.4	-38.3	-36.3				
Water Level (ft. from TOR)	24.71	24.71	24.71				
Flow Rate (mL/min.)	200	200	200				

NOTES: _____

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/28/00

Well/Sample ID: EA-116R Personnel: JG/RC Start Time: 1208 Finish Time: 1400

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 70 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 93 Depth to Water 23.17 (ft)
Depth of screened interval or open borehole interval 90.3-117 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-116R	HCl
Manganese	500 ml, Plastic	EA-116R	HNO_3
Nitrate	125 ml, Plastic	EA-116R	H_2SO_4
Sulfide	250 ml, Plastic	EA-116R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-116R	--------
Methane	3 x 40 ml vial	EA-116R	HCl
Ferrous Iron (Field Analyzed):	2.54 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.0	2.5	3.0
Time	1208	1213	1218	1223	1228	1233	1238
Temperature (°C)	12.47	12.82	13.01	13.45	13.68	13.58	13.34
pH	9.87	9.69	9.42	9.17	9.00	9.02	9.11
Conductivity (S/cm)	188	189	193	202	204	208	212
DO (mg/L)	9.94	9.62	9.37	9.73	9.93	9.89	9.60
Turbidity (NTUs)	13	60	48	33	21	15	14
Eh (mV)	-650	-606	-559	-524	-538	-574	-503
Water Level (ft. from TOR)	23.18	23.20	23.19	23.19	23.18	23.18	23.17
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	1243	1248	1253	1258	1303	1308	1313
Temperature (°C)	13.08	12.89	12.60	12.35	12.33	12.27	12.27
pH	9.19	8.94	8.49	8.10	7.92	7.80	7.63
Conductivity (S/cm)	213	213	214	213	213	212	211
DO (mg/L)	10.18	10.48	9.94	10.09	10.04	10.12	10.75
Turbidity (NTUs)	9	8	6	5	4	4	3
Eh (mV)	-574	-584	-540	-460	-450	-457	-434
Water Level (ft. from TOR)	23.18	23.18	23.18	23.18	23.18	23.18	23.18
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/28/00

Well/Sample ID: EA116R2 Personnel: RC Start Time: 0900 Finish Time: 1430

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	__ PVC / __ SS / Other Steel
Protective Casing Secure	x Yes __ No	Well Diameter:	__ 2-in. / x 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 125 Depth to Water 24.76 (ft)
Depth of screened interval or open borehole interval 117-142' (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-116R2 (DUP 7)	HCl
Manganese	500 ml, Plastic	EA-116R2 (DUP 7)	HNO_3
Nitrate	125 ml, Plastic	EA-116R2 (DUP 7)	H_2SO_4
Sulfide	250 ml, Plastic	EA-116R2 (DUP 7)	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-116R2 (DUP 7)	--------
Methane	3 x 40 ml vial	EA-116R2 (DUP 7)	HCl
Ferrous Iron (Field Analyzed):	0.66 mg/L	Ferrous Iron (DUP 7) 0.66 mg/L	

Equipment Decon

P = Purge	S = Sample	Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	1	2	3	4	5	5.5
Time	915	920	925	930	943	948	953
Temperature (°C)	11.96	11.84	11.60	11.58	11.27	12.51	12.70
pH	11.07	12.00	12.16	12.15	12.21	12.19	12.22
Conductivity (S/cm)	0.329	1.015	1.120	1.275	1.418	2.170	2.150
DO (mg/L)	4.78	3.40	1.75	1.36	2.51	1.13	1.09
Turbidity (NTUs)	17	20	5.8	2.4	2.0	2.0	2.1
Eh (mV)	16.25	96.3	58.4	4.28	2.0	-15.0	-23.1
Water Level (ft. from TOR)	25.25	25.20	25.30	25.30	25.40	25.30	25.20
Flow Rate (mL/min.)	200	200	200	200	200	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	6	6.5	7	7.5	8	8.5	9
Time	958	1003	1008	1015	1020	1025	1030
Temperature (°C)	12.79	12.95	12.87	13.31	13.36	13.30	13.35
pH	12.24	12.22	12.20	12.19	12.18	12.18	12.18
Conductivity (S/cm)	2.099	2.012	2.078	2.080	2.074	2.030	2.011
DO (mg/L)	1.13	0.80	0.81	0.86	0.84	0.81	0.84
Turbidity (NTUs)	1.7	1.6	1.5	1.8	1.6	1.6	1.5
Eh (mV)	-30.6	-38.8	-46.8	-57.0	-63.2	-70.3	-74.8
Water Level (ft. from TOR)	25.20	25.20	25.20	25.20	25.20	25.20	25.20
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: Metals Sample on hold at laboratory.

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Project No.: 60957.56 Task: 0004 Date: 9/28/00

Well ID: EA-116R2 Personnel: RC Start Time: 0900 Finish Time: 1430

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	9.5	10					
Time	1035	1040					
Temperature (°C)	13.28	13.26					
pH	12.18	12.17					
Conductivity (S/cm)	2.017	2.016					
DO (mg/L)	0.89	0.87					
Turbidity (NTUs)	1.5	1.7					
Eh (mV)	-79.4	-81.5					
Water Level (ft. from TOR)	25.20	25.20					
Flow Rate (mL/min.)	100	100					

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: EPA collected 6 VOAs. EA collected a full set of samples for MRD lab.

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/4/00

Well/Sample ID: MW03-11R Personnel: RC Start Time: 1020 Finish Time: 1054

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: __PVC / ___ SS / Other Steel
Protective Casing Secure x Yes __ No Well Diameter: __2-in. / x 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 35 Depth to Water 9.65 (ft)
Depth of screened interval or open borehole interval 28.2-55 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-11R	HCl
Manganese	500 ml, Plastic	MW03-11R	HNO_3
Nitrate	125 ml, Plastic	MW03-11R	H_2SO_4
Sulfide	250 ml, Plastic	MW03-11R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-11R	--------
Methane	3 x 40 ml vial	MW03-11R	HCl
Ferrous Iron (Field Analyzed):	1.92 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	1	2	3	4	5	6	
Time	1029	1034	1039	1049	1049	1054	
Temperature (°C)	12.18	11.83	11.60	11.50	11.53	11.58	
pH	6.35	6.30	6.31	6.30	6.28	6.28	
Conductivity (S/cm)	0.135	0.133	0.132	0.132	0.130	0.130	
DO (mg/L)	-0.49	-0.28	-0.05	0.02	0.04	0.12	
Turbidity (NTUs)	1.8	2.0	3.1	2.6	2.0	2.7	
Eh (mV)	-45.7	-43.3	-44.9	-46.5	-41.3	-41.9	
Water Level (ft. from TOR)	9.66	9.66	9.67	9.67	9.67	9.67	
Flow Rate (mL/min.)	200	200	200	200	200	200	

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site 03 Project No.: 60957.56 Task: 0004 Date: 10/2/00

Well/Sample ID: MW03-12D Personnel: SK Start Time: 1355 Finish Time: 1500

Air Monitoring
uipment Used: Photovac /Vrac Ambient Air Reading: 0.0 ppm
libration Information: ISO/Methane Well Headspace Reading: 0.0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 30 Depth to Water 13.45' (ft)
Depth of screened interval or open borehole interval 25-35' (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-12D	HCl
Manganese	500 ml, Plastic	MW03-12D	HNO_3
Nitrate	125 ml, Plastic	MW03-12D	H_2SO_4
Sulfide	250 ml, Plastic	MW03-12D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-12D	--------
Methane	3 x 40 ml vial	MW03-12D	HCl
Ferrous Iron (Field Analyzed):	3.93 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.0	2.5	3.0
[redacted]e	1405	1410	1415	1420	1425	1430	1435
[redacted]perature (°C/F)		11.74	11.65	11.71	11.54	11.65	11.64
PH		6.72	6.72	6.72	6.69	6.68	6.66
Conductivity (S/cm)		0.258	0.255	0.251	0.250	0.250	0.249
DO (mg/L)		2.54	2.46	2.48	2.41	1.33	2.28
Turbidity (NTUs)		19	14	8.5	7.9	9.6	8.1
Eh (mV)		202.6	206.8	208.8	208.0	298.1	223.0
Water Level (ft. from TOR)	13.45	15.35	15.35	15.35	15.35	15.35	15.35
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5		
Time	1440	1445	1450	1455	1500		
Temperature (°C)	11.69	11.63	11.60	11.61	11.62		
pH	6.65	6.65	6.64	6.64	6.63		
Conductivity (S/cm)	0.248	0.248	0.247	0.247	0.247		
DO (mg/L)	2.34	2.37	2.26	2.27	2.28		
Turbidity (NTUs)	5.3	4.3	3.8	3.4	1.6		
Eh (mV)	245.2	246.2	244.5	248.5	249.0		
Water Level (ft. from TOR)	15.35	15.35	15.35	15.35	15.35		
[redacted] Rate (mL/min.)	100	100	100	100	100		

NOTES: * ORP IS BOUNCING AROUND FERROUS IRON = 3.93

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/2/00

Well/Sample ID: MW03-12R Personnel: SW Start Time: 1405 Finish Time: 1455

Air Monitoring
uipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
libration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) ___ Depth to Water 12.21 (ft)
Depth of screened interval or open borehole interval 45-55' (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-12R	HCl
Manganese	500 ml, Plastic	MW03-12R	HNO_3
Nitrate	125 ml, Plastic	MW03-12R	H_2SO_4
Sulfide	250 ml, Plastic	MW03-12R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-12R	--------
Methane	3 x 40 ml vial	MW03-12R	HCl
Ferrous Iron (Field Analyzed):	0.34 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	1.0	2.0	3.0	4.0	5.0	6.0
[redacted]e	1405	1410	1415	1420	1425	1430	1435
[redacted]mperature (°C)	11.15	11.41	11.84	11.50	11.33	11.40	11.45
pH	6.36	5.76	5.98	5.74	5.72	5.70	5.70
Conductivity (S/cm)	0.120	0.120	0.119	0.120	0.120	0.121	0.121
DO (mg/L)	5.63	2.07	4.89	1.79	1.44	0.81	0.72
Turbidity (NTUs)	*	*	*	75	29	19	15
Eh (mV)	108	112	114	113	111	102	98
Water Level (ft. from TOR)	13.26	13.28	13.30	13.30	13.29	13.29	13.29
Flow Rate (mL/min.)	200	200	200	200	200	200	200

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	7.0	8.0	9.0	10.0			
Time	1440	1445	1450	1455			
Temperature (°C)	11.51	11.49	11.48	11.50			
pH	5.70	5.70	5.70	5.69			
Conductivity (S/cm)	0.121	0.121	0.121	0.122			
DO (mg/L)	0.83	0.66	0.65	0.62			
Turbidity (NTUs)	20	8	5	5			
Eh (mV)	99	95	91	90			
Water Level (ft. from TOR)	13.30	13.30	13.30	13.30			
[redacted] Rate (mL/min.)	200	200	200	200			

NOTES: _____

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/3/00

Well/Sample ID: MW03-13D Personnel: SW Start Time: 0805 Finish Time: 0900

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 34 Depth to Water 9.02 (ft)
Depth of screened interval or open borehole interval 29-39 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-13D	HCl
Manganese	500 ml, Plastic	MW03-13D	HNO_3
Nitrate	125 ml, Plastic	MW03-13D	H_2SO_4
Sulfide	250 ml, Plastic	MW03-13D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-13D	--------
Methane	3 x 40 ml vial	MW03-13D	HCl
Ferrous Iron (Field Analyzed):	2.42 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	1.0	2.0	3.0	4.0	5.0	6.0
Time	0805	0810	0815	0820	0825	0830	0835
Temperature (°C)	10.97	10.78	10.68	10.77	10.75	10.70	10.66
pH	6.28	6.00	6.01	5.98	5.97	5.97	5.97
Conductivity (S/cm)	0.120	0.150	0.157	0.158	0.153	0.157	0.157
DO (mg/L)	6.48	2.11	2.01	1.04	1.05	0.72	0.66
Turbidity (NTUs)	210	210	90	160	14	7.7	8.6
Eh (mV)	54.0	-3.2	-2.5	-15.7	-15.8	-20.8	-22.7
Water Level (ft. from TOR)	10.09	10.09	10.10	10.10	10.10	10.10	10.10
Flow Rate (mL/min.)	200	200	200	200	200	200	200

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	7.0	8.0	9.0	10.0	11.0		
Time	0840	0845	0850	0855	0900		
Temperature (°C)	10.61	10.63	10.65	10.62	10.66		
pH	5.96	5.96	5.97	5.96	5.95		
Conductivity (S/cm)	0.157	0.157	0.157	0.156	0.153		
DO (mg/L)	0.61	0.58	0.58	0.57	0.57		
Turbidity (NTUs)	8.2	6.2	3.1	3.5	2.9		
Eh (mV)	-24.5	-25.3	-25.4	-25.8	-24.9		
Water Level (ft. from TOR)	10.10	10.10	10.10	10.10	10.10		
Flow Rate (mL/min.)	200	200	200	200	200		

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/3/00

Well/Sample ID: MW03-13R Personnel: SK/SW Start Time: 0830 Finish Time: 0950

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / __ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 52.2 Depth to Water 10.0 (ft)
Depth of screened interval or open borehole interval 47.2-57.2 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-13R	HCl
Manganese	500 ml, Plastic	MW03-13R	HNO_3
Nitrate	125 ml, Plastic	MW03-13R	H_2SO_4
Sulfide	250 ml, Plastic	MW03-13R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-13R	———
Methane	3 x 40 ml vial	MW03-13R	HCl
Ferrous Iron (Field Analyzed):	1.49 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	0.5	1.0	1.5	2.0	2.5	3.0
Time	-	0835	0840	0845	0850	0855	0900
Temperature (°C)	-	11.06	11.07	11.08	11.07	11.11	11.20
pH	-	7.13	7.11	6.88	6.52	6.36	6.31
Conductivity (S/cm)	-	0.276	0.266	0.247	0.221	0.212	0.207
DO (mg/L)	-	1.63	1.32	1.15	1.08	1.10	1.09
Turbidity (NTUs)	-	19	5.4	5.0	3.0	3.9	3.5
Eh (mV)	-	-58.9	-64.4	-45.8	-14.5	-1.6	4.7
Water Level (ft. from TOR)	10.0	10.53	10.55	10.55	10.55	10.55	10.55
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	0905	0910	0915	0920	0925	0930	0935
Temperature (°C)	11.26	11.42	11.57	11.36	11.32	11.35	11.30
pH	6.25	6.22	6.23	6.23	6.22	6.20	6.16
Conductivity (S/cm)	0.203	0.202	0.200	0.200	0.199	0.199	0.199
DO (mg/L)	1.11	1.23	1.30	1.27	1.18	1.15	1.19
Turbidity (NTUs)	0.75	0.75	0.75	0.70	0.70	0.70	1.0
Eh (mV)	8.5	11.6	13.4	15.4	16.9	19.7	19.8
Water Level (ft. from TOR)	10.55	10.55	10.55	10.55	10.55	10.55	10.55
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: DRAFT

Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 10/3/00

Well/Sample ID: MW03-13R Personnel: SK/SW Start Time: 0830 Finish Time: 0950

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.0	7.5	8.0				
Time	0940	0945	0950				
Temperature (°C)	11.29	11.30	11.31				
pH	6.19	6.18	6.19				
Conductivity (S/cm)	0.197	0.197	0.196				
DO (mg/L)	1.18	1.15	1.14				
Turbidity (NTUs)	1.0	1.0	1.0				
Eh (mV)	20.7	21.6	21.8				
Water Level (ft. from TOR)	10.55	10.55	10.55				
Flow Rate (mL/min.)	100	100	100				

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

DRAFT

Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site 03 Project No.: 60957.56 Task: 0004 Date: 9/28/00

Well/Sample ID: MW03-14D Personnel: SK/TB Start Time: 1315 Finish Time: 1545

Air Monitoring
Equipment Used: Photovac /VRAE Ambient Air Reading: 0.0 ppm
Calibration Information: ISO/Methane Well Headspace Reading: 0.0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: X Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR 35 Depth to Water 40.00 (ft)
Depth of screened interval or open borehole interval 30-40 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-14D	HCl
Manganese	500 ml, Plastic	MW03-14D	HNO_3
Nitrate	125 ml, Plastic	MW03-14D	H_2SO_4
Sulfide	250 ml, Plastic	MW03-14D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-14D	--------
Methane	3 x 40 ml vial	MW03-14D	HCl
Ferrous Iron (Field Analyzed):	5.10 mg/L		

Equipment Decon

P = Purge	S = Sample	Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0.5	1.0	1.5	2.0	2.5	3.0	3.5
Time	1320	1325	1330	1335	1340	1345	1350
Temperature (°C/F)	11.71	11.91	12.21	12.43	12.47	12.64	12.40
pH	7.70	7.06	6.90	6.80	6.76	6.73	6.71
Conductivity (S/cm)	0.370	0.367	0.365	0.367	0.366	0.366	0.367
DO (mg/L)	12.57	7.63	6.10	5.79	4.91	4.65	3.82
Turbidity (NTUs)	120	500	900	900	600	500	400
Eh (mV)	-176.3	-176.2	-176.4	-175.4	-174.6	-173.6	-172.7
Water Level (ft. from TOR)	10.50	10.20	10.15	10.13	10.10	10.10	10.10
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	4.0	4.5	5.0	5.5	6.0	6.5	7.0
Time	1355	1400	1405	1410	1415	1420	1425
Temperature (°C)	12.32	12.39	12.63	12.61	12.46	12.38	12.17
pH	6.70	6.68	6.67	6.66	6.66	6.66	6.65
Conductivity (S/cm)	0.368	0.370	0.371	0.371	0.371	0.369	0.369
DO (mg/L)	3.47	3.12	2.71	2.68	2.44	2.14	1.96
Turbidity (NTUs)	290	230	200	190	180	170	160
Eh (mV)	-172.4	-171.8	-171.0	-170.1	-169.8	-170.0	-169.6
Water Level (ft. from TOR)	10.10	10.10	10.10	10.10	10.10	10.10	10.10
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: FERROUS IRON = 5.10 mg/L

DRAFT

Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/28/00

Well ID: MW03-14D Personnel: SK/TB Start Time: 1315 Finish Time: 1545

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.5	8.0	8.5	9.0	9.5	10.0	10.5
Time	1430	1435	1440	1445	1450	1455	1500
Temperature (°C)	11.88	11.94	12.03	12.09	12.15	12.21	12.28
pH	6.63	6.62	6.62	6.62	6.63	6.63	6.63
Conductivity (S/cm)	0.370	0.371	0.373	0.373	0.371	0.370	0.368
DO (mg/L)	1.56	1.42	1.35	1.29	1.25	1.21	1.15
Turbidity (NTUs)	160	160	160	160	160	160	160
Eh (mV)	-169.7	-169.4	-169.0	-168.8	-169.2	-169.7	-170.0
Water Level (ft. from TOR)	10.10	10.10	10.10	10.10	10.10	10.10	10.10
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	11.0	11.5	12.0				
Time	1505	1510	1515				
Temperature (°C/F)	12.30	12.27	12.14				
pH	6.63	6.64	6.64				
Conductivity (m_/cm)	0.366	0.364	0.364				
DO (mg/L)	1.10	1.08	1.04				
Turbidity (NTUs)	150	140	120				
Eh (mV)	-169.9	-170.5	-170.9				
Water Level (ft. from TOR)	10.10	10.10	10.10				
Flow Rate (mL/min.)	100	100	100				

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

DRAFT

Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site 03 Project No.: 60957.56 Task: 0004 Date: 9/29/00

Well/Sample ID: MW03-14R Personnel: SK/TB Start Time: 1000 Finish Time: 1200

Air Monitoring
Equipment Used: Photovac /VRAE Ambient Air Reading: 0.0 ppm
Calibration Information: ISO/Methane Well Headspace Reading: 13.2 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 12 Depth to Water 10.10' (ft)
Depth of screened interval or open borehole interval 47-57' (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-14R	HCl
Manganese	500 ml, Plastic	MW03-14R	HNO_3
Nitrate	125 ml, Plastic	MW03-14R	H_2SO_4
Sulfide	250 ml, Plastic	MW03-14R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-14R	--------
Methane	3 x 40 ml vial	MW03-14R	HCl
Ferrous Iron (Field Analyzed):	2.25 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropanal, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropanal, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.0	2.5	3.0
Time	1000	1015	1020	1025	1030	1035	1040
Temperature (°C/F)	1000	11.80	11.61	11.60	11.55	11.55	11.61
PH	1000	7.22	7.09	7.08	7.05	7.03	7.03
Conductivity (S/cm)	1000	0.312	0.312	0.308	0.306	0.289	0.294
DO (mg/L)	1000	20.05	18.19	16.97	15.06	13.78	13.16
Turbidity (NTUs)	1000	190	150	110	100	70	65
Salinity (%)	-	-	-	-	-	-	-
Eh (mV)	1000	-116.5	-135.4	-135.6	-134.9	-132.1	-130.9
Water Level (ft. from TOR)	10.01	10.80	10.80	10.80	10.80	10.80	10.8
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.5	6.0	6.5	7.0
Time	1045	1050	1055	1100	1105	1110	1115
Temperature (°C)	11.58	11.57	11.63	11.63	11.63	11.63	11.62
pH	7.08	7.18	7.22	7.26	7.31	7.29	7.30
Conductivity (S/cm)	0.294	0.292	0.274	O.280	0.282	0.283	0.280
DO (mg/L)	12.86	11.60	10.78	10.20	9.82	9.95	9.81
Turbidity (NTUs)	50	45	36	32	29	28	23
Eh (mV)	-140.0	-157.2	-163.8	-169.0	-169.5	-169.1	-167.1
Water Level (ft. from TOR)	10.80	10.80	10.80	10.80	10.80	10.80	10.80
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: 2.25 FERROUS IRON

DRAFT

Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0003 Date: 9/29/00

Well ID: MW03-14R Personnel: SK/TB Start Time: 1000 Finish Time: 1200

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.5	8.0	8.5	9.0	9.5	10.0	10.5
Time	1120	1125	1130	1135	1140	1145	1150
Temperature (°C)	11.63	11.68	11.68	11.72	11.76	11.77	11.82
pH	7.33	7.30	7.27	7.20	7.13	7.13	7.04
Conductivity (S/cm)	0.278	0.276	0.275	0.272	0.267	0.270	0.269
DO (mg/L)	9.24	9.43	9.56	10.24	9.46	9.54	10.05
Turbidity (NTUs)	23	21	19	17	14	14	14
Eh (mV)	-168.0	-167.4	-160.9	-152.0	-145.5	-144.5	-141.1
Water Level (ft. from TOR)	10.80	10.80	10.80	10.80	10.80	10.80	10.80
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	11.0	11.5					
Time	1155	1200					
Temperature (°C/F)	11.84	11.84					
pH	7.11	7.10					
Conductivity (m_/cm)	0.269	0.269					
DO (mg/L)	10.09	10.10					
Turbidity (NTUs)	12	12					
Eh (mV)	-140.4	-140.2					
Water Level (ft. from TOR)	10.80	10.80					
Flow Rate (mL/min.)	100	100					

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: PI=2.25 FERROUS IRON

DRAFT

Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site 03 Project No.: 60957.56 Task: 0004 Date: 9/28/00

Well/Sample ID: MW03-14R2 Personnel: SK/TB Start Time: 0830 Finish Time: 1100

Air Monitoring
Equipment Used: Photovac /VRAE Ambient Air Reading: 0.0 ppm
Calibration Information: ISO/Methane Well Headspace Reading: 0.0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: ___PVC / ___ SS / Other Steel
Protective Casing Secure x Yes __ No Well Diameter: ___2-in. / x 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 90 Depth to Water 10.18 (ft)
Depth of screened interval or open borehole interval 68-93 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-14R2, DUP-8	HCl
Manganese	500 ml, Plastic	MW03-14R2, DUP-8	HNO_3
Nitrate	125 ml, Plastic	MW03-14R2, DUP-8	H_2SO_4
Sulfide	250 ml, Plastic	MW03-14R2, DUP-8	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-14R2, DUP-8	--------
Methane	3 x 40 ml vial	MW03-14R2, DUP-8	HCl
Ferrous Iron (Field Analyzed):	0.56 mg/L	Dup-8 Ferrous Iron = 0.50 mg/L	

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, isopropanal, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, isopropanal, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.0	2.5	3.0
Time	0855	0900	0905	0910	0915	0920	0925
Temperature (°C/F)		12.23	12.22	12.17	12.18	12.08	12.07
PH		12.20	12.29	12.30	12.31	12.32	12.32
Conductivity (S/cm)		2.257	2.404	2.418	2.418	2.410	2.416
DO (mg/L)		5.12	4.16	2.39	1.65	1.19	0.86
Turbidity (NTUs)		15.1	6.79	5.36	9.0	7.3	7.1
Eh (mV)		-36.7	-70.3	-83.5	-94.5	-101.7	-108.7
Water Level (ft. from TOR)		10.54	10.90	11.15	11.42	11.69	11.93
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	0930	0935	0940	0945	0950	0955	1000
Temperature (°C)	12.09	12.11	12.08	12.15	12.16	12.13	12.12
pH	12.33	12.33	12.33	12.33	12.33	12.33	12.33
Conductivity (S/cm)	2.414	2.411	2.410	2.410	2.409	2.411	2.410
DO (mg/L)	0.86	0.83	0.88	0.90	0.89	0.87	0.84
Turbidity (NTUs)	9.8	9.4	7.3	5.5	5.1	5.1	4.3
Eh (mV)	-114.3	-119.1	-123.3	-127.1	-131.1	-134.0	-137.9
Water Level (ft. from TOR)	12.20	12.45	12.71	12.85	13.10	13.41	13.59
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES:

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Field Sampling Form

Project Name: CVOC Characterization Former Nike PR-58 Site Project No.: 60957.56 Task: 0004 Date: 9/28/00

Well ID: MW03-14R2 Personnel: SK/TB Start Time: 0830 Finish Time: 1100

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.0	7.5	8.0	8.5	9.0	9.5	10.0
Time	1005	1010	1015	1020	1025	1030	1035
Temperature (°C)	12.12	12.33	12.40	12.53	12.56	12.65	12.78
pH	12.34	12.33	12.33	12.32	12.32	12.32	12.32
Conductivity (S/cm)	2.407	2.400	2.398	2.394	2.390	2.387	2.382
DO (mg/L)	0.86	0.86	0.92	0.93	0.94	0.97	0.96
Turbidity (NTUs)	4.3	2.6	2.5	2.5	2.4	2.4	1.5
Eh (mV)	-141.7	-144.6	-146.8	-149.3	-151.0	-153.6	-155.6
Water Level (ft. from TOR)	113.70	13.74	13.75	13.85	13.80	13.87	13.89
Flow Rate (mL/min.)	100	100	100	100	100	100	100mL/min

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	10.5	11.0	11.5	12.0			
Time	1040	1045	1050	10.55			
Temperature (°C/F)	12.67	13.01	13.16	13.40			
pH	12.32	12.31	12.30	12.30			
Conductivity (m_/cm)	2.381	2.374	2.372	2.367			
DO (mg/L)	0.96	1.00	1.05	1.07			
Turbidity (NTUs)	1.4	1.3	1.4	1.4			
Eh (mV)	-157.7	-162.2	-165.3	-167.5			
Water Level (ft. from TOR)	13.88	13.90	14.05	14.01			
Flow Rate (mL/min.)	100	100	100	100			

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

DRAFT

Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/26/00

Well/Sample ID: EA-110D Personnel: TB/BO Start Time: 1240 Finish Time: 1450

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 80 Depth to Water 22.98 (ft)
Depth of screened interval or open borehole interval 75-85 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-110D	HCl
Manganese	500 ml, Plastic	EA-110D	HNO_3
Nitrate	125 ml, Plastic	EA-110D	H_2SO_4
Sulfide	250 ml, Plastic	EA-110D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-110D	--------
Methane	3 x 40 ml vial	EA-110D	HCl
Ferrous Iron (Field Analyzed):	5.10 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	0.5	1.0	1.5	2.0	2.5	3.0
Time	1240	1245	1300	1305	1310	1315	1320
Temperature (°C)	13.85	13.73	13.83	13.96	13.89	13.88	13.83
pH	7.58	7.50	7.46	7.35	7.24	7.19	7.14
Conductivity (S/cm)	0.230	0.228	0.214	0.198	0.188	0.182	0.177
DO (mg/L)	6.48	5.36	5.12	4.11	3.5	3.42	3.66
Turbidity (NTUs)	91.0	98	270	231	165	180	103
Eh (mV)	-41.4	-122.9	-153.2	-182.0	-183.1	-182.3	-182.2
Water Level (ft. from TOR)	23.01	23.01	23.02	23.02	23.02	23.09	23.02
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	1325	1330	1335	1340	13.45	1350	1355
Temperature (°C)	13.69	13.66	13.58	13.77	13.78	13.14	13.68
pH	7.01	7.09	7.07	7.07	7.07	7.06	7.05
Conductivity (S/cm)	0.175	0.176	*	0.192	0.193	0.194	0.194
DO (mg/L)	2.95	2.72	1.43	2.12	1.77	1.74	1.86
Turbidity (NTUs)	74	57	61	48	98	37	31
Eh (mV)	-185.1	-185.0	*	-194.9	-195.2	-194	-192
Water Level (ft. from TOR)	23.02	23.02	23.02	23.02	23.02	23.02	23.02
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: * changed nitrogen tank

DRAFT

Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/26/00

Well/Sample ID: EA-110D Personnel: TB/BO Start Time: 1240 Finish Time: 1450

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.0	7.5	8.0	8.5	9.0	9.5	10.0
Time	1400	1410	1415	1420	1425	1430	1435
Temperature (°C)	13.64	13.46	13.42	13.51	13.60	13.53	13.50
pH	7.04	7.03	7.02	7.02	7.02	7.02	7.02
Conductivity (S/cm)	0.193	0.191	0.190	0.189	0.189	0.190	0.190
DO (mg/L)	1.65	1.62	1.58	1.63	1.63	1.65	1.61
Turbidity (NTUs)	32	20	24	22	18	18	15
Eh (mV)	-191.2	-189.5	-188.2	-185.7	-185.7	-187.2	-188.5
Water Level (ft. from TOR)	23.02	23.02	23.02	23.02	23.02	23.02	23.02
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	10.5						
Time	1440						
Temperature (°C)	13.45						
pH	7.02						
Conductivity (S/cm)	0.191						
DO (mg/L)	1.61						
Turbidity (NTUs)	12.9						
Eh (mV)	-189.2						
Water Level (ft. from TOR)	23.02						
Flow Rate (mL/min.)	100						

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: sampled after two hours

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/26/00

Well/Sample ID: EA-110R Personnel: KB/JG Start Time: 1130 Finish Time: 1240

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 100.5 Depth to Water 22.58 (ft)
Depth of screened interval or open borehole interval 88-113 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-110R	HCl
Manganese	500 ml, Plastic	EA-110R	HNO_3
Nitrate	125 ml, Plastic	EA-110R	H_2SO_4
Sulfide	250 ml, Plastic	EA-110R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-110R	———
Methane	3 x 40 ml vial	EA-110R	HCl
Ferrous Iron (Field Analyzed):	0.0 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	0.5	1.0	1.5	2.0	2.5	3.0
Time	1209	1214	1219	1224	1229	1231	1236
Temperature (°C)	13.41	13.79	13.94	13.96	13.87	13.86	13.82
pH	8.98	8.89	8.70	8.56	8.49	8.47	8.48
Conductivity (S/cm)	199	200	203	205	205	205	206
DO (mg/L)	0.27	0.43	0.44	0.62	0.31	0.27	0.22
Turbidity (NTUs)	1	2	3	3	2	1	1
Eh (mV)	111.5	110.2	114.7	118.3	120.9	122.6	122.6
Water Level (ft. from TOR)	22.78	22.83	22.87	23.91	22.86	22.84	22.82
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/27/00

Well/Sample ID: EA-111D Personnel: KB/BO Start Time: 1026 Finish Time: 1242

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 57 Depth to Water 16.22 (ft)
Depth of screened interval or open borehole interval 49.5-64.5 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	EA-111D	HCl
Manganese	500 ml, Plastic	EA-111D	HNO_3
Nitrate	125 ml, Plastic	EA-111D	H_2SO_4
Sulfide	250 ml, Plastic	EA-111D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-111D	------
Methane	3 x 40 ml vial	EA-111D	HCl
Ferrous Iron (Field Analyzed):	5.10 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	0.5	1.0	1.5	2.0	2.5	3.0
Time	1026	1031	1041	1046	1051	1056	1101
Temperature (°C)	14.19	15.37	17.32	17.41	16.83	17.14	18.18
pH	6.21	6.23	6.26	6.26	6.25	6.25	6.26
Conductivity (S/cm)	0.154	0.157	0.169	0.170	0.165	0.167	0.175
DO (mg/L)	3.18	1.60	1.48	1.34	1.21	1.19	1.51
Turbidity (NTUs)	40	40	38	30	30	23	23
Eh (mV)	-0.5	-0.5	10.2	4.5	1.7	0.9	0.5
Water Level (ft. from TOR)	16.22	16.25	16.26	16.26	16.26	16.28	16.27
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	4.0	4.5	5.0	5.5	6.0	6.5	7.0
Time	1106	1111	1116	1121	1126	1131	1136
Temperature (°C)	18.91	19.08	19.44	19.58	19.91	20.19	20.67
pH	6.26	6.27	6.27	6.27	6.27	6.28	6.27
Conductivity (S/cm)	0.175	0.176	0.147	0.177	0.171	0.106	0.174
DO (mg/L)	1.37	1.33	1.38	1.49	1.44	1.87	2.26
Turbidity (NTUs)	19	19	17	15	16	14	13
Eh (mV)	-0.5	-0.5	-0.4	0.3	-0.1	0.8	2.6
Water Level (ft. from TOR)	16.26	16.26	16.26	16.26	16.26	16.25	16.27
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: At 1036 had no water in flow through cell; had to increase pressure

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/27/00

Well/Sample ID: EA-111D Personnel: KB/BO Start Time: 1026 Finish Time: 1242

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	8.0	8.5	9.0	9.5	10.0	10.5	11.0
Time	1141	1146	1217	1222	1227	1232	1237
Temperature (°C)	15.77	14.05	16.81	16.84	18.29	19.21	20.17
pH	6.24	6.20	6.24	6.23	6.24	6.24	6.26
Conductivity (S/cm)	0.154	0.160	0.137	0.131	0.133	0.108	0.133
DO (mg/L)	1.26	1.13	2.22	1.13	1.00	0.98	1.02
Turbidity (NTUs)	9.5	5.1	3.7	3.6	2.7	3.1	2.4
Eh (mV)	-0.4	2.9	-8.7	-8.9	-11.7	-13.6	-14.9
Water Level (ft. from TOR)	16.27	16.25	16.26	16.26	16.26	16.24	16.24
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	11.5						
Time	1242						
Temperature (°C)	21.32						
pH	6.27						
Conductivity (S/cm)	0.113						
DO (mg/L)	1.06						
Turbidity (NTUs)	2.7						
Eh (mV)	-16.1						
Water Level (ft. from TOR)	16.29						
Flow Rate (mL/min.)	100						

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: Ferrous iron = 5.10 mg/L

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 29600 Task: 3201 Date: 09-27-00

Well/Sample ID: EA- 111R Personnel: KMB Start Time: 1030 Finish Time: 1430

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0.0
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / __ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 77.5 Depth to Water 16.20(ft)
Depth of screened interval or open borehole interval 65-90 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3x ml/40 ml vial	EA-111R, DUP-1	HCl
Manganese	500 ml, Plastic	EA-111R, DUP-1	HNO_3
Nitrate	125 ml, Plastic	EA-111R, DUP-1	H_2SO_4
Sulfide	250 ml, Plastic	EA-111R, DUP-1	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	EA-111R, DUP-1	--------
Methane	3 x 40 ml vial	EA-111R, DUP-1	HCl
Ferrous Iron (Field Analyzed):	75.10 mg/L		

Equipment Decon

P = Purge	S = Sample	Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	0.5	1.0	1.5	2.0	2.5	3.0
Time	1040	1045	1050	1055	1100	1105	1110
Temperature (°C)	14.11	14.38	14.03	13.49	14.07	14.90	15.51
pH	9.27	8.57	8.31	7.84	7.73	7.67	7.59
Conductivity (S/cm)	37.89	19.83	31.32	28.13	28.02	27.77	27.76
DO (mg/L)	0.97	1.13	1.63	1.43	1.47	1.43	1.39
Turbidity (NTUs)	18	20	17	9.0	3.9	13	11
Eh (mV)	-114.3	-107.7	-105.5	-105.7	-106.0	-104.0	-101.6
Water Level (ft. from TOR)	18.46	18.46	20.11	19.56	19.47	18.81	18.32
Flow Rate (mL/min)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	1115	1120	1125	1130	1135	1140	1145
Temperature (°C)	15.83	16.16	15.15	13.91	13.80	13.85	13.96
pH	7.55	7.52	7.45	7.44	7.47	7.50	7.51
Conductivity (S/cm)	27.85	15.40	28.16	28.22	28.83	28.95	28.73
DO (mg/L)	1.34	1.38	1.14	0.70	6.4	0.52	0.47
Turbidity (NTUs)	12	9.9	8.0	5.3	2.3	4.1	3.1
Eh (mV)	-99.0	-92.3	-96.7	-99.0	-97.4	-97.4	-98.6
Water Level (ft. from TOR)	18.02	18.14	18.62	19.24	19.71	19.85	19.92
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES:

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 296006 Task: 3201 Date: 9-27-00

Well ID: EA-111R Personnel: KMB Start Time: 900 Finish Time: 1430

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.0	7.5	8.0	8.5	9.0	9.5	10.0
Time	1150	1155	1200	1205	1210	1215	1220
Temperature (°C)	14.27	14.42	14.52	14.71	15.11	15.58	15.88
pH	7.52	7.51	7.51	7.52	7.54	7.55	7.57
Conductivity (S/cm)	28.47	28.56	28.62	28.67	28.64	28.64	28.72
DO (mg/L)	0.44	0.41	0.38	0.35	0.33	0.35	0.35
Turbidity (NTUs)	2.7	3.7	4.6	3.6	1.7	4.6	2.0
Eh (mV)	-99.5	-99.3		-99.5	-99.4	-99.2	-98.8
Water Level (ft. from TOR)	19.78	19.68	19.58	19.31	19.15	18.98	18.79
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	10.5	11	11.5	12	12.5	13.0	13.5
Time	1225	1230	12.35	1240	1245	1250	1255
Temperature (°C)	16.25	15.84	14.91	18.87	15.10	15.29	15.54
pH	7.58	7.60	7.57	7.59	7.61	7.62	7.64
Conductivity (S/cm)	28.66	29.10	29.02	28.91	28.82	28.75	28.68
DO (mg/L)	4.0	3.5	2.7	0.22	0.20	2.1	2.1
Turbidity (NTUs)	2.6	2.2	4.3	3.7	2.8	4.2	3.5
Eh (mV)	-98.3	-97.7	-96.5	-96.9	-97.2	-97.8	-97.6
Water Level (ft. from TOR)	18.71	18.82	18.96	18.98	18.92	18.91	18.84
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: Sampled @ 1300. Iron – 5.10 mg/l

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 29600.96 Task: 3201 Date: 9/30/00

Well/Sample ID: MW01-08D Personnel: KMB Start Time: 1400 Finish Time: 1650

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder / Peristaltic
Pump Intake Depth (ft. below TOR) 40 Depth to Water 17.29 (ft)
Depth of screened interval or open borehole interval 35-45 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW01-08D	HCl
Manganese	500 ml, Plastic	MW01-08D	HNO_3
Nitrate	125 ml, Plastic	MW01-08D	H_2SO_4
Sulfide	250 ml, Plastic	MW01-08D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW01-08D	———
Methane	3 x 40 ml vial	MW01-08D	HCl
Ferrous Iron (Field Analyzed):	>5.10 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	0.5	1.0	1.5	2.0	2.5	3.0
Time	1420	1425	1430	1435	1440	1445	1450
Temperature (°C)	18.16	18.49	18.08	17.50	17.07	16.76	16.71
pH	7.73	7.66	7.67	7.57	7.53	7.47	7.47
Conductivity (S/cm)	0.256	0.248	0.236	0.224	0.215	0.206	0.199
DO (mg/L)	0	0	0	0	0	0	0
Turbidity (NTUs)	130	130	110	80	70	54	40
Eh (mV)	-106.5	-86.9	-89.5	-83.1	-75.6	-67.5	-61.5
Water Level (ft. from TOR)	17.34	17.35	17.35	17.35	17.35	17.35	17.35
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.5	7.0
Time	1455	1500	1505	1510	1515	1520	1525
Temperature (°C)	16.82	16.72	16.70	16.36	16.21	16.54	16.80
pH	7.39	7.36	7.37	7.31	7.28	7.29	7.27
Conductivity (S/cm)	0.195	0.191	0.188	0.186	0.184	0.183	0.182
DO (mg/L)	0	0	0	0	0	0	0
Turbidity (NTUs)	35	35	24	24	19	16	17
Eh (mV)	-58.4	-54.1	-52.4	-50.3	-49.2	-49.1	-49.2
Water Level (ft. from TOR)	17.35	17.35	17.35	17.35	17.35	17.35	17.35
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 29600.96 Task: 3201 Date: 9/30/00

Well ID: MW01-08D Personnel: KMB Start Time: 1400 Finish Time: 1650

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.5	8.0	8.5	9.0	9.5	10.0	10.5
Time	1530	1535	1540	1545	1550	1555	1600
Temperature (°C)	17.02	17.49	18.36	18.90	19.38	19.65	19.94
pH	7.29	7.29	7.30	7.29	7.28	7.28	7.27
Conductivity (S/cm)	0.181	0.180	0.180	0.180	0.179	0.179	0.179
DO (mg/L)	0	0	0	0.01	0	0.26	0.26
Turbidity (NTUs)	17	14	9.5	9.8	8.4	7.2	7.5
Eh (mV)	-49.1	-47.6	-44.9	-43.1	-40.4	-39.1	-36.7
Water Level (ft. from TOR)	17.35	17.35	17.35	17.35	17.35	17.35	17.35
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	11.0	11.5	12.0	12.5			
Time	1605	1610	1615	1620			
Temperature (°C)	20.82	15.10	15.01	15.10			
pH	7.28	7.16	7.12	7.16			
Conductivity (S/cm)	0.178	0.174	0.176	0.174			
DO (mg/L)	0.89	0	0	0			
Turbidity (NTUs)	6.8	19	24	29			
Eh (mV)	-35.6	-27.7	-35.5	-39.2			
Water Level (ft. from TOR)	17.35	17.36	17.36	17.36			
Flow Rate (mL/min.)	100	100	100	100			

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: 1608: Increased flow rate after flow stopped

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Field Sampling Form

Project Name: NCBS Davisville Site 03 Project No.: 29600.96 Task: 3201 Date: 9/30/00

Well/Sample ID: MW01-09D Personnel: JG/PH Start Time: 1329 Finish Time: 1529

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 39.5 Depth to Water 21.20 (ft)
Depth of screened interval or open borehole interval 37.5-41.5 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW01-09D	HCl
Manganese	500 ml, Plastic	MW01-09D	HNO_3
Nitrate	125 ml, Plastic	MW01-09D	H_2SO_4
Sulfide	250 ml, Plastic	MW01-09D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW01-09D	------
Methane	3 x 40 ml vial	MW01-09D	HCl
Ferrous Iron (Field Analyzed):	2.76 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.2	1.2	2.2	3.7	4.2	4.7
Time	1329	1334	1339	1344	1349	1354	1359
Temperature (°C)		14.95	15.88	15.46	14.93	14.89	15.52
pH		7.80	7.55	7.15	6.67	6.55	6.52
Conductivity (S/cm)		0.213	0.213	0.212	0.204	0.202	0.200
DO (mg/L)		3.65	3.34	2.97	2.29	2.43	2.50
Turbidity (NTUs)		38	24	13	8	10	8
Eh (mV)		34	36	-16	-23	-16	-14
Water Level (ft. from TOR)	21.10	22.33	21.64	21.65	21.77	21.23	21.01
Flow Rate (mL/min.)	40	40	200	200	300	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	5.2	5.7	6.2	6.7	7.2	7.7	8.2
Time	1404	1409	1414	1419	1424	1429	1434
Temperature (°C)	15.77	15.85	15.91	16.04	16.21	16.32	16.47
pH	6.49	6.49	6.48	6.47	6.45	6.45	6.44
Conductivity (S/cm)	0.199	0.200	0.201	0.201	0.202	0.202	0.202
DO (mg/L)	2.43	2.48	2.49	2.53	2.57	2.58	2.51
Turbidity (NTUs)	6	5	5	5	5	5	4
Eh (mV)	-13	-13	-13	-13	-11	-10	-9
Water Level (ft. from TOR)	20.98	20.93	20.82	20.79	20.73	20.65	20.54
Flow Rate (mL/min.)	100	100	100	100	100	100	100

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 29600.96 Task: 3201 Date: 9/30/00

Well ID: MW01-9D Personnel: JG/PH Start Time: 1329 Finish Time: 1529

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	8.7	9.2	9.7	10.2	10.95	11.7	12.2
Time	1439	1444	1449	1454	1459	1504	1509
Temperature (°C)	16.67	16.64	16.27	15.97	15.56	15.63	15.81
pH	6.45	6.45	6.44	6.43	6.41	6.40	6.40
Conductivity (S/cm)	0.200	0.198	0.198	0.197	0.195	0.194	0.195
DO (mg/L)	2.69	2.61	2.57	2.41	2.33	2.31	2.33
Turbidity (NTUs)	6	5	6	6	5	7	8
Eh (mV)	-6	-6	-5	-4	-2	-1	-1
Water Level (ft. from TOR)	20.52	20.60	20.74	20.83	20.77	20.68	20.63
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	12.7	13.2	13.7	14.2			
Time	1514	1519	1524	1529			
Temperature (°C)	15.99	16.11	16.11	16.11			
pH	6.39	6.40	6.40	6.40			
Conductivity (S/cm)	0.194	0.194	0.194	0.194			
DO (mg/L)	2.35	2.41	2.42	2.41			
Turbidity (NTUs)	9	7	7	6			
Eh (mV)	-1	-1	-1	-2			
Water Level (ft. from TOR)	20.63	20.63	20.64	20.65			
Flow Rate (mL/min.)	100	100	100	100			

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/3/00

Well/Sample ID: MW01-10D Personnel: KB Start Time: 0750 Finish Time: 1240

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 76 Depth to Water 26-56 (ft)
Depth of screened interval or open borehole interval 71-81 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW01-10D	HCl
Manganese	500 ml, Plastic	MW01-10D	HNO_3
Nitrate	125 ml, Plastic	MW01-10D	H_2SO_4
Sulfide	250 ml, Plastic	MW01-10D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW01-10D	------
Methane	3 x 40 ml vial	MW01-10D	HCl
Ferrous Iron (Field Analyzed):	10.28 mg/L (4:1 dilution)		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	1.0	2.0	3.0	4.0	5.0	6.0
Time	0820	0825	0830	0835	0840	0845	0850
Temperature (°C)	14.21	14.10	14.14	14.27	14.69	15.36	15.71
pH	6.29	6.22	6.20	6.19	6.19	6.20	6.20
Conductivity (S/cm)	0.162	0.164	0.165	0.165	0.165	0.165	0.165
DO (mg/L)	0.55	0.35	0.30	0.26	0.26	26	0.26
Turbidity (NTUs)	6.1	3.7	2.5	3.2	2.7	2.5	2.6
Eh (mV)	104.0	65.5	40.5	24.9	13.1	7.2	1.5
Water Level (ft. from TOR)	21.59	21.58	21.59	21.58	21.56	21.56	21.56
Flow Rate (mL/min.)	200	200	200	200	200	200	200

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	7.0	8.0	9.0	10.0	11.0		
Time	0855	0900	0905	0910	0915		
Temperature (°C)	15.18	14.57	14.08	13.92	13.72		
pH	6.19	6.15	6.13	6.12	6.10		
Conductivity (S/cm)	0.165	0.165	0.164	0.163	0.164		
DO (mg/L)	0.26	0.24	0.21	0.20	0.19		
Turbidity (NTUs)	2.3	2.3	2.0	1.6	1.2		
Eh (mV)	-2.5	-6.1	-10.7	-16.7	-20.5		
Water Level (ft. from TOR)	21.57	21.57	21.57	21.57	21.57		
Flow Rate (mL/min.)	200	200	200	200	200		

NOTES: DRAFT

Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/3/00

Well/Sample ID: MW01-10R Personnel: MC Start Time: 0820 Finish Time: 930

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / ___ 4-in. / ___ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 98 Depth to Water 22.61(ft)
Depth of screened interval or open borehole interval 85-115 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW01-10R	HCl
Manganese	500 ml, Plastic	MW01-10R	HNO_3
Nitrate	125 ml, Plastic	MW01-10R	H_2SO_4
Sulfide	250 ml, Plastic	MW01-10R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW01-10R	———
Methane	3 x 40 ml vial	MW01-10R	HCl
Ferrous Iron (Field Analyzed):	2.74 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0.5	1.0	1.5	2.0	2.5	3.0	3.5
Time	0825	0830	0835	0840	0845	0850	0855
Temperature (°C)	14.38	14.29	14.28	14.26	14.11	13.96	13.93
pH	7.88	7.60	7.64	7.74	7.82	7.88	7.90
Conductivity (S/cm)	0.195	0.197	0.199	0.200	0.200	0.199	0.200
DO (mg/L)	2.13	3.06	2.50	1.74	1.34	1.20	1.20
Turbidity (NTUs)	35	24	18	15	12	10	-
Eh (mV)	-284.9	-253.7	-259.5	-284.4	-303.3	-313.6	-316.6
Water Level (ft. from TOR)	22.72	22.75	22.75	22.75	22.75	22.78	22.78
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	4.0	4.5	5.0	5.5	6.0	6.5	7.0
Time	0900	0905	0910	0915	0920	0925	0930
Temperature (°C)	13.86	14.13	14.88	15.12	15.00	14.91	14.90
pH	7.90	7.87	7.82	7.82	7.83	7.82	7.83
Conductivity (S/cm)	0.199	0.199	0.199	0.199	0.199	0.199	0.199
DO (mg/L)	0.93	1.07	1.20	1.10	1.17	0.99	0.99
Turbidity (NTUs)	7.7	7.7	8.7	7.3	6.9	7.4	7.5
Eh (mV)	-317.9	-312.8	-302.8	-309.1	-311.1	-313.1	-316.0
Water Level (ft. from TOR)	22.80	22.80	22.78	22.70	22.70	22.71	22.71
Flow Rate (mL/min.)	100	100	100	100	100	100	100

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/1/00

Well/Sample ID: MW01-11D Personnel: JG Start Time: 1105 Finish Time: 1340

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 39.5 Depth to Water 21.74 (ft)
Depth of screened interval or open borehole interval 37-42 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW01-11D	HCl
Manganese	500 ml, Plastic	MW01-11D	HNO_3
Nitrate	125 ml, Plastic	MW01-11D	H_2SO_4
Sulfide	250 ml, Plastic	MW01-11D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW01-11D	------
Methane	3 x 40 ml vial	MW01-11D	HCl
Ferrous Iron (Field Analyzed):	6.12 mg/L (4:1 dilution)		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.750	1.5	2.0	2.5	3.0	3.5
Time	1105	1110	1115	1120	1125	1130	1135
Temperature (°C)	-	17.04	16.96	16.44	17.09	17.79	17.98
pH	-	6.64	6.58	6.51	6.47	6.46	6.45
Conductivity (S/cm)	-	0.223	0.235	0.220	0.221	0.213	0.211
DO (mg/L)	-	2.11	0.65	0.45	0.47	0.48	0.50
Turbidity (NTUs)	-	220	190	100	70	75	31
Eh (mV)	-	-34.0	-46.0	-41.0	-38.0	-38.0	-37.0
Water Level (ft. from TOR)	21.74	21.89	22.01	21.84	21.89	21.84	21.83
Flow Rate (mL/min.)	150	150	150	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	4.0	4.5	5.0	5.5	6.0	6.5	7.0
Time	1140	1145	1150	1155	1200	1205	1210
Temperature (°C)	18.38	18.77	18.33	18.26	17.97	17.41	16.72
pH	6.46	6.45	6.45	6.45	6.43	6.43	6.44
Conductivity (S/cm)	0.206	0.206	0.198	0.197	0.195	0.194	0.194
DO (mg/L)	0.52	0.55	0.52	0.50	0.45	0.38	0.32
Turbidity (NTUs)	60.0	38	18	18	18	12	9
Eh (mV)	-34.0	-32.0	-32.0	-33.0	-31.0	-31.0	-33.0
Water Level (ft. from TOR)	21.81	21.83	21.83	21.84	21.88	21.89	21.97
Flow Rate (mL/min.)	100	100	100	100	100	100	100

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/1/00

Well/Sample ID: MW01-11D Personnel: JG Start Time: 1105 Finish Time: 1340

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.5	8.0	8.5	9.0	9.5	10.0	10.5
Time	1215	1220	1225	1230	1235	1240	1245
Temperature (°C)	16.41	16.81	17.07	17.30	17.43	17.53	17.69
pH	6.43	6.45	6.46	6.45	6.44	6.44	6.45
Conductivity (S/cm)	0.193	0.193	0.192	0.192	0.192	0.191	0.191
DO (mg/L)	0.25	0.26	0.27	0.28	0.30	0.30	0.30
Turbidity (NTUs)	23	50	22	8	8	7	7
Eh (mV)	-36.0	-37.0	-37.0	-37.0	-37.0	-37.0	-37.0
Water Level (ft. from TOR)	21.89	21.82	21.86	21.84	21.84	21.84	21.84
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	11.0	11.5	12.5	13.0			
Time	1250	1255	1300	1305			
Temperature (°C)	17.93	17.17	16.42	16.89			
pH	6.45	6.45	6.44	6.45			
Conductivity (S/cm)	0.191	0.191	0.191	0.191			
DO (mg/L)	0.31	0.32	0.26	0.24			
Turbidity (NTUs)	7	7	10	9			
Eh (mV)	-37.0	-35.0	-37.0	-40.0			
Water Level (ft. from TOR)	21.94	21.79	21.85	21.86			
Flow Rate (mL/min.)	100	100	100	100			

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/1/00

Well/Sample ID: MW01-12D Personnel: RC Start Time: 1030 Finish Time: 1215

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 50.5 Depth to Water 17.42 (ft)
Depth of screened interval or open borehole interval 48-53 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW01-12D (DUP2)(MS/MSD)	HCl
Manganese	500 ml, Plastic	MW01-12D (DUP2)(MS/MSD)	HNO_3
Nitrate	125 ml, Plastic	MW01-12D (DUP2)(MS/MSD)	H_2SO_4
Sulfide	250 ml, Plastic	MW01-12D (DUP2)(MS/MSD)	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW01-12D (DUP2)(MS/MSD)	--------
Methane	3 x 40 ml vial	MW01-12D (DUP2)(MS/MSD)	HCl
Ferrous Iron (Field Analyzed):	1.85 mg/L	Dup 2 Ferrous Iron 2.89 mg/L	

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	2	3.25	4.50	5.75	7	8.25	10.25
Time	1058	1103	1108	1115	1120	1125	1130
Temperature (°C)	16.32	16.31	16.24	16.10	15.93	15.89	16.15
pH	5.65	5.69	5.67	5.68	5.65	5.60	5.58
Conductivity (S/cm)	0.185	0.193	0.187	0.186	0.183	0.180	0.177
DO (mg/L)	-7.75	-3.95	-1.31	-1.23	-2.06	-0.73	-0.55
Turbidity (NTUs)	8.76	15.2	93.4	145	130	103	81.3
Eh (mV)	-37.9	-43.7	-37.7	-34.2	-30.3	-26.4	-22.3
Water Level (ft. from TOR)	17.48	17.49	17.49	17.50	17.50	17.52	17.50
Flow Rate (mL/min.)	250	250	250	250	250	250	200

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	12.25	13.25	14.25	15.25	16.25	17.25	18.25
Time	1135	1140	1145	1150	1155	1200	1205
Temperature (°C)	16.32	15.81	16.06	15.70	15.83	15.68	15.43
pH	5.59	5.59	5.60	5.63	5.63	5.60	5.58
Conductivity (S/cm)	0.176	0.174	0.173	0.172	0.170	0.169	0.168
DO (mg/L)	-0.32	-0.57	-0.60	-0.87	-2.15	-0.91	-0.88
Turbidity (NTUs)	64.7	53.7	45.3	47.5	39.5	28.7	27.2
Eh (mV)	-20.4	-17.4	-18.2	-19.5	-18.6	-17.5	-17.2
Water Level (ft. from TOR)	17.50	17.51	17.51	17.51	17.51	17.52	17.52
Flow Rate (mL/min.)	200	200	200	200	200	200	200

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/1/00

Well/Sample ID: MW01-12D Personnel: RC Start Time: 1030 Finish Time: 1215

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	19.25						
Time	1210						
Temperature (°C)	15.32						
pH	5.57						
Conductivity (S/cm)	0.167						
DO (mg/L)	-0.93						
Turbidity (NTUs)	27.4						
Eh (mV)	-16.8						
Water Level (ft. from TOR)	17.52						
Flow Rate (mL/min.)	200						

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 29600.96 Task: 3201 Date: 9/27/00

Well/Sample ID: MW01-13D Personnel: RC Start Time: 1400 Finish Time: 1700

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0.0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 69 Depth to Water 13.43 (ft)
Depth of screened interval or open borehole interval 64-74 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	80 ml/40 ml vial	MW01-13D	HCl
Manganese	500 ml, Plastic	MW01-13D	HNO_3
Nitrate	125 ml, Plastic	MW01-13D	H_2SO_4
Sulfide	250 ml, Plastic	MW01-13D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW01-13D	--------
Methane	3 x 40 ml vial	MW01-13D	HCl
Ferrous Iron (Field Analyzed):	1.75 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0.5	1.25	2	275	325	3.75	4.25
Time	1410	1415	1420	1425	1430	1435	1440
Temperature (°C)	14.49	14.53	14.57	14.37	14.31	14.31	14.26
pH	6.14	6.25	6.27	6.29	6.32	6.32	6.32
Conductivity (S/cm)	0.192	0.185		0.173	0.170	0.170	0.170
DO (mg/L)	17.66	14.87	14.24	13.86	13.29	12.76	11.78
Turbidity (NTUs)	579	High	High	High	High	High	High
Eh (mV)	200.3	144.3	135.1	117.8	98.7	77.1	57.2
Water Level (ft. from TOR)	13.75	13.63	13.62	13.62	13.62	13.62	13.62
Flow Rate (mL/min.)	400	400	75	75	75	75	75

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	5	6	7	7.5	8	8.5	9
Time	1450	1500	1510	1515	1520	1525	1530
Temperature (°C)	14.32	14.30	14.08	14.03	13.93	13.95	14.02
pH	6.34	6.34	6.35	6.34	6.34	6.34	6.34
Conductivity (S/cm)	0.169	0.168	0.168	0.168	0.167	0.167	0.167
DO (mg/L)	10.32	9.78	9.51	9.64	9.85	10.02	10.21
Turbidity (NTUs)	High	High	High	High	High	High	950
Eh (mV)	-33.1	-37.7	-36.7	-25.7	-17.3	-9.3	-3.7
Water Level (ft. from TOR)	13.61	13.60	13.61	13.61	13.61	13.61	13.61
Flow Rate (mL/min.)	75	75	75	75	75	75	75

NOTES: _____

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Field Sampling Form

Project Name: Davisville Site 03 Project No.: 29600.96 Task: 3201 Date: 9/27/00

Well/Sample ID: MW01-13D Personnel: RC Start Time: 1030 Finish Time: 1700

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	9.5	10	10.5	11	11.5	12	12.5
Time	1535	1540	1545	1550	1555	1600	1605
Temperature (°C)	13.98	13.86	13.87	13.90	13.91	13.95	14.06
pH	6.34	6.34	6.34	6.34	6.34	6.35	6.35
Conductivity (S/cm)	0.167	0.167	0.166	0.166	0.166	0.165	0.165
DO (mg/L)	10.36	10.54	10.75	10.82	11.04	11.45	11.70
Turbidity (NTUs)	750	600	550	550	450	400	400
Eh (mV)	-1.7	-7.2	-11.5	-15.1	-17.8	-22.4	-25.3
Water Level (ft. from TOR)	13.62	13.62	13.61	13.61	13.61	13.61	13.60
Flow Rate (mL/min.)	75	75	75	75	75	75	75

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	13	13.5	14	14.5			
Time	1616	1615	1620	1625			
Temperature (°C)	13.95	13.86	13.83	13.85			
pH	6.36	6.35	6.34	6.34			
Conductivity (S/cm)	0.165	0.165	0.165	0.165			
DO (mg/L)	11.78	12.27	12.47	12.40			
Turbidity (NTUs)	360	320	260	250			
Eh (mV)	-28.2	-30.9	-32.7	-33.0			
Water Level (ft. from TOR)	13.60	13.60	13.60	13.60			
Flow Rate (mL/min.)	75	75	75	75			

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 29600.96 Task: 3201 Date: 9/27/00

Well/Sample ID: MW01-13R Personnel: JG Start Time: 0910 Finish Time: 1300

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 5 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 5 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ _Peristaltic
Pump Intake Depth (ft. below TOR) 91.51 Depth to Water 12.88 (ft)
Depth of screened interval or open borehole interval 78-105 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	80ml 40ml vial	MW01-13R	HCl
Manganese	500 ml, Plastic	MW01-13R	HNO_3
Nitrate	125 ml, Plastic	MW01-13R	H_2SO_4
Sulfide	250 ml, Plastic	MW01-13R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW01-13R	--------
Methane	3 x 40 ml vial	MW01-13R	HCl
Ferrous Iron (Field Analyzed):	1.0 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.75	1.5	2.25	3.0	3.75	4.5
Time	1008	1013	1018	1023	1028	1033	1038
Temperature (°C)	13.64	12.76	12.48	12.39	12.27	12.20	12.17
pH	8.05	7.48	7.21	7.17	7.14	7.15	7.14
Conductivity (S/cm)	0.17	0.30	0.17	0.17	0.17	0.17	0.17
DO (mg/L)	1.90	2.58	1.40	0.63	0.36	0.27	0.23
Turbidity (NTUs)	53.7	36	16	9.0	7	6	7
Eh (mV)	142.9	87.1	1.0	-17.1	-33.8	-40.5	-45.1
Water Level (ft. from TOR)	13.05	13.10	13.20	13.30	13.38	13.45	13.50
Flow Rate (mL/min.)	150	150	150	150	150	150	150

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	5.25	6.25	7.25	8.25	9.25	10.25	11.25
Time	1043	1048	1053	1058	1103	1108	1113
Temperature (°C)	12.51	12.81	12.79	12.68	12.63	12.64	12.59
pH	7.17	7.18	7.17	7.17	7.18	7.18	7.18
Conductivity (S/cm)	0.17	0.18	0.17	0.17	0.18	0.18	0.18
DO (mg/L)	0.29	0.26	0.26	0.26	0.26	0.23	0.22
Turbidity (NTUs)	0	11	12	13	17	29	24
Eh (mV)	-50.1	-52.2	-54.7	-52.3	-56.3	-57.9	-60.3
Water Level (ft. from TOR)	13.38	13.33	13.32	13.34	13.37	13.39	13.40
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES:

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 29600.96 Task: 3201 Date: 9/27/00

Well/Sample ID: MW01-13R Personnel: JG Start Time: 0910 Finish Time: 1300

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	12.25	13.25	14.25	15.25	16.25	17.25	18.25
Time	1118	1123	1128	1133	1138	1143	1148
Temperature (°C)	12.59	12.61	12.59	12.59	12.48	12.53	12.50
pH	7.18	7.19	7.19	7.19	7.19	7.19	7.19
Conductivity (S/cm)	0.17	0.17	0.17	0.17	0.17	0.17	0.18
DO (mg/L)	0.21	0.19	0.18	0.17	0.16	0.15	0.14
Turbidity (NTUs)	23	28	35	43	37	44	44
Eh (mV)	-61.3	-62.0	-64.0	-64.4	-64.7	-65.5	-66.5
Water Level (ft from TOR)	13.30	13.30	13.30	13.34	13.37	13.39	13.40
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	19.25						
Time	1153						
Temperature (°C)	12.66						
pH	7.19						
Conductivity (S/cm)	0.18						
DO (mg/L)	0.14						
Turbidity (NTUs)	41						
Eh (mV)	-67.0						
Water Level (ft. from TOR)	13.						
Flow Rate (mL/min.)	100						

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No 29600-96 Task 3201 Date 9/27/00

Well/Sample ID: MW01-14D Personnel JG/RC Start Time: 1430 Finish Time: 1730

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0.0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 85 Depth to Water 23.93 (ft)
Depth of screened interval or open borehole interval 81-89 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	80 ml/ 40 ml vial	MW01-14D	HCl
Manganese	500 ml, Plastic	MW01-14D	HNO_3
Nitrate	125 ml, Plastic	MW01-14D	H_2SO_4
Sulfide	250 ml, Plastic	MW01-14D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW01-14D	------
Methane	3 x 40 ml vial	MW01-14D	HCl
Ferrous Iron (Field Analyzed):	2.43 mg/L		

Equipment Decon

P = Purge S = Sample		Eqipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.0	2.5	3.0
Time	1430	1435	1440	1445	1450	1455	1500
Temperature (C)	16.29	13.50	14.41	14.75	14.60	14.33	14.20
pH	6.33	6.23	6.28	6.22	6.22	6.23	6.23
Conductivity (S/cm)	0.19	0.18	0.18	0.18	0.18	0.19	0.19
DO (mg/L)	7.00	235	2.33	1.72	1.31	1.08	0.94
Turbidity (NTUs)	65	38	50	29	19	17	21
Eh (mV)	126.4	10.0	7.7	-3.3	-10.0	-13.0	-15.3
Water Level (ft. from TOR)	23.93	24.50	24.03	23.95	23.96	23.96	24.02
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	1505	1510	1515	1520	1525	1530	1535
Temperature (°C)	13.99	13.95	15.40	14.95	14.10	13.94	13.37
pH	6.22	6.21	6.22	6.24	6.23	6.22	6.26
Conductivity (S/cm)	0.19	0.19	0.20	0.19	0.19	0.19	0.19
DO (mg/L)	0.86	0.82	0.89	0.89	0.81	0.72	0.62
Turbidity (NTUs)	21	22	19	21	17	17	13
Eh (mV)	-15.9	-16.7	-21.1	-20.6	-21.3	-22.0	-25.0
Water Level (ft. from TOR)	24.08	24.09	23.72	23.71	23.72	23.74	23.81
Flow Rate (mL/min.)	100	1000	100	100	100	100	100

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No 29600-96 Task 3201 Date 9/27/00

Well/Sample ID: MW01-14D Personnel JG/RC Start Time: 1430 Finish Time: 1730

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.0	7.5	8.0	8.5	9.0	9.5	10.0
Time	1540	1545	1550	1555	1600	1605	1610
Temperature (°C)	13.77	13.87	14.19	14.20	14.46	14.49	14.53
pH	6.29	6.25	6.30	6.31	6.39	6.34	6.34
Conductivity (S/cm)	0.19	0.18	0.19	0.19	0.19	0.19	0.19
DO (mg/L)	0.59	0.61	0.65	0.66	0.67	0.69	0.69
Turbidity (NTUs)	13	12	12	11	11	11	8
Eh (mV)	-27.3	-28.8	-29.1	-30.3	-31.4	-31.8	-31.8
Water Level (ft. from TOR)	23.81	23.71	23.59	23.52	23.40	23.40	23.40
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	10.5	11.0					
Time	1615	1620					
Temperature (°C)	14.40	14.34					
pH	6.33	6.37					
Conductivity (S/cm)	0.19	0.19					
DO (mg/L)	0.67	0.65					
Turbidity (NTUs)	8	9					
Eh (mV)	-32.7	-32.8					
Water Level (ft. from TOR)	23.41	23.40					
Flow Rate (mL/min.)	100	100					

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/30/00

Well/Sample ID: MW01-15D Personnel: RC Start Time: 0900 Finish Time: 1040

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 48.5 Depth to Water 14.42 (ft)
Depth of screened interval or open borehole interval 56.51 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW01-15D	HCl
Manganese	500 ml, Plastic	MW01-15D	HNO_3
Nitrate	125 ml, Plastic	MW01-15D	H_2SO_4
Sulfide	250 ml, Plastic	MW01-15D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW01-15D	———
Methane	3 x 40 ml vial	MW01-15D	HCl
Ferrous Iron (Field Analyzed):	1.17 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.5	2.5	3.5	4.5	5.5
Time	0935	0940	0945	0950	0955	1000	1005
Temperature (°C)	14.26	14.27	14.37	14.35	14.43	14.55	14.57
pH	6.64	6.48	6.48	6.36	6.32	6.29	6.26
Conductivity (S/cm)	124.0	138.0	155.0	161.0	161.0	159.0	156.0
DO (mg/L)	2.55	1.88	1.04	0.81	0.65	0.50	0.44
Turbidity (NTUs)	35	34	37	31	29	26	24
Eh (mV)	190.9	173.6	162.8	156.7	154.7	153.6	152.3
Water Level (ft. from TOR)	14.47	14.47	14.47	14.47	14.47	14.46	14.46
Flow Rate (mL/min.)	125	125	175	175	175	175	175

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	6.5	7.5	8.5	9.5	10.5	11.5	12.0
Time	1010	1015	1020	1025	1030	10.35	1040
Temperature (°C)	14.35	14.23	14.06	14.24	14.00	14.00	13.95
pH	6.25	6.24	6.23	6.23	6.23	6.23	6.22
Conductivity (S/cm)	154.0	152.0	151.0	151.0	151.0	151.0	151.0
DO (mg/L)	0.39	0.36	0.29	0.48	0.27	0.24	0.23
Turbidity (NTUs)	23	20	19	20	19	17	17
Eh (mV)	151.0	152.0	146.7	153.6	147.0	146.1	149.0
Water Level (ft. from TOR)	14.47	14.47	14.47	14.48	14.48	14.48	14.48
Flow Rate (mL/min.)	175	175	175	175	175	175	175

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/30/00

Well/Sample ID: MW01-15R Personnel: JG/RC Start Time: 0930 Finish Time: 1125

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder / __ Peristaltic
Pump Intake Depth (ft. below TOR) 70 Depth to Water 14.49 (ft)
Depth of screened interval or open borehole interval 56-81 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW01-15R	HCl
Manganese	500 ml, Plastic	MW01-15R	HNO_3
Nitrate	125 ml, Plastic	MW01-15R	H_2SO_4
Sulfide	250 ml, Plastic	MW01-15R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW01-15R	———
Methane	3 x 40 ml vial	MW01-15R	HCl
Ferrous Iron (Field Analyzed):	0.26 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	1.5	2.75	4.0	5.25	6.5	7.75
Time	0930	0945	0950	0955	1000	1005	1010
Temperature (°C)	-	14.49	14.55	14.04	14.07	14.34	14.36
pH	-	7.61	7.17	7.14	7.16	7.17	7.21
Conductivity (S/cm)	-	0.198	0.206	0.212	0.212	0.214	0.216
DO (mg/L)	-	5.53	3.39	2.65	2.69	2.86	2.98
Turbidity (NTUs)	-	40	36	14	45	170	290
Eh (mV)	-	-73	-101	-125	-132	-140	-149
Water Level (ft. from TOR)	-	14.49	14.49	14.51	14.49	14.45	14.44
Flow Rate (mL/min.)	100	250	250	250	250	250	250

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	8.0	9.25	10.5	11.75	13.00	14.25	15.50
Time	1015	1020	1025	1030	1035	1040	1045
Temperature (°C)	14.10	14.19	14.36	14.20	13.78	13.65	13.96
pH	7.31	7.41	7.55	7.75	8.13	8.41	8.68
Conductivity (S/cm)	0.219	0.220	0.222	0.223	0.222	0.221	0.220
DO (mg/L)	3.05	2.91	2.87	2.67	2.51	2.34	2.16
Turbidity (NTUs)	170	140	150	120	130	130	130
Eh (mV)	-169	-191	-221	-262	-329	-374	-406
Water Level (ft. from TOR)	14.44	14.42	14.42	14.42	14.43	14.42	14.41
Flow Rate (mL/min.)	250	250	250	250	250	250	250

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/29/00

Well/Sample ID: MW02-03D Personnel: JG/RC Start Time: 1000 Finish Time: 1145

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 36.5 Depth to Water 25.34 (ft)
Depth of screened interval or open borehole interval 31.5-41.5 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW02-03D	HCl
Manganese	500 ml, Plastic	MW02-03D	HNO_3
Nitrate	125 ml, Plastic	MW02-03D	H_2SO_4
Sulfide	250 ml, Plastic	MW02-03D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW02-03D	———
Methane	3 x 40 ml vial	MW02-03D	HCl
Ferrous Iron (Field Analyzed):	2.88 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	1.5	2.0	2.5	3.0	3.5	4.0
Time	1000	1015	1020	1025	1030	1035	1040
Temperature (°C)	14.62	14.28	14.60	14.36	14.37	14.47	14.62
pH	6.35	6.29	6.27	6.27	6.29	6.26	6.28
Conductivity (S/cm)	0.152	0.165	0.164	0.163	0.163	0.163	0.164
DO (mg/L)	9.23	1.42	0.70	0.54	0.46	0.47	0.39
Turbidity (NTUs)	812	215	87	62	45	49	47
Eh (mV)	24.2	11.6	12.9	12.9	11.6	10.9	9.4
Water Level (ft. from TOR)	25.34	25.45	25.48	25.54	25.43	25.47	25.53
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	4.5	5.0	5.5	6.0	6.5	7.0	7.5
Time	1045	1050	1055	1100	1105	1110	1115
Temperature (°C)	14.45	14.42	14.73	14.79	14.85	14.79	14.85
pH	6.29	6.28	6.26	6.29	6.28	6.28	6.28
Conductivity (S/cm)	0.165	0.163	0.163	0.163	0.164	0.163	0.164
DO (mg/L)	0.33	0.35	0.34	0.34	0.35	0.33	0.35
Turbidity (NTUs)	44	40	45	34	39	36	36
Eh (mV)	8.8	9.0	8.5	8.5	8.1	8.0	7.9
Water Level (ft. from TOR)	25.42	25.43	25.51	25.43	25.43	25.44	25.41
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: _____

DRAFT

Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/29/00

Well/Sample ID: MW-02-03D Personnel: JG/RC Start Time: 1000 Finish Time: 1145

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	8.0						
Time	1120						
Temperature (°C)	14.91						
pH	6.28						
Conductivity (S/cm)	0.164						
DO (mg/L)	0.35						
Turbidity (NTUs)	34						
Eh (mV)	7.9						
Water Level (ft. from TOR)	25.43						
Flow Rate (mL/min.)	100						

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: _____

DRAFT

Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/29/00

Well/Sample ID: MW02-03R Personnel: RC Start Time: 0915 Finish Time: 1110

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ __ Peristaltic
Pump Intake Depth (ft. below TOR) 50 Depth to Water 23.42 (ft)
Depth of screened interval or open borehole interval 46-71 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW02-03R	HCl
Manganese	500 ml, Plastic	MW02-03R	HNO_3
Nitrate	125 ml, Plastic	MW02-03R	H_2SO_4
Sulfide	250 ml, Plastic	MW02-03R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW02-03R	----
Methane	3 x 40 ml vial	MW02-03R	HCl
Ferrous Iron (Field Analyzed):	1.91 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	1	2	4	6	7.5	9.0
Time	0945	0950	0955	1005	1010	1015	1020
Temperature (°C)	13.91	13.98	13.87	13.90	13.93	13.95	13.94
pH	6.97	7.26	7.50	7.60	7.56	7.58	7.53
Conductivity (S/cm)	0.254	0.285	0.287	0.287	0.288	0.288	0.286
DO (mg/L)	5.17	0.92	0.78	0.93	0.63	0.37	0.58
Turbidity (NTUs)	150	80	90	25.6	22.1	18.1	16.5
Eh (mV)	-80.1	-164.4	-224.0	-250.0	-247.8	-247.7	-239.9
Water Level (ft. from TOR)	23.45	23.45	23.45	23.45	23.45	23.45	23.45
Flow Rate (mL/min.)	150	200	200	300	300	300	300

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	12.0	13.5	15.0	16.5	18.0	19.5	21.0
Time	1025	1030	1035	1040	1045	1050	1055
Temperature (°C)	13.92	13.97	13.99	13.97	13.96	14.01	14.04
pH	7.23	6.93	6.89	6.85	6.77	6.69	6.64
Conductivity (S/cm)	0.265	0.254	0.249	0.244	0.239	0.234	0.232
DO (mg/L)	0.60	0.60	0.66	0.64	0.66	0.66	0.66
Turbidity (NTUs)	21.3	21.4	16.0	13.9	13.8	12.3	9.80
Eh (mV)	-188.9	-114.8	-116.6	-113.9	-105.7	-96.1	-92.1
Water Level (ft. from TOR)	23.45	23.47	23.47	23.47	23.47	23.47	23.47
Flow Rate (mL/min.)	300	300	300	300	300	300	300

NOTES: DRAFT

Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/29/00

Well/Sample ID: MW02-03R Personnel: RC Start Time: 0915 Finish Time: 1110

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	22.5	24.0	25.5				
Time	1100	1105	1110				
Temperature (°C)	13.96	14.00	14.03				
pH	6.64	6.60	6.60				
Conductivity (S/cm)	0.232	0.233	0.231				
DO (mg/L)	0.67	0.70	0.70				
Turbidity (NTUs)	8.76	7.50	7.95				
Eh (mV)	-88.7	-87.4	-86.2				
Water Level (ft. from TOR)	23.47	23.74	23.74				
Flow Rate (mL/min.)	300	300	300				

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/3/00

Well/Sample ID: MW02-08D Personnel: JG Start Time: 1105 Finish Time: 1215

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 40-90 Depth to Water 19.10 (ft)
Depth of screened interval or open borehole interval 35.90-45.90 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW02-08D	HCl
Manganese	500 ml, Plastic	MW02-08D	HNO_3
Nitrate	125 ml, Plastic	MW02-08D	H_2SO_4
Sulfide	250 ml, Plastic	MW02-08D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW02-08D	———
Methane	3 x 40 ml vial	MW02-08D	HCl
Ferrous Iron (Field Analyzed):	0.06 mg/L		

Equipment Decon

P = Purge S = Sample		Eqipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	0.5	1.0	1.5	2.0	2.5	3.0
Time	1105	1110	1115	1120	1125	1130	1135
Temperature (°C)	-	17.81	16.20	15.53	15.90	16.17	16.77
pH	-	5.83	5.76	5.74	5.73	5.74	5.75
Conductivity (S/cm)	-	0.123	0.113	0.111	0.111	0.111	0.111
DO (mg/L)	-	1.30	1.81	1.11	0.49	0.48	0.49
Turbidity (NTUs)	-	70	39	25	31	27	29
Eh (mV)	-	279	293	295	295	295	298
Water Level (ft. from TOR)	19.10	19.39	19.44	19.41	19.41	19.30	19.30
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0					
Time	1140	1145					
Temperature (°C)	17.18	17.15					
pH	5.76	5.75					
Conductivity (S/cm)	0.111	0.111					
DO (mg/L)	0.50	0.49					
Turbidity (NTUs)	27	29					
Eh (mV)	299	299					
Water Level (ft. from TOR)	19.29	19.28					
Flow Rate (mL/min.)	100	100					

NOTES: DRAFT

Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 29600.96 Task: 3201 Date: 9/29/00

Well/Sample ID: MW02-10D Personnel: KMB,BaO Start Time: 1339 Finish Time: 1600

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 47 Depth to Water 18.09 (ft)
Depth of screened interval or open borehole interval 42-52 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW02-10D	HCl
Manganese	500 ml, Plastic	MW02-10D	HNO_3
Nitrate	125 ml, Plastic	MW02-10D	H_2SO_4
Sulfide	250 ml, Plastic	MW02-10D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW02-10D	———
Methane	3 x 40 ml vial	MW02-10D	HCl
Ferrous Iron (Field Analyzed):	5.10 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	—	0.5	1.0	1.5	2.0	2.5	3.0
Time	1356	1401	1406	1411	1425*	1430	1435
Temperature (°C)	15.94	17.59	18.15	18.21	17.77	17.17	16.99
pH	6.94	7.06	7.12	7.12	7.11	7.09	7.11
Conductivity (S/cm)	0.108	0.156	0.106	0.107	0.109	0.106	0.107
DO (mg/L)	0	0.72	0.94	0.90	0.93	0.58	0.69
Turbidity (NTUs)	90	60	55	65	55	65	60
Eh (mV)	1.3	-5.8	-5.0	-4.8	-4.1	-4.9	-6.4
Water Level (ft. from TOR)	18.09	18.13	18.15	18.09	18.19	18.19	18.19
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	1440	1445	1450	1455	1500	1505	1510
Temperature (°C)	17.09	17.27	17.05	17.17	17.30	17.48	17.68
pH	7.12	7.14	7.13	7.12	7.13	7.13	7.14
Conductivity (S/cm)	.107	.107	.107	.107	.107	.109	.107
DO (mg/L)	.55	.36	.46	.36	.34	.36	.43
Turbidity (NTUs)	50	35	45	35	34	28	25
Eh (mV)	-8.2	-8.8	-9.5	-10.3	-11.5	-11.7	-13.1
Water Level (ft. from TOR)	18.19	18.19	18.18	18.16	18.16	18.16	18.16
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: parameters not taken between 1411 and 1425 because water flow rate had stopped.

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Field Sampling Form

Project Name: NCBC Davisville site 03 Project No.: 29600.96 Task: 3201 Date: 9/29/00

Well/Sample ID: MW02-10D Personnel: KMB,BaO Start Time: 1339 Finish Time: 1600

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7	7.5	8	8.5	9	9.5	10
Time	1515	1520	1525	1530	1535	1540	1545
Temperature (°C)	17.87	18.04	18.13	17.79	17.96	16.47	15.63
pH	7.15	7.16	7.14	7.13	7.16	7.11	7.08
Conductivity (S/cm)	.107	.107	.109	.107	.107	.107	.196
DO (mg/L)	.46	.41	.40	.29	.15	0	0
Turbidity (NTUs)	28	19	22	25	21	21	27
Eh (mV)	-13.1	-13.3	-12.9	-13.1	-13.5	-12.3	-13.0
Water Level (ft. from TOR)	18.15	18.15	18.17	18.16	18.15	18.15	18.35
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	10.5	11	11.5				
Time	1550	1555	1600				
Temperature (°C)	15.75	15.87	15.73				
pH	7.12	7.14	7.15				
Conductivity (S/cm)	.194	.194	.196				
DO (mg/L)	.63	0	0				
Turbidity (NTUs)	70	75	90				
Eh (mV)	-14.8	-16.1	-16.4				
Water Level (ft. from TOR)	18.34	18.34	18.35				
Flow Rate (mL/min.)	100	100	100				

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: Sampled after 2 hours with ok from Paul Higgins Ferrous Iron, 5.10

DRAFT

Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/29/00

Well/Sample ID: MW02-11D Personnel: KB/BO Start Time: 0945 Finish Time: 1250

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 57.3 Depth to Water 21.17 (ft)
Depth of screened interval or open borehole interval 52.3-62.3 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW02-11D	HCl
Manganese	500 ml, Plastic	MW02-11D	HNO_3
Nitrate	125 ml, Plastic	MW02-11D	H_2SO_4
Sulfide	250 ml, Plastic	MW02-11D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW02-11D	------
Methane	3 x 40 ml vial	MW02-11D	HCl
Ferrous Iron (Field Analyzed):	5.10 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	0.5	1.0	1.5	2.0	2.5	3.0
Time	1008	1013	1018	1023	1028	1033	1038
Temperature (°C)	12.3	12.04	12.04	12.05	12.06	12.08	12.12
pH	7.56	7.44	7.39	7.34	7.36	7.31	7.36
Conductivity (S/cm)	0.194	0.196	0.193	0.198	0.193	0.193	0.193
DO (mg/L)	0.39	0	0	0	0	0	0
Turbidity (NTUs)	190	120	75	55	37	23	18
Eh (mV)	-13.7	-13.3	-13.2	-13.1	-13.2	-13.9	-13.8
Water Level (ft. from TOR)	21.17	21.21	21.21	21.21	21.21	21.20	21.21
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	1043	1048	1053	1058	1103	1108	1113
Temperature (°C)	12.29	12.15	12.12	12.13	12.15	12.13	12.14
pH	7.30	7.30	7.32	7.29	7.38	7.28	7.27
Conductivity (S/cm)	0.191	0.195	0.193	0.193	0.194	0.193	0.193
DO (mg/L)	0	0	0	0	0	0	0
Turbidity (NTUs)	13	10	8	7.5	6.2	5.8	6
Eh (mV)	-8.6	-9.8	-12.1	-12.6	-12.6	-12.4	-12.5
Water Level (ft. from TOR)	21.21	21.21	21.21	21.20	21.21	21.21	21.21
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: _____

DRAFT

Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/29/00

Well/Sample ID: MW02-11D Personnel: KB/BO Start Time: 0945 Finish Time: 1250

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.0	7.5	8.0	8.5			
Time	1118	1123	1128	1133			
Temperature (°C)	12.16	12.12	12.20	12.22			
pH	7.25	7.28	7.28	7.29			
Conductivity (S/cm)	0.194	0.193	0.192	0.193			
DO (mg/L)	0	0	0	0			
Turbidity (NTUs)	6.1	4.9	4.6	5			
Eh (mV)	-12.7	-13.1	-13.2	-13.1			
Water Level (ft. from TOR)	21.21	21.21	21.21	21.21			
Flow Rate (mL/min.)	100	100	100	100			

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/30/00

Well/Sample ID: MW03-02D Personnel: BO Start Time: 1400 Finish Time: 1538

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 54 Depth to Water 17.75 (ft)
Depth of screened interval or open borehole interval 49-59 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-02D	HCl
Manganese	500 ml, Plastic	MW03-02D	HNO_3
Nitrate	125 ml, Plastic	MW03-02D	H_2SO_4
Sulfide	250 ml, Plastic	MW03-02D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-02D	------
Methane	3 x 40 ml vial	MW03-02D	HCl
Ferrous Iron (Field Analyzed):	5.10 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	0.5	1.0	1.5	2.0	2.5	3.0
Time	1418	1423	1428	1433	1438	1443	1448
Temperature (°C)	15.59	15.53	15.57	15.75	15.82	16.22	16.22
pH	6.27	6.28	6.27	6.26	6.27	6.29	6.27
Conductivity (S/cm)	0.165	0.165	0.166	0.166	0.165	0.165	0.165
DO (mg/L)	1.06	0.77	0.68	0.65	0.68	0.72	0.74
Turbidity (NTUs)	95	45	27	18	14	11	9.2
Eh (mV)	0.4	-1.4	-2.9	-3.8	-3.9	-4.2	-4.3
Water Level (ft. from TOR)	17.75	18.52	18.49	18.45	18.35	18.3	18.29
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	1453	1458	1503	1508	1513	1518	1523
Temperature (°C)	16.22	16.42	16.49	16.66	16.72	16.74	16.88
pH	6.27	6.26	6.28	6.27	6.28	6.27	6.28
Conductivity (S/cm)	0.165	0.166	0.166	0.166	0.167	0.166	0.167
DO (mg/L)	0.73	0.72	0.70	0.67	0.66	0.65	0.62
Turbidity (NTUs)	7.8	6.6	6.0	5.5	5.2	4.3	3.8
Eh (mV)	-4.6	-5.3	-6.2	-6.7	-7.5	-7.8	-8.9
Water Level (ft. from TOR)	18.25	18.23	18.19	18.16	18.16	18.16	18.1
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/30/00

Well/Sample ID: MW03-02D Personnel: BO Start Time: 1400 Finish Time: 1538

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.0	7.5	8.0				
Time	1528	1533	1538				
Temperature (°C)	16.88	16.92	17.11				
pH	6.28	6.25	6.26				
Conductivity (S/cm)	0.167	0.167	0.167				
DO (mg/L)	0.61	0.61	0.59				
Turbidity (NTUs)	3.6	3.6	3.6				
Eh (mV)	-9.1	-9.4	-9.3				
Water Level (ft. from TOR)	18.1	18.09	18.09				
Flow Rate (mL/min.)	100	100	100				

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 29600.96 Task: 3201 Date: 09/30/00

Well/Sample ID: MW03-03D Personnel: KMB.BAO Start Time: 0930 Finish Time: 1150

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 70 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 53 Depth to Water 17.47 (ft)
Depth of screened interval or open borehole interval 48-58 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	80 x 40ml vial	MW03-03D	HCl
Manganese	500 ml, Plastic	MW03-03D	HNO_3
Nitrate	125 ml, Plastic	MW03-03D	H_2SO_4
Sulfide	250 ml, Plastic	MW03-03D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-03D	———
Methane	3 x 40 ml vial	MW03-03D	HCl
Ferrous Iron (Field Analyzed):	5.1 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	.5	1.0	1.5	2.0	2.5	
Time	0945	0950	0955	1000	1005	1010	
Temperature (°C)	15.52	15.13	14.76	14.59	14.35	14.28	
pH	7.32	7.21	7.14	7.10	7.13	7.07	
Conductivity (S/cm)	0.188	0.191	0.192	0.192	0.192	0.192	
DO (mg/L)	1.26	1.38	1.28	0.81	0.62	0 .42	
Turbidity (NTUs)	34	60	160	160	95	65	
Eh (mV)	-4.4	-6.2	-6.9	-8.1	-7.7	-9.3	
Water Level (ft. from TOR)	17.47	17.50	17.50	17.50	17.50	17.50	
Flow Rate (mL/min.)	100	100	100	100	100	100	

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.0	3.5	4.0	4.5	5.0	5.5	6.0
Time	1015	1020	1025	1030	1035	1040	1045
Temperature (°C)	14.26	14.74	15.87	15.84	14.99	15.05	14.71
pH	7.07	7.01	7.15	7.10	7.06	7.08	7.05
Conductivity (S/cm)	0.192	0.190	0.191	0.191	0.190	0.191	0.191
DO (mg/L)	0.41	0.30	0.66	0.45	0.62	0.57	0.21
Turbidity (NTUs)	95	95	95	100	90	80	65
Eh (mV)	-10.8	-10.3	-15.1	-14.3	-9.3	-12.7	-10.7
Water Level (ft. from TOR)	17.50	17.51	17.51	17.51	17.51	17.51	17.51
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 29600.96 Task: 3201 Date: 09/30/00

Well/Sample ID: MW03-03D Personnel: KMB/BAO Start Time: 0930 Finish Time: 1150

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	6.5	7.0	7.5	8.0	8.5	9.0	9.5
Time	1050	1055	1100	1105	1110	1115	1120
Temperature (°C)	15.24	15.08	14.66	14.77	15.06	14.86	15.56
pH	7.11	7.11	7.04	7.04	7.13	7.05	7.12
Conductivity (S/cm)	0.190	0.190	0.190	0.190	0.190	0.191	0.189
DO (mg/L)	0.31	0.34	0.38	0.22	0.25	0.26	0.25
Turbidity (NTUs)	55	35	29	21	18	15	13
Eh (mV)	-13.4	-13.9	-10.9	-11.2	-13.1	-11.2	-14.4
Water Level (ft. from TOR)	17.51	17.5	17.5	17.5	17.5	17.5	17.5
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	10.0	10.5	11.0	11.5	12.0	12.5	
Time	1125	1130	1135	1140	1145	1150	
Temperature (°C)	15.52	15.31	14.94	15.10	14.96	14.67	
pH	7.07	7.06	6.99	7.10	7.05	7.01	
Conductivity (S/cm)	0.190	0.189	0.190	0.190	0.190	0.190	
DO (mg/L)	0.27	0.26	0.27	0.27	0.25	0.25	
Turbidity (NTUs)	10	10	8	7.6	8	8	
Eh (mV)	-14.1	-13.4	-11.2	-12.8	-13.3	-13.6	
Water Level (ft. from TOR)	17.5	17.5	17.5	17.5	17.5	17.5	
Flow Rate (mL/min.)	100	100	100	100	100	100	

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/30/00

Well/Sample ID: MW03-03R Personnel: KB/BO Start Time: 0932 Finish Time: 1200

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder / Peristaltic
Pump Intake Depth (ft. below TOR) 75 Depth to Water 17.11 (ft)
-epth of screened interval or open borehole interval 70-95 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-03R, DUP 3, MS/MSD	HCl
Manganese	500 ml, Plastic	MW03-03R, DUP 3, MS/MSD	HNO_3
Nitrate	125 ml, Plastic	MW03-03R, DUP 3, MS/MSD	H_2SO_4
Sulfide	250 ml, Plastic	MW03-03R, DUP 3, MS/MSD	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-03R, DUP 3, MS/MSD	--------
Methane	3 x 40 ml vial	MW03-03R, DUP 3, MS/MSD	HCl
Ferrous Iron (Field Analyzed):	5.10 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	0.5	1.0	1.5	2.0	2.5	3.0
[illegible]e	0945	0950	0955	1000	1005	1010	1015
Temperature (°C)	15.11	14.81	14.11	14.04	13.96	14.00	13.89
pH	6.46	6.47	6.48	6.44	6.40	6.42	6.42
Conductivity (S/cm)	0.185	0.186	0.182	0.177	0.172	0.176	0.175
DO (mg/L)	0.81	0.44	0.26	0.21	0.19	0.18	0.16
Turbidity (NTUs)	8.6	7.2	5.8	3.8	2.0	2.1	3.1
Eh (mV)	-25.3	-29.9	-31.5	-30.4	-27.7	-30.1	-36.3
Water Level (ft. from TOR)	17.11	17.11	17.11	17.11	17.11	17.11	17.11
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
[illegible] Rate (mL/min.)							

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/2/00

Well/Sample ID: MW03-05D Personnel: KB Start Time: 1330 Finish Time: 1630

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 90.5 Depth to Water 17.50 (ft)
Depth of screened interval or open borehole interval 35.5-45.5 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-05D	HCl
Manganese	500 ml, Plastic	MW03-05D	HNO_3
Nitrate	125 ml, Plastic	MW03-05D	H_2SO_4
Sulfide	250 ml, Plastic	MW03-05D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-05D	———
Methane	3 x 40 ml vial	MW03-05D	HCl
Ferrous Iron (Field Analyzed):	0.0 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	0.5	1.0	1.5	2.0	2.5	3.0
Time	1400	1405	1410	1415	1420	1425	1430
Temperature (°C)	19.63	18.99	18.31	18.09	17.53	17.28	17.22
pH	5.68	5.59	5.50	5.45	5.39	5.38	5.38
Conductivity (S/cm)	0.116	0.116	0.107	0.108	0.108	0.109	0.109
DO (mg/L)	5.67	4.98	4.78	4.56	4.40	4.32	4.27
Turbidity (NTUs)	157	401	559	499	290	120	100
Eh (mV)	188.1	214.7	233.8	246.2	257.7	263.3	268.6
Water Level (ft. from TOR)	17.51	17.64	17.64	17.69	17.68	17.69	17.69
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	1435	1440	1445	1450	1455	1500	1505
Temperature (°C)	17.01	17.83	18.01	18.00	18.24	18.47	18.86
pH	5.33	5.41	5.41	5.40	5.40	5.41	5.43
Conductivity (S/cm)	0.110	0.110	0.110	0.110	0.110	0.110	0.111
DO (mg/L)	4.47	4.07	4.04	4.01	3.97	3.94	3.89
Turbidity (NTUs)	80	70	65	55	50	55	40
Eh (mV)	273.7	272.2	275.3	279.3	281.0	282.0	282.7
Water Level (ft. from TOR)	17.69	17.65	17.65	17.60	17.60	17.60	17.60
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: DRAFT

Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/2/00

Well/Sample ID: MW03-05D Personnel: KB Start Time: 1330 Finish Time: 1630

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.0	7.5	8.0	8.5	9.0	9.5	10.0
Time	1510	1515	1520	1525	1530	1535	1540
Temperature (°C)	18.98	16.92	17.37	17.72	17.52	17.03	16.42
pH	5.44	5.38	5.38	5.42	5.39	5.36	5.38
Conductivity (S/cm)	0.110	0.111	0.111	0.111	0.111	0.112	0.112
DO (mg/L)	3.87	3.95	3.81	3.77	3.77	3.66	3.79
Turbidity (NTUs)	38	40	32	40	38	34	39
Eh (mV)	283.3	289.0	290.2	288.9	291.5	293.6	296.3
Water Level (ft. from TOR)	17.60	17.65	17.64	17.64	17.64	17.65	17.65
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	10.5	11.0	11.5	12.0			
Time	1545	1550	1555	1600			
Temperature (°C)	16.86	17.14	17.07	16.87			
pH	5.35	5.43	5.40	5.38			
Conductivity (S/cm)	0.111	0.112	0.112	0.112			
DO (mg/L)	3.58	3.64	3.64	3.61			
Turbidity (NTUs)	32	40	50	45			
Eh (mV)	293.7	297.3	300.8	303.1			
Water Level (ft. from TOR)	17.65	17.65	17.66	17.66			
Flow Rate (mL/min.)	100	100	100	100			

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: DRAFT

Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/2/00

Well/Sample ID: MW03-06D Personnel: JG Start Time: 1353 Finish Time: 1620

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 56.5 Depth to Water 16.74 (ft)
Depth of screened interval or open borehole interval 51.5-61.5 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-06D	HCl
Manganese	500 ml, Plastic	MW03-06D	HNO_3
Nitrate	125 ml, Plastic	MW03-06D	H_2SO_4
Sulfide	250 ml, Plastic	MW03-06D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-06D	--------
Methane	3 x 40 ml vial	MW03-06D	HCl
Ferrous Iron (Field Analyzed):	3.92 mg/L (4.1 mg/L diluted)		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.0	2.75	3.5
Time	1353	1358	1403	1408	1413	1418	1423
Temperature (°C)	-	17.39	17.98	17.75	17.47	17.52	17.38
pH	-	6.58	6.13	5.89	5.69	5.64	5.70
Conductivity (S/cm)	-	0.140	0.140	0.146	0.147	0.148	0.49
DO (mg/L)	-	6.41	8.47	7.54	7.96	8.22	9.48
Turbidity (NTUs)	-	-	-	-	450	1100	800
Eh (mV)	-	260	281	293	275	256	252
Water Level (ft. from TOR)	16.74	16.76	16.78	16.79	16.78	16.78	-
Flow Rate (mL/min.)	100	100	100	100	100	100	150

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	4.25	5.0	5.75	6.5	7.0	7.75	9.25
Time	1428	1432	1437	1442	1447	1452	1502
Temperature (°C)	17.42	17.33	17.21	17.05	16.81	15.96	15.61
pH	5.61	5.58	5.58	5.56	5.50	5.63	5.85
Conductivity (S/cm)	0.149	0.149	0.149	0.149	0.149	0.150	0.148
DO (mg/L)	9.59	11.54	11.44	12.33	13.13	14.75	6.50
Turbidity (NTUs)	850	550	500	450	390	290	190
Eh (mV)	234	216	213	209	206	232	271
Water Level (ft. from TOR)	16.78	16.78	16.78	16.78	16.78	16.78	16.78
Flow Rate (mL/min.)	150	150	150	150	150	150	100

NOTES: * 1500- RECAL DO METER

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/2/00

Well/Sample ID: MW03-06D Personnel: JG Start Time: 1353 Finish Time: 1620

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	10.0	11.5	12.25	13.0	13.75	14.5	15.25
Time	1507	1517	1522	1527	1532	1537	1542
Temperature (°C)	15.71	15.40	15.34	15.28	16.02	17.10	17.56
pH	5.57	588	5.90	5.92	5.92	5.91	5.93
Conductivity (S/cm)	0.147	0.139	0.138	0.138	0.139	0.139	0.139
DO (mg/L)	10.76	0.41	0.29	0.28	0.29	0.44	0.48
Turbidity (NTUs)	200	390	330	320	380	330	350
Eh (mV)	251	-17	-24	-25	-28	-30	-31
Water Level (ft. from TOR)	16.79	16.79	16.79	16.79	16.78	16.78	16.78
Flow Rate (mL/min.)	150	150	150	150	150	150	150

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	16.0	16.75	17.50				
Time	1547	1552	1557				
Temperature (°C)	17.44	16.45	16.49				
pH	5.92	5.93	5.93				
Conductivity (S/cm)	0.138	0.139	0.139				
DO (mg/L)	0.45	0.34	0.34				
Turbidity (NTUs)	290	280	220				
Eh (mV)	-32	-31	-32				
Water Level (ft. from TOR)	16.78	16.78	16.78				
Flow Rate (mL/min.)	150	150	150				

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site Project No.: 2960096 Task: 3201 Date: 10/2/00

Well/Sample ID: MW03-07D Personnel: JG Start Time: 0926 Finish Time: 1210

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 40.5 Depth to Water 13.59 (ft)
Depth of screened interval or open borehole interval 35.5-45.5 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-07D	HCl
Manganese	500 ml, Plastic	MW03-07D	HNO_3
Nitrate	125 ml, Plastic	MW03-07D	H_2SO_4
Sulfide	250 ml, Plastic	MW03-07D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-07D	----
Methane	3 x 40 ml vial	MW03-07D	HCl
Ferrous Iron (Field Analyzed):	1.14 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.25	3.0	3.75
Time	0926	0931	0936	0941	0946	0951	1012
Temperature (°C)	-	15.59	15.29	15.53	14.27	14.69	16.34
pH	-	4.65	5.14	5.04	5.30	5.09	5.22
Conductivity (S/cm)	-	0.133	0.118	0.116	0.124	0.121	0.121
DO (mg/L)	-	4.64	4.41	3.23	2.09	1.28	1.99
Turbidity (NTUs)	-	180	750	160	160	110	95
Eh (mV)	-	308	335	336	336	331	309
Water Level (ft. from TOR)	13.59	13.62	13.64	13.68	13.66	13.64	13.64
Flow Rate (mL/min.)	100	100	100	100	150	150	150

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	4.5	5.0	5.5	6.0	6.5	7.0	7.5
Time	1017	1022	1027	1032	1037	1042	1047
Temperature (°C)	16.37	16.16	16.35	16.64	16.58	16.37	16.52
pH	5.10	5.08	5.08	5.11	5.12	5.10	5.11
Conductivity (S/cm)	0.121	0.120	0.121	0.121	0.121	0.122	0.122
DO (mg/L)	1.46	1.60	1.76	1.79	1.85	2.05	2.13
Turbidity (NTUs)	100	110	80	50	35	39	40
Eh (mV)	308	304	299	291	286	283	277
Water Level (ft. from TOR)	13.67	13.64	13.64	13.64	13.64	13.64	13.64
Flow Rate (mL/min.)	150	100	100	100	100	100	100

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/2/00

Well/Sample ID: MW03-07D Personnel: JG Start Time: 0926 Finish Time: 1210

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	8.0	8.5	9.0	9.5	10.0	10.5	11.0
Time	1025	1057	1102	1107	1112	1117	1122
Temperature (°C)	16.96	17.41	16.84	16.82	17.21	17.81	18.58
pH	5.13	5.14	5.14	5.11	5.12	5.15	5.18
Conductivity (S/cm)	0.122	0.122	0.123	0.123	0.124	0.124	0.127
DO (mg/L)	2.51	2.56	2.87	2.75	2.95	3.21	3.56
Turbidity (NTUs)	40	27	36	35	45	36	37
Eh (mV)	271	266	263	260	255	249	244
Water Level (ft. from TOR)	13.64	13.64	13.64	13.64	13.64	13.64	13.63
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	11.5	12.0	12.5	13.0			
Time	1127	1132	1137	1142			
Temperature (°C)	19.02	18.92	18.82	19.25			
pH	5.19	5.20	5.18	5.17			
Conductivity (S/cm)	0.126	0.127	0.128	0.129			
DO (mg/L)	3.85	4.30	4.84	5.13			
Turbidity (NTUs)	26	45	35	21			
Eh (mV)	241	237	233	231			
Water Level (ft. from TOR)	13.64	13.64	13.63	13.63			
Flow Rate (mL/min.)	100	100	100	100			

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/2/00

Well/Sample ID: MW03-08D Personnel: MC Start Time: 0915 Finish Time: 1030

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ _Peristaltic
Pump Intake Depth (ft. below TOR) 32.3 Depth to Water 10.58 (ft)
Depth of screened interval or open borehole interval 28.3-38.3 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-08D	HCl
Manganese	500 ml, Plastic	MW03-08D	HNO_3
Nitrate	125 ml, Plastic	MW03-08D	H_2SO_4
Sulfide	250 ml, Plastic	MW03-08D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-08D	--------
Methane	3 x 40 ml vial	MW03-08D	HCl
Ferrous Iron (Field Analyzed):	0.02 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Time	0930	0935	0940	0945	0950	0955	1000
Temperature (°C)	12.85	13.36	13.34	13.32	14.15	13.70	12.82
pH	5.42	5.42	5.42	5.44	5.42	5.44	5.43
Conductivity (S/cm)	0.076	0.077	0.077	0.078	0.078	0.078	0.079
DO (mg/L)	1.47	1.33	1.26	1.26	1.26	1.32	1.13
Turbidity (NTUs)	28	23.6	21.3	13.1	17.4	8.7	7.5
Eh (mV)	71.1	75.4	78.4	81.3	83.5	90.6	90.2
Water Level (ft. from TOR)	10.57	10.57	10.57	10.57	10.57	10.60	10.60
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	0.8	0.9	1.0	1.1	1.2	1.3	
Time	1005	1010	1015	1020	1025	1030	
Temperature (°C)	12.74	12.43	12.16	13.33	13.75	13.98	
pH	5.45	5.43	5.44	5.45	5.44	5.43	
Conductivity (S/cm)	0.078	0.059	0.060	0.079	0.079	0.078	
DO (mg/L)	1.09	1.09	0.99	1.01	1.05	1.10	
Turbidity (NTUs)	8.4	7.3	8.3	8.7	8.4	9.2	
Eh (mV)	91.6	94.6	95.4	97.8	99.4	101.9	
Water Level (ft. from TOR)	10.60	10.60	10.60	10.60	10.60	10.60	
Flow Rate (mL/min.)	100	100	100	100	100	100	

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/2/00

Well/Sample ID: MW03-08R Personnel: KB Start Time: 1350 Finish Time: 1600

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / ___ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 51.5 Depth to Water 9.18 (ft)
Depth of screened interval or open borehole interval 46.5-56.5 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-08R	HCl
Manganese	500 ml, Plastic	MW03-08R	HNO_3
Nitrate	125 ml, Plastic	MW03-08R	H_2SO_4
Sulfide	250 ml, Plastic	MW03-08R	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-08R	———
Methane	3 x 40 ml vial	MW03-08R	HCl
Ferrous Iron (Field Analyzed):	1.15 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	0.7	1.4	2.1	2.8	3.5	4.5
Time	1050	1055	1100	1105	1110	1115	1120
Temperature (°C)	14.85	14.87	14.64	14.57	14.47	14.59	15.37
pH	7.01	6.92	6.83	6.66	6.64	6.54	6.50
Conductivity (S/cm)	0.273	0.266	0.261	0.249	0.248	0.242	0.240
DO (mg/L)	2.17	1.75	1.55	1.31	1.25	1.16	1.15
Turbidity (NTUs)	4.76	4.82	3.68	4.64	4.04	2.77	3.31
Eh (mV)	-114.2	-108.2	-101.9	-86.1	-80.6	-72.6	-69.2
Water Level (ft. from TOR)	10.92	11.02	11.06	11.12	11.14	11.19	11.02
Flow Rate (mL/min.)	150	150	150	150	150	150	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	5.0	5.5	6.0	6.5	7.0	7.5	8.0
Time	1125	1130	1135	1140	1145	1150	1155
Temperature (°C)	15.13	14.79	14.81	14.81	14.84	14.89	14.74
pH	6.51	6.46	6.41	6.38	6.34	6.32	6.31
Conductivity (S/cm)	0.240	0.239	0.236	0.235	0.233	0.234	0.232
DO (mg/L)	1.12	1.08	1.03	0.98	0.97	0.95	0.93
Turbidity (NTUs)	2.81	2.04	2.22	2.37	1.51	1.91	-
Eh (mV)	-67.8	-62.7	-59.7	-55.5	-51.0	-48.0	-44.2
Water Level (ft. from TOR)	11.06	11.10	11.12	11.16	11.18	11.22	11.22
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/2/00

Well/Sample ID: MW03-08R Personnel: KB Start Time: 1350 Finish Time: 1600

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	8.5						
Time	1200						
Temperature (°C)	14.50						
pH	6.31						
Conductivity (S/cm)	0.231						
DO (mg/L)	0.91						
Turbidity (NTUs)	1.43						
Eh (mV)	-43.3						
Water Level (ft. from TOR)	11.22						
Flow Rate (mL/min.)	100						

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/3/00

Well/Sample ID: MW03-09D Personnel: JG Start Time: 0806 Finish Time: 0950

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 56 Depth to Water 21.53 (ft)
Depth of screened interval or open borehole interval 51-61 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-09D (DUP 4)	HCl
Manganese	500 ml, Plastic	MW03-09D (DUP 4)	HNO_3
Nitrate	125 ml, Plastic	MW03-09D (DUP 4)	H_2SO_4
Sulfide	250 ml, Plastic	MW03-09D (DUP 4)	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-09D (DUP 4)	--------
Methane	3 x 40 ml vial	MW03-09D (DUP 4)	HCl
Ferrous Iron (Field Analyzed):	3.16 mg/L	Dup 4 Ferrous Iron 6.46 mg/L	

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	0.5	1.0	1.5	2.25	2.75	3.25
Time	0806	0811	0816	0821	0826	0831	0836
Temperature (°C)	-	14.40	13.40	13.08	12.80	12.86	13.00
pH	-	7.47	6.85	6.62	6.50	6.49	6.49
Conductivity (S/cm)	-	0.194	0.170	0.169	0.182	0.184	0.185
DO (mg/L)	-	9.15	7.64	5.26	2.46	1.85	1.51
Turbidity (NTUs)	-	1	1	18	30	20	18
Eh (mV)	-	302	306	235	134	106	92
Water Level (ft. from TOR)	21.35	21.37	21.43	21.40	21.39	21.38	21.39
Flow Rate (mL/min.)	100	100	100	100	150	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.75	4.5	5.25	6.0	6.75	7.5	8.25
Time	0841	0846	0851	0856	0901	0906	0911
Temperature (°C)	13.08	13.02	12.83	12.94	13.29	13.40	13.45
pH	6.48	6.48	6.47	6.48	6.49	6.49	6.48
Conductivity (S/cm)	0.186	0.187	0.188	0.187	0.187	0.187	0.187
DO (mg/L)	1.19	0.91	0.66	0.63	0.65	0.61	0.60
Turbidity (NTUs)	32	9	27	8	7	7	4
Eh (mV)	81	71	65	63	62	62	60
Water Level (ft. from TOR)	21.40	21.40	21.39	21.39	21.38	21.39	21.39
Flow Rate (mL/min.)	100	150	150	150	150	150	150

NOTES: DUP

Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/3/00

Well/Sample ID: MW03-09D Personnel: JG Start Time: 0806 Finish Time: 0950

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	9.0						
Time	0916						
Temperature (°C)	13.45						
pH	6.48						
Conductivity (S/cm)	0.187						
DO (mg/L)	0.58						
Turbidity (NTUs)	5						
Eh (mV)	57						
Water Level (ft. from TOR)	21.39						
Flow Rate (mL/min.)	150						

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/2/00

Well/Sample ID: MW03-10D Personnel: MC Start Time: 1210 Finish Time: 1600

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / ___ 4-in. / ___ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ ___ Peristaltic
Pump Intake Depth (ft. below TOR) 44 Depth to Water 14.37(ft)
Depth of screened interval or open borehole interval 39-49 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW03-10D	HCl
Manganese	500 ml, Plastic	MW03-10D	HNO_3
Nitrate	125 ml, Plastic	MW03-10D	H_2SO_4
Sulfide	250 ml, Plastic	MW03-10D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW03-10D	--------
Methane	3 x 40 ml vial	MW03-10D	HCl
Ferrous Iron (Field Analyzed):	0.03 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Time	1215	1220	1225	1230	1235	1240	1245
Temperature (°C)	16.14	16.75	16.37	18.00	17.96	17.80	19.07
pH	5.47	5.50	5.49	5.51	5.51	5.52	5.53
Conductivity (S/cm)	0.095	0.094	0.093	0.094	0.094	0.093	0.094
DO (mg/L)	2.20	1.89	1.38	2.62	1.37	1.42	1.49
Turbidity (NTUs)	280	850	-	-	-	-	-
Eh (mV)	104.1	109.8	113.1	115.2	113.2	115.2	113.2
Water Level (ft. from TOR)	14.40	14.40	14.40	14.40	14.40	14.40	14.40
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	0.8	0.9	1.0	1.1	1.2	1.3	1.4
Time	1250	1255	1300	1305	1310	1315	1320
Temperature (°C)	17.82	17.46	17.30	17.85	17.73	17.62	17.82
pH	5.52	5.51	5.51	5.51	5.52	5.51	5.52
Conductivity (S/cm)	0.094	0.094	0.094	0.096	0.096	0.096	0.094
DO (mg/L)	3.84	1.09	1.10	0.98	0.90	0.94	0.93
Turbidity (NTUs)	230	110	950	400	60	35	26
Eh (mV)	120.5	123.9	125.5	124.6	128.8	132.0	131.8
Water Level (ft. from TOR)	14.40	14.40	14.40	14.40	14.40	14.40	14.40
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES: _____

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Field Sampling Form

Project Name: NCBC-Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/2/00

Well/Sample ID: MW03-10D Personnel: MC Start Time: 1210 Finish Time: 1600

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	1.5	1.6	1.7	1.8	1.9	2.0	2.1
Time	1325	1330	1335	1340	1345	1350	1355
Temperature (°C)	17.89	18.09	18.37	18.35	18.58	18.80	18.98
pH	5.52	5.52	5.52	5.52	5.53	5.51	5.51
Conductivity (S/cm)	0.094	0.094	0.094	0.094	0.094	0.094	0.094
DO (mg/L)	0.94	0.94	0.94	0.96	1.20	1.04	1.02
Turbidity (NTUs)	27	19	14	16	6	9	5
Eh (mV)	131.2	132.9	132.0	132.0	135.2	135.1	135.6
Water Level (ft. from TOR)	14.40	14.40	14.40	14.40	14.40	14.40	14.40
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	2.2	2.3					
Time	1400	1405					
Temperature (°C)	18.45	17.94					
pH	5.50	5.51					
Conductivity (S/cm)	0.094	0.094					
DO (mg/L)	0.98	0.94					
Turbidity (NTUs)	1.7	1.5					
Eh (mV)	136.3	137.4					
Water Level (ft. from TOR)	14.40	14.40					
Flow Rate (mL/min.)	100	100					

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/3/00

Well/Sample ID: MW-Z3-01 Personnel: KB/MC Start Time: 1100 Finish Time: 1315

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) NA Depth to Water 20.88 (ft)
Depth of screened interval or open borehole interval 81-91 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW-Z3-01	HCl
Manganese	500 ml, Plastic	MW-Z3-01	HNO_3
Nitrate	125 ml, Plastic	MW-Z3-01	H_2SO_4
Sulfide	250 ml, Plastic	MW-Z3-01	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW-Z3-01	--------
Methane	3 x 40 ml vial	MW-Z3-01	HCl
Ferrous Iron (Field Analyzed):	10.68 mg/L 4:1 dilution		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	0.5	1.0	1.5	2.0	2.5	3.0
Time	1135	1140	1145	1150	1155	1200	1205
Temperature (°C)	16.18	15.50	14.81	14.75	14.56	14.53	13.98
pH	6.38	6.38	6.38	6.36	6.34	6.34	6.34
Conductivity (S/cm)	0.152	0.168	0.177	0.182	0.184	0.185	0.186
DO (mg/L)	0.03	1.51	1.26	1.16	0.85	0.36	0.72
Turbidity (NTUs)	21	4.6	3.4	4.2	7.4	11	16
Eh (mV)	-61.5	-96.0	-101.7	-104.0	-105.6	-107.3	-109.4
Water Level (ft. from TOR)	20.90	20.89	20.89	20.89	20.89	20.90	20.90
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4.0	4.5	5.0	5.5	6.0	6.5
Time	1210	1215	1220	1225	1230	1235	1240
Temperature (°C)	13.85	13.78	13.97	14.61	13.92	13.49	13.24
pH	6.35	6.36	6.37	6.37	6.38	6.38	6.39
Conductivity (S/cm)	0.186	0.187	0.187	0.187	0.187	0.187	0.187
DO (mg/L)	0.68	0.59	0.28	0.25	0.13	0.06	0.31
Turbidity (NTUs)	26	31	31	24	20	17	19
Eh (mV)	-112.2	-114.2	-116.3	-119.0	-120.6	-121.9	-123.6
Water Level (ft. from TOR)	20.90	20.90	20.90	20.90	20.90	20.90	20.90
Flow Rate (mL/min.)	100	100	100	100	100	100	100

NOTES:

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/3/00

Well/Sample ID: MW-Z3-01 Personnel: KB/MC Start Time: 1100 Finish Time: 1315

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	7.0	7.5	8.0	8.5	9.0	9.5	10.0
Time	1245	1250	1255	1300	1305	1310	1315
Temperature (°C)	12.93	12.45	12.13	12.16	12.14	12.15	12.12
pH	6.38	6.39	6.41	6.41	6.43	6.42	6.41
Conductivity (S/cm)	0.184	0.187	0.187	0.186	0.186	0.186	0.186
DO (mg/L)	0	0	0	0	0	0	0.20
Turbidity (NTUs)	15	13	9.3	7.2	4.2	4.4	4.7
Eh (mV)	-125.6	-128.0	-130.3	-133.7	-135.6	-137.1	-136.5
Water Level (ft. from TOR)	20.90	20.90	20.91	20.91	20.91	20.91	20.91
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES:

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 29600.96 Task: 3201 Date: 9/29/00

Well/Sample ID: MW-Z3-02 Personnel: RC JG Start Time: 1345 Finish Time: 1600

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0.0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0.0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / ___ 4-in. / ___ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 5.5 Depth to Water 21.49 (ft)
Depth of screened interval or open borehole interval 50-60 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW-Z3-02	HCl
Manganese	500 ml, Plastic	MW-Z3-02	HNO_3
Nitrate	125 ml, Plastic	MW-Z3-02	H_2SO_4
Sulfide	250 ml, Plastic	MW-Z3-02	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW-Z3-02	--------
Methane	3 x 40 ml vial	MW-Z3-02	HCl
Ferrous Iron (Field Analyzed):	2.38 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	0	2	3.2	4.4	5.6	6.8	8
Time	1355	1400	1405	1410	1415	1420	1425
Temperature (°C)	12.56	12.52	12.61	12.70	12.65	12.46	12.87
pH	6.13	6.28	6.36	6.33	6.32	6.32	6.33
Conductivity (S/cm)	0.174	0.177	0.181	0.181	0.181	0.181	0.181
DO (mg/L)	3.51	1.75	2.07	1.15	1.04	0.98	0.96
Turbidity (NTUs)	>1000	600	761	635	618	703	616
Eh (mV)	34.7	-0.8	-9.3	-12.3	-14.3	-16.4	-18.1
Water Level (ft. from TOR)	22.27	21.98	21.89	21.90	21.97	21.77	21.77
Flow Rate (mL/min.)	300	250	250	250	250	150	150

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	9	10	11	12	13	14	15
Time	1430	1435	1440	1445	1450	1455	1500
Temperature (°C)	13.20	13.38	13.45	13.46	13.09	1322	1324
pH	6.36	6.35	6.34	6.35	6.35	6.34	6.34
Conductivity (S/cm)	0.181	0.182	0.182	0.182	0.181	0.181	0.181
DO (mg/L)	1.36	1.01	1.07	0.98	1.02	0.91	0.87
Turbidity (NTUs)	708	694	613	488	332	282	355
Eh (mV)	-20.1	-20.0	-20.7	-20.6	-20.4	-21.0	-21.2
Water Level (ft. from TOR)	21.77	21.77	21.74	21.80	21.69	21.80	21.87
Flow Rate (mL/min.)	150	200	200	250	125	125	150

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 60957.56 Task: 0003 Date: 9/29/00

Well ID: MWZ302 Personnel: RC, JG Start Time: 1345 Finish Time: 1600

Parameter (Units)	Reading # 15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	15.5	16.0	16.5	17	17.5	18	18.5
Time	1505	1510	1515	1520	1525	1530	1535
Temperature (°C)	13.28	13.69	13.89	13.42	13.34	13.53	13.40
pH	6.35	6.35	6.36	6.37	6.36	6.35	6.36
Conductivity (S/cm)	0.182	0.182	0.181	0.182	0.181	0.181	0.181
DO (mg/L)	1.05	0.86	0.87	0.84	0.87	0.81	0.84
Turbidity (NTUs)	339	344	348	327	226	205	229
Eh (mV)	-21.4	-22.7	-23.7	-23.6	-23.0	-23.4	-23.9
Water Level (ft. from TOR)	21.67	21.67	21.78	21.79	21.65	21.70	21.77
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	19	19.5	20	20.5			
Time	1545	1550	1555	1600			
Temperature (°C/F)	13.36	13.82	14.19	14.76			
pH	6.35	6.35	6.36	6.37			
Conductivity (m_/cm)	0.180	0.181	0.180	0.180			
DO (mg/L)	0.79	0.78	0.79	0.74			
Turbidity (NTUs)	216	197	195	196			
Eh (mV)	-23.5	-24.0	-24.3	-24.6			
Water Level (ft. from TOR)	21.60	21.60	21.59	21.59			
Flow Rate (mL/min.)	100	100	100	100			

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: Temp rise due to sun on cell, collect sample at 1600 Fe2+ 2.38 Mg/l

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 9/28/00

Well/Sample ID: MW-Z3-03D Personnel: KB/BO Start Time: 1350 Finish Time: 1600

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 59 Depth to Water 20.19 (ft)
Depth of screened interval or open borehole interval 54-64 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW-Z3-03D	HCl
Manganese	500 ml, Plastic	MW-Z3-03D	HNO_3
Nitrate	125 ml, Plastic	MW-Z3-03D	H_2SO_4
Sulfide	250 ml, Plastic	MW-Z3-03D	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW-Z3-03D	--------
Methane	3 x 40 ml vial	MW-Z3-03D	HCl
Ferrous Iron (Field Analyzed):	5.10 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	0.5	1.0	1.5	2.0	2.5	3.0
Time	1440	1445	1450	1455	1500	1505	1510
Temperature (°C)	14.16	14.46	14.84	14.84	14.84	15.02	15.00
pH	6.86	6.88	6.88	6.88	6.87	6.88	6.88
Conductivity (S/cm)	0.119	0.211	0.212	0.113	0.113	0.113	0.113
DO (mg/L)	0.43	0.44	0.47	0.48	0.50	0.60	0.60
Turbidity (NTUs)	200	280	7.8	5.5	4.8	4.6	4.9
Eh (mV)	-33.1	-35.7	-36.1	-35.7	-35.5	-35.3	-34.9
Water Level (ft. from TOR)	20.29	20.29	20.30	20.30	20.29	20.28	20.28
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: _____

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 29600.96 Task: 3201 Date: 9/28/00

Well/Sample ID: MW-Z4-01 Personnel: KMB, BAO Start Time: 0917 Finish Time: 1130

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0.0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0.0 ppm

Well Data/Integrity
Well Locked x Yes __ No Well Material: x PVC / __ SS / Other
Protective Casing Secure x Yes __ No Well Diameter: x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact x Yes __ No Water Level Equip. Used: x Elect. Cond. Probe
Water Sampling Pump Used: x Dedicated Bladder/ Peristaltic
Pump Intake Depth (ft. below TOR) 79.5 Depth to Water 23.19 (ft)
Depth of screened interval or open borehole interval 74.5-84.5 (ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW-Z4-01	HCl
Manganese	500 ml, Plastic	MW-Z4-01	HNO_3
Nitrate	125 ml, Plastic	MW-Z4-01	H_2SO_4
Sulfide	250 ml, Plastic	MW-Z4-01	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW-Z4-01	--------
Methane	3 x 40 ml vial	MW-Z4-01	HCl
Ferrous Iron (Field Analyzed):	0.73 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	
P	S	Water Quality Meter with Flow through cell	

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	-	.5	1	1.5	2	2.5	3
Time	0919	0924	0929	0934	0939	0944	0949
Temperature (°C/F)	16.87	16.26	15.93	16.23	15.99	16.02	16.53
pH	8.44	7.98	7.88	7.82	7.75	7.75	7.73
Conductivity (S/cm)	0.119	0.117	0.118	0.118	0.118	0.118	0.118
DO (mg/L)	0.72	0.40	0.32	0.28	0.22	0.17	0.17
Turbidity (NTUs)	*	*	*	*	*	*	*
Eh (mV)	-50.7	-53.7	-58.5	-61.7	-64.5	-67.7	-68.3
Water Level (ft. from TOR)	23.19	26.51	26.81	27.01	27.46	27.65	27.51
Flow Rate (mL/min.)	100	100	100	100	100	100	100

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	3.5	4	4.5	5	5.5	6	6.3
Time	0954	0959	1004	1009	1014	1019	1024
Temperature (°C)	16.52	16.76	17.04	17.67	19.04	19.79	19.65
pH	7.71	7.67	7.70	7.71	7.77	7.77	7.72
Conductivity (S/cm)	0.117	0.117	0.116	0.116	0.116	0.116	0.115
DO (mg/L)	0.16	0.13	0.16	0.18	0.21	0.23	0.23
Turbidity (NTUs)	*	*	*	*	*	*	*
Eh (mV)	-68.3	-69.3	-69.1	-67.7	-68.2	-67.8	-66.7
Water Level (ft. from TOR)	27.45	27.30	26.91	26.23	25.41	25.27	25.17
Flow Rate (mL/min.)	100	100	100	100	100	100	60

NOTES: Turbidity reading above instrument limit

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 60957.56 Task: 0003 Date: 9/28/00

Well ID: MW-Z4-01 Personnel: KMB, BAO Start Time: 0917 Finish Time: 1130

Parameter (Units)	Reading #15	Reading #16	Reading #17	Reading #18	Reading #19	Reading #20	Reading #21
Liters	6.6	6.9	7.2	7.5	7.8	8.1	8.4
Time	1029	1034	1039	1044	1049	1054	1059
Temperature (°C/F)	18.94	19.34	19.18	20.44	19.17	18.72	18.04
pH	7.60	7.64	7.65	7.62	7.53	7.53	7.35
Conductivity (m_/cm)	0.116	0.116	0.116	0.116	0.117	0.116	0.118
DO (mg/L)	0.21	0.21	0.22	0.34	0.23	0.20	0.52
Turbidity (NTUs)	*	*	*	*	*	*	*
Eh (mV)	-63.1	-66.4	-66.7	-67.2	-68.9	-71.7	-68.4
Water Level (ft. from TOR)	25.11	25.09	25.08	25.09	25.21	25.33	25.56
Flow Rate (mL/min.)	60	60	60	60	60	60	60

Parameter (Units)	Reading #22	Reading #23	Reading #24	Reading #25	Reading #26	Reading #27	Reading #28
Liters	8.7	9	9.3	9.6			
Time	1104	1109	1114	1119			
Temperature (°C)	17.54	17.68	17.73	17.84			
pH	7.39	7.39	7.41	7.43			
Conductivity (S/cm)	0.117	0.118	0.117	0.118			
DO (mg/L)	0.37	0.30	0.29	0.27			
Turbidity (NTUs)	*	*	*	*			
Eh (mV)	-71.3	-73.6	-74.7	-75.4			
Water Level (ft. from TOR)	25.79	25.91	25.99	26.02			
Flow Rate (mL/min.)	60	60	60	60			

Parameter (Units)	Reading #29	Reading #30	Reading #31	Reading #32	Reading #33	Reading #34	Reading #35
Liters							
Time							
Temperature (°C)							
pH							
Conductivity (S/cm)							
DO (mg/L)							
Turbidity (NTUs)							
Eh (mV)							
Water Level (ft. from TOR)							
Flow Rate (mL/min.)							

NOTES: Ferrous Iron Reading = 0.73

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Field Sampling Form

Project Name: NCBC Davisville Site 03 Project No.: 2960096 Task: 3201 Date: 10/3/00

Well/Sample ID: MW-Z4-02 Personnel: KB/RC Start Time: 1430 Finish Time: 1630

Air Monitoring
Equipment Used: Photovac 2020 Ambient Air Reading: 0 ppm
Calibration Information: 100 ppm Isobutylene Well Headspace Reading: 0 ppm

Well Data/Integrity

Well Locked	x Yes __ No	Well Material:	x PVC / ___ SS / Other
Protective Casing Secure	x Yes __ No	Well Diameter:	x 2-in. / __ 4-in. / __ 6-in. / Other
Concrete Collar Intact	x Yes __ No	Water Level Equip. Used:	x Elect. Cond. Probe

Water Sampling Pump Used: x Dedicated Bladder/ x Peristaltic
Pump Intake Depth (ft. below TOR) 57.5 Depth to Water 16.79 (ft)
Depth of screened interval or open borehole interval 50-65(ft)

Sample Information

Analytical Parameter	Volume Required/ Sample Container	Sample ID	Preservation Method
VOC	3 x 40ml vial	MW-Z4-02	HCl
Manganese	500 ml, Plastic	MW-Z4-02	HNO_3
Nitrate	125 ml, Plastic	MW-Z4-02	H_2SO_4
Sulfide	250 ml, Plastic	MW-Z4-02	ZnOAc/NaOH
Alkalinity, Chloride, Sulfate	1000 ml, Plastic	MW-Z4-02	--------
Methane	3 x 40 ml vial	MW-Z4-02	HCl
Ferrous Iron (Field Analyzed):	2.97 mg/L		

Equipment Decon

P = Purge S = Sample		Equipment Used	Decon Method
P	S	Water Level Indicator	Alconox, Isopropynol, and DI
P	S	Water Quality Meter with Flow through cell	Alconox, Isopropynol, and DI

Water Quality Parameters

Parameter (Units)	Initial	Reading # 2	Reading #3	Reading #4	Reading #5	Reading #6	Reading #7
Liters	4	5	6	7	8	9	10
Time	1525	1530	1535	1545	1550	1555	1600
Temperature (°C)	16.10	17.14	17.46	17.00	16.81	16.67	16.58
pH	7.38	7.38	7.40	7.43	7.45	7.46	7.46
Conductivity (S/cm)	0.189	0.189	0.190	0.188	0.187	0.186	0.185
DO (mg/L)	1.30	0.0	1.59	0.0	0.0	0.0	0.01
Turbidity (NTUs)	16	15	12	12	8.5	9.4	8.1
Eh (mV)	-253.6	-255.1	-259.1	-261.1	-260.7	-261.4	-260.0
Water Level (ft. from TOR)	17.73	17.43	17.35	17.36	17.39	17.39	17.39
Flow Rate (mL/min.)	200	200	200	200	200	200	200

Parameter (Units)	Reading #8	Reading #9	Reading #10	Reading #11	Reading #12	Reading #13	Reading #14
Liters	11	12	13				
Time	1605	1610	1615				
Temperature (°C)	16.45	16.63	16.41				
pH	7.46	7.45	7.47				
Conductivity (S/cm)	0.185	0.185	0.185				
DO (mg/L)	0.78	0.82	0.24				
Turbidity (NTUs)	8.1	8.1	7.5				
Eh (mV)	-261.2	-260.2	-258.0				
Water Level (ft. from TOR)	17.40	17.41	17.42				
Flow Rate (mL/min.)	200	200	200				

NOTES: _____

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