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ROUND 4 SUMMARY REPORT FOR DENITRIFICATION-BASED BIODEGRADATION PILOT TEST AT THE NAVY EXCHANGE SERVICE STATION DRAFT ACTING AS FINAL NAS BRUNSWICK ME

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Round 4 Summary Report

for

Denitrification-Based Biodegradation Pilot Test Navy Exchange Service Station

Naval Air Station Brunswick, Maine

Naval Facilities Engineering Command Mid-Atlantic

Contract Number N62472-03-D-0057
Contract Task Order 14

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ROUND 4 SUMMARY REPORT

FOR

DENITRIFICATION-BASED BIODEGRADATION PILOT TEST NAVY EXCHANGE SERVICE STATION

NAVAL AIR STATION BRUNSWICK, MAINE

COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

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1.0 INTRODUCTION

Tetra Tech NUS, Inc. (TtNUS) prepared this report to summarize the results of the Round 4 field and sampling activities, conducted in October and November 2007, for the Navy Exchange (NEX) Service Station Site located at Naval Air Station (NAS) in Brunswick, Maine (Figures 1-1 and 1-2). This report was prepared for the United States Navy (Navy) Naval Facilities Engineering Command under Contract Number N62472-03-D-0057, Contract Task Order 14.

1.1 PILOT TEST OBJECTIVE

The objective of the pilot test is to assess the effectiveness of the Geovation Technologies, Inc.'s (Geovation) Denitrification-Based Biodegradation (DBB) process to mitigate sorbed-phase petroleum hydrocarbon contamination in the vicinity of the NEX Service Station. This assessment will be based on whether the site-specific remediation goal of 500 mg/Kg of gasoline range organics (GRO) can be achieved in the saturated soil using the DBB process.

1.2 DENITRIFICATION-BASED BIODEGRADATION PROCESS

Geovation's DBB process involves the application of N-Blend, a proprietary, nitrate-based electron acceptor reagent, into saturated subsurface soils contaminated with gasoline-related petroleum hydrocarbons. The N-Blend reagent stimulates the growth of naturally-occurring denitrification microbes that can biodegrade gasoline-related petroleum hydrocarbons.

1.3 PILOT TEST PROGRAM

The pilot test consists of performing baseline monitoring, treating a portion of the residual source area by applying Geovation's N-Blend reagent into selected monitoring wells and mini-wells, performing periodic sampling and analysis, and evaluating the data to assess the DBB process effectiveness. Geovation was subcontracted by TtNUS to perform the baseline monitoring of biogeochemical conditions and molecular analysis, perform additions of the N-Blend reagent into the mini-wells, and assess the status of microbial activity during the pilot test. TtNUS performed baseline and periodic soil and groundwater sampling to determine whether the 500 mg/Kg GRO treatment goal can be attained through in-situ anaerobic biodegradation using the native microbes present in the pilot test area.

The area being treated for the pilot study is depicted in Figure 1-2. This area is bounded approximately by Burbank Avenue to the north and by the northwestern corner of Building 27 to the south. The test area

footprint corresponds to the lower half of one of the two residual source areas delineated during the 2003 investigation by the previous Navy contractor.

Because the pilot test involves the stimulation of naturally-occurring microbes in the test area, the growth of the microbiological population is expected to increase gradually, and biodegradation is expected to occur over a period of 12 to 18 months after the initial application of N-Blend. Ten major applications supplemented by four minor additions of N-Blend were planned over an approximate 12-month period to foster the growth of the denitrification microbes and to increase the degradation rate. The actual rates and quantities of reagent added varied from event to event based on field conditions and measurements. Geovation periodically monitors various field conditions and determines the application quantities for each event.

Prior to the Round 4 sampling event, the nitrate reagent was applied during October, November, and December of 2004, during January, April, June, July, August, and September of 2005, April and May of 2006 and from October 2006 through Spring 2007. The treatment period occurred over 36 months, rather than the planned 12 months. Sub-freezing conditions during winter months of 2005 and 2006 prevented applications of N-Blend. Because microbial communities develop (reproduce) gradually, application of nutrients over an extended period allows the applied nitrate to be utilized by the microbes rather than to migrate out of the pilot test area.

Based on the delineation of contaminant extent, N-Blend was dispersed into some of the 17 addition wells (DB-01 to DB-17) installed in September 2004, three existing air sparging wells (AS-6, AS-7, and AS-8), various existing monitoring wells, two mini-wells (DB-18 and DB-19) installed during March 2005, and several monitoring wells located upgradient of the pilot test area to distribute the reagent into the test portion of the residual source area.

Baseline and periodic sampling of soil and groundwater, as proposed in the *Final Work Plan for Denitrification-Based Biodegradation Pilot Test* (TtNUS, 2004), have been performed to evaluate the progress of the biodegradation. Three periodic sampling events were initially planned for an 18-month period, with each periodic event occurring approximately 6 months apart. Results of the 2004 baseline, the first (March 2005), second (October 2005), and the third (July 2006) periodic sampling events are presented in Sections 1.5 through 1.8.

Results from the July 2006 third round of sampling indicated an increase in GRO and total VPH concentrations in both soil and groundwater, over the Round 2 sampling results. A decision was therefore made to continue the periodic sampling. A fourth round of sampling was conducted on October 30, October 31 and November 1, 2007 and included sample collection from six additional wells downgradient (south and southwest) of the source area. The Round 4 (October 2007) soil and groundwater sampling

results are presented in this summary report. Results of each periodic event are compared with the baseline sampling results to assess the pilot test progress.

1.4 2003 SITE ENVIRONMENTAL CONDITIONS AND STATUS

As a result of past releases of gasoline from corroded fuel lines and the bulk storage of petroleum products associated with the NEX Service Station, soil and groundwater underlying the area spanned by the NEX Service Station and Building 27 were contaminated by petroleum hydrocarbons, specifically the gasoline range organics (GROs). As presented in the *Corrective Action Plan* (EA, 2003), two areas of residual GRO contamination remained in subsurface soil along with two plumes of contaminated groundwater. The areas of GRO-contaminated groundwater (dissolved phase) and soil (sorbed phase) delineated in 2003 are depicted in Figures 1-3 and 1-4, respectively.

Previous efforts to remove petroleum hydrocarbon contaminated soil included: excavation and removal of 440 tons of petroleum product-contaminated soil in 1992; soil vapor extraction/air sparging (SVE/AS) treatment implemented from 1993 through 2003; and a limited in-situ chemical oxidation (ISCO) pilot test performed during 2002. While SVE/AS had been effective in removing some of the petroleum hydrocarbons from subsurface soil, it was ineffective in addressing the sorbed-phase mass present in the saturated overburden materials present in the area between the NEX Service Station and Building 27. Application of ISCO resulted in the unwanted partial mobilization of sorbed-phase GRO and did not appear to decrease the petroleum hydrocarbons in the saturated soil.

A limited baseline biodegradation evaluation was performed in June 2003 to assess site-specific biogeochemical conditions. The results of the study indicated that anaerobic and reducing conditions were dominant within the plume, that microbial populations were discernable in the source areas, and that the presence of ammonium indicated that anaerobic processes via denitrification were occurring. These conditions favored the anaerobic degradation of the petroleum hydrocarbons through the denitrification process. As a result, denitrification-based biodegradation was evaluated in the *Focused Feasibility Study* (EA 2004) and presented in the *Corrective Action Plan* (EA 2004) as the recommended remedial action. With the acceptance of the *Corrective Action Plan* by the Maine Department of Environmental Protection (MEDEP), Navy designed the pilot test program to evaluate the effectiveness of the denitrification-based biodegradation of gasoline petroleum hydrocarbons.

1.5 2004 BASELINE ENVIRONMENTAL CONDITIONS

In preparation for the initiation of the in-situ biodegradation pilot test, baseline sampling and chemical analysis of groundwater and soil samples were completed during August and September 2004. Results of

the baseline GRO concentrations in groundwater and soil are presented in the *Baseline Summary Report for Denitrification-Based Biodegradation Pilot Test* (TtNUS, 2005). Interpreted distributions of baseline groundwater and soil GRO concentrations are depicted in Figures 1-5 and 1-6, respectively.

Comparison of the baseline 2004 (Figure 1-5) and 2003 (Figure 1-3) GRO groundwater results indicated that the delineated extents of the GRO plume were comparable during the two sampling events. Dissolved-phase GRO concentrations of up to 50 mg/L (DP-19) were detected in the pilot test area during the baseline event. The 2004 data indicated that only low concentrations of methyl tert-butyl ether (MTBE) were detected in a few samples. MTBE did not appear to be a significant contaminant.

However, the interpreted extent of GRO-contaminated soil (exceeding 500 mg/Kg) appeared to be greater in the 2003 delineation (Figure 1-4) than in the baseline 2004 delineation (Figure 1-6). It is likely that heterogeneity in the soil stratigraphy and in the distribution of petroleum hydrocarbons account for some of the disparity.

To assess the types of organic compounds present in the petroleum hydrocarbons, four soil samples from the 2004 baseline sampling event were analyzed using the Massachusetts volatile petroleum hydrocarbon (VPH) method, which provided for the analysis of aromatics in the C9 - C10 range and aliphatics in the C5 - C8 and C9 - C12 ranges. Also, the VPH method provides identification of specific aromatic compounds (benzene, ethylbenzene, naphthalene, toluene, m&p-xylenes, and o-xylene) and MTBE. Based on the utility of the information provided for aromatic and aliphatic petroleum hydrocarbons, the VPH analytical method was recommended for use during the subsequent periodic sampling events.

A set of existing monitoring wells in the pilot test area were sampled during August 2004 and the samples were provided to Geovation for biogeochemical and microbiological analysis to evaluate the status of the microbial populations in the pilot test area and assess whether bioaugmentation was needed to support the pilot study. The evaluations are presented in the *Baseline Microbiological and Biogeochemical Assessment Letter Report* (Geovation, 2004).

Based on the microbiological data, using epi-fluorescent light microscopy, Geovation concluded that there was an abundance of anaerobic microorganisms present in the pilot test area. Genetic sequencing using denaturing gradient gel electrophoresis (DGGE) analysis identified a diverse consortia of microbes (bacteria, fungi, and archaea), and the presence of denitrifiers and hydrocarbon-degrading bacteria and fungi. Further, the polymerase chain reaction (PCR) analysis identified the presence of the benzyl succinate synthase (BssA) gene, which is associated with anaerobic, aromatic-hydrocarbon degrading bacteria. The data, taken as a whole, indicated the presence of an abundant microbial community capable of denitrification and degradation of aromatic hydrocarbons.

The geochemical data indicated that favorable anaerobic and reducing conditions existed in the plume and that the distribution of nitrogen species (nitrate, nitrite, and ammonium) and phosphates indicated ongoing denitrification.

Because of the abundance of the microbial population at the pilot test site and the already favorable anaerobic conditions, Geovation concluded that bioaugmentation (addition of microbes) was not required to support the pilot test.

1.6 ROUND 1 ENVIRONMENTAL CONDITIONS

The first periodic sampling event (Round 1) was completed during March 2005, and the results are presented in the *Round 1 Summary Report* (TtNUS, 2005). Round 1 represented conditions approximately 5 months after the initiation of N-Blend additions in October 2004. Selected boring locations and depth intervals were targeted for the Round 1 sampling to provide comparison with the 2004 baseline results. Monitoring wells were selected for sampling to provide a representative distribution in the plume. Figures 1-7, 1-8, and 1-9 depict the extent of groundwater GRO, aromatics, and aliphatics. Figure 1-10, 1-11, and 1-12 depict the extent of GRO, aromatics, and aliphatics in saturated soil. Based on the Round 1 sampling program, the following conclusions were reached:

Groundwater Contamination

- The extent of the interpreted GRO plumes during the baseline (2004) and Round 1 (March 2005) sampling events were approximately the same. Groundwater GRO concentrations were generally comparable as well.

- The baseline and Round 1 plume extents and concentrations were also comparable to those observed previously during 2003 (post in-situ chemical oxidation pilot test).

- There did not appear to be discernible changes in GRO concentrations that could be attributable to the denitrification-based biodegradation. However, stimulation of microbial population growth and increasing the biodegradation processes would require time because this is a biological system and growth is non-linear.

- The primary contributors to the total VPH aromatic in groundwater consisted of xylenes (total), toluene, and ethylbenzene. Benzene, which is a carcinogenic compound, was not detected in any sample. MTBE was only detected at a low concentration in one sample.

Soil Contamination

- The interpreted extent of GRO-contaminated saturated soil in Round 1 (March 2005) appeared to be comparable to the interpreted baseline extent (2004). Both interpreted extents of contamination exceeding the 500 mg/Kg clean-up goal were smaller than the previously identified extent in 2003.

- The areal extent of the GRO contamination exceeding the site-specific 500 mg/Kg GRO cleanup goal was limited to the area bounded approximately by DB-18, DB-05, DB-15, and DP-9.

- The sum of VPH aromatic concentrations was generally equal to the sum of aliphatic concentrations for highly-contaminated soil samples, indicating that the saturated soil within the pilot test area appeared to be contaminated almost equally by aromatics and aliphatics.

- Neither benzene nor MTBE was detected in any of the Round 1 soil samples.

- For soil samples with elevated GRO or total VPH concentrations, the detected targeted aromatic analytes (comprising ethylbenzene, naphthalene, toluene, xylenes) represent between 9 and 35 percent of the total aromatic hydrocarbon presence. These results indicate that using only BTEX data would provide an inaccurate assessment of aromatic petroleum hydrocarbons.

1.7 ROUND 2 ENVIRONMENTAL CONDITIONS

The second periodic sampling event (Round 2) was completed during October 2005, and the results are presented in the *Round 2 Summary Report* (TtNUS, 2005). Round 2 represented conditions approximately 12 months after the initiation of N-Blend additions in October 2004. Selected boring locations and depth intervals were targeted for the Round 2 sampling to provide comparison with the 2004 baseline and Round 1 results. Figures 1-13 and 1-14 depict the Round 2 interpreted GRO extent in groundwater and soil, respectively. Monitoring wells were selected for sampling to provide a representative distribution in the plume. Based on the Round 2 sampling program, the following conclusions were reached:

Groundwater Contamination

- The interpreted GRO plume extents for the baseline (2004), Round 1 (March 2005), and Round 2 (October 2005) sampling events were approximately the same. However, GRO concentrations in the plume core decreased by Round 2.

- Maximum and median GRO concentrations decreased between the baseline and Round 2 sampling events, which represent decreases in GRO mass.

- The microbiological assessment performed in July 2005 indicated that the microbial population had increased and geochemical conditions favored denitrifying processes as the result of the reagent applications.

- Based on the evaluation of microbiological and geochemical factors, and on quantifiable decreases in groundwater GRO concentrations, it is reasonable to conclude that denitrification-based biodegradation is on-going and effective.

- In a number of the samples with detectable petroleum hydrocarbons, the total VPH aromatic concentrations were approximately 60 percent higher than the total VPH aliphatics. These results suggest that the aromatic hydrocarbons are predominant in the dissolved phase.

- For some samples (where the sum of aromatics exceeded 7,000 µg/L), the primary contributors consisted of total xylenes, ethylbenzene, and toluene.

- Neither benzene nor MTBE was detected in any of the Round 2 groundwater samples.

- MTBE was detected in one sample at low concentration only during Round 1. The elimination of MTBE cannot be attributed to biodegradation. MTBE is highly miscible in water and it is likely that advection in the plume is the principal mechanism for MTBE dissipation.

- Review of the available data suggests that the aromatic hydrocarbons are more readily degraded than the aliphatic hydrocarbons by the denitrifying microbes. Possible factors may be that the VPH aromatics are generally more water soluble and have lower molecular weights than the aliphatics, which could allow for better degradation.

<u>Soil Contamination</u>

- The areal extent of GRO-contaminated soil exceeding the 500 mg/Kg cleanup goal during Round 2 appeared to be slightly larger than the baseline conditions, but was comparable to Round 1 conditions.

- The core area of GRO contamination decreased between Round 1 (10,000 mg/Kg concentration contour) and Round 2 (5,000 mg/Kg concentration contour). Maximum concentrations at the core declined from 11,000 mg/Kg to 6,100 mg/Kg.

- The areal extent of the GRO contamination exceeding the site-specific 500 mg/Kg GRO cleanup goal is limited to the area bounded approximately by DB-18, DP-3, DB-11, and DB-15.

- Review of the VPH data for highly contaminated soil samples indicated that the sum of aromatic hydrocarbon concentrations was generally comparable to the sum of aliphatic concentrations.

- Of the targeted analytes, ethylbenzene and xylenes were detected in Round 2, in contrast with Round 1 where toluene was also detected.

- For soil samples containing elevated GRO or total VPH concentrations (exceeding 500 mg/Kg), the targeted aromatic analytes (consisting of detected ethylbenzene and xylenes) represent between 0 and 16 percent of the total aromatic hydrocarbon presence. Previously during Round 1, targeted aromatic analytes represented between 9 and 35 percent of the total VPH aromatic hydrocarbon presence. These results indicate that denitrifying microbes are capable of degrading the “BTEX” hydrocarbons.

- Available data indicate that VPH aromatics and aliphatics concentrations decreased between the Round 1 and Round 2 sampling events. Both aromatic and aliphatic hydrocarbons appear to be readily degraded.

- Based on the evaluation of microbiological and geochemical factors, and quantifiable decreases in soil GRO concentrations (and VPH aromatics and aliphatics), it is reasonable to conclude that denitrification-based biodegradation is on-going and effective.

- The remediation goal of 500 mg/Kg of GRO appears to be achievable, as demonstrated by comparing Rounds 1 and 2 data for two sample locations with elevated GRO presence.

1.8 ROUND 3 ENVIRONMENTAL CONDITIONS

The third periodic sampling event (Round 3) was completed during July 2006, and the results are presented in the *Round 3 Summary Report* (TtNUS, 2007). Round 3 represented conditions approximately 21 months after the initiation of N-Blend additions in October 2004. Selected boring locations and depth intervals were targeted for the Round 3 sampling to provide comparison with the 2004

baseline and Rounds 1 and 2 results. Figures 1-15 and 1-16 depict the Round 3 interpreted GRO extent in groundwater and soil, respectively. Monitoring wells were selected for sampling to provide a representative distribution in the plume. Based on the Round 3 sampling program, the following conclusions, taken from the *Round 3 Summary Report* (TtNUS, 2007), were reached:

Groundwater Contamination

- The dissolved-phase GRO plume extent for Round 3 (Figure 1-15) was generally comparable in size with the baseline August 2004 (Figure 1-5) footprint, as represented by the 1000 µg/L (1 mg/L) concentration contour interval; however, higher GRO concentrations (up to 44,000 µg/L) were detected within the core of the plume during Round 3, when compared with the baseline results.

- The Round 3 groundwater GRO concentrations ranged from non-detect (10 U µg/L at DB-07) to 44,000 µg/L (at DB-14), with the highest levels detected in the area between DB-01 and DB-14. Localized elevated GRO (26,000 µg/L) was also measured at DP-3.

- Total VPH (as sum of aliphatics and aromatics) concentrations were in good correlation with the corresponding GRO concentrations.

- Aromatics in the groundwater samples were present at higher concentrations than the aliphatics. The aqueous aromatics extent is similar to the GRO extent.

- VPH aromatics appear to be the predominant constituents of detected petroleum hydrocarbons in groundwater while the aliphatics were the minority constituents.

- During Round 3, the primary contributors to VPH aromatics were the xylenes and ethylbenzene

- Groundwater GRO and VPH aromatic concentrations declined between the baseline and Round 2, but by Round 3, concentrations returned to baseline or even higher concentrations. Increases in aliphatics were generally modest between Rounds 2 and 3.

- Detailed evaluation of the VPH data indicated that BTEX compounds, aromatics, and aliphatics increased in concentrations between Rounds 2 and 3. The increased precipitation during fall 2005 and spring and summer of 2006 may have resulted in increased infiltration and mobilization of residual petroleum hydrocarbons that were previously present in the unsaturated soil resulting in increased GRO and VPH concentrations throughout the pilot test area.

Soil Contamination

- Round 3 soil GRO concentrations ranged between non-detect (2.7 U mg/Kg) to 7,200 mg/Kg.

- The areal extent of GRO contamination exceeding the site-specific 500 mg/Kg GRO cleanup goal is limited to the area bounded approximately by DB-18 (west), DB-07 (east), DB-15 (south), and DP-2 (north).

- The Round 3 total VPH concentrations were generally in good agreement with corresponding GRO results.

- The total VPH aromatics ranged from non-detect (27 U mg/Kg) to 4,700 mg/Kg.

- Total aromatic concentrations are generally comparable to total aliphatic concentrations.

- Of the targeted VPH aromatics, ethylbenzene, xylenes, naphthalene, and toluene were detected in the soil samples. Toluene was only detected infrequently (2 out of 33 samples). Benzene and MTBE were not detected in any sample.

- BTEX analytes (ethylbenzene, xylenes, naphthalene, and toluene) made up between 0 to 19 percent of the total VPH concentrations, indicating that the BTEX compounds in soil are not major contributors to GRO or VPH presence.

- For trend analysis, GRO and VPH concentrations at several Line 1 and Line 3 sampling locations increased between Round 2 and Round 3.

- Possible causes for increases in GRO (and VPH) concentrations may be attributable to: 1) previous residual petroleum hydrocarbons situated upgradient or in shallower intervals were mobilized as the results of increased precipitation and infiltration during 2005 and 2006, or 2) the increases in the microbial population, resulting from the addition of nitrate reagents and degradation of petroleum hydrocarbons, may have affected the GRO analysis.

- Based on available data, the DBB process appears to have been effective in decreasing the BTEX compounds, other aromatic hydrocarbons, and aliphatics.

- Samples obtained from the top-of-clay at the DB-14 and DB-16 locations indicated that there is a localized petroleum hydrocarbon presence at DB-14. One possible reason for the lack of

adequate treatment is the proximity of the footing drain near the Line 3 wells and preferential flow into the drain. Additional evaluations will be required to assess DBB treatment at this location.

1.9 MODIFICATIONS TO THE PLANNED SCOPE

While the majority of field activities were completed in accordance with the *Final Work Plan for Denitrification-Based Biodegradation Pilot Test* (TtNUS, November 2004), modifications to the planned activities were required in response to changes in investigation conditions.

VPH Analysis – The *Work Plan* specified GRO analysis of soil and groundwater samples. Based on previous communications with the MEDEP, analysis for Volatile Petroleum Hydrocarbons (VPH) for four samples was added to the baseline event. Because of the utility of the information provided (aromatics, aliphatics and targeted compounds), VPH was retained for future sampling events. During Round 1, paired GRO and VPH analyses were performed, with good correlation of the results. Also, the VPH analysis allowed for a more detailed evaluation of the types of hydrocarbons that may be degraded by the denitrification process. Paired GRO and VPH analyses were selected for the Rounds 2, 3 and 4 sampling events.

The Massachusetts VPH Method 04-1 (May 2004, rev. 1.1) provides for the identification of ranges of aromatic and aliphatic hydrocarbons, targeted analytes (benzene, ethylbenzene, naphthalene, toluene, m&p-xylenes, and o-xylene) and MTBE. The VPH method provides characterization of hydrocarbon ranges while the GRO method provides a total value for all organic compounds within the gasoline range.

Nitrate and Nitrite Analysis - Groundwater samples were originally planned for analysis of ammonium (a biodegradation waste product), as evidence of microbial activity. Upon further discussion between Geovation and TtNUS, it was determined that nitrate and nitrite analysis would be more useful to Geovation during the periodic sampling events to evaluate aquifer conditions. The MEDEP was notified of the proposed change in chemical analysis, and concurrence was provided for the modification (per electronic mail of March 16, 2005).

Nitrate Reagent Applications – As proposed in the *Work Plan*, it was intended that some of the mini-wells would not be used for reagent addition. These locations would be useful in assessing whether the denitrification process could expand beyond the immediate vicinity of the application wells. However, as the pilot test progressed, it was necessary to use all the mini-wells to apply the N-Blend reagent at one time or another.

Another refinement of the reagent application was required. Because of the relatively high groundwater velocities and the need to minimize offsite migration of the nitrate reagent, Geovation determined that application of reagent into the upgradient portion of the GRO plume would provide a longer retention time of nitrates in the Line 1 mini-wells, where the highest GRO concentrations occurred. This approach was initiated after the Round 1 sampling event. An added benefit from the action is that some of the petroleum hydrocarbons upgradient of the pilot test area will also be treated as part of this program.

Volatile Organic Carbon (VOCs) – After the unexpected variations in the Round 3 sampling data, and following discussions between the Navy, TtNUS, and Geovation, it was decided that one more sampling round would be implemented. For Round 4, the soil samples would be analyzed using the same EPA Method 8260B used for the groundwater, instead of the Modified 8260B method used previously. This was a change from the gas chromatograph method.

Diesel Range Organics (DRO) – Six additional existing wells (MW-NASB-8, MW-NASB-9, MW-NASB-226, MW-NASB-250, MW-NASB-251 and MW-NASB-252), located downgradient of the source area, were sampled during the Round 4 event. In addition to the other parameters, these six samples were analyzed for DRO using Maine HETL Method 4.1.25. This method is designed to measure the concentration of diesel range organics in water and soil and corresponds to a hydrocarbon range of C12 - C28.

2.0 FIELD INVESTIGATION ACTIVITIES

Summaries of the field activities completed as part of the Round 4 sampling event are included in this Section. All field activities were completed in accordance with the *Final Work Plan for Denitrification-Based Biodegradation Pilot Test* (TtNUS, November 2004), with the exception of changes noted in Section 1.9.

2.1 GROUNDWATER SAMPLING

Groundwater samples were collected from 11 monitoring wells (DP-9, DP-13, MW-300, MW-301, MW-SDP-5, MW-NASB-8, MW-NASB-9, MW-NASB-226, and MW-NASB-250 through 252) and 7 mini-wells (DB-01, DB-04, DB-07, DB-10, DB-11, DB-14, and DB-18) during October 30 to November 1, 2007. These 18 wells included six additional wells (the MW-NASB series) which were sampled for the first time during this pilot study. MW-302, which was sampled during earlier rounds, was dropped from this sampling round following discussions between the Navy and TtNUS.

Table 2-1 presents well construction data, groundwater elevations, and water levels measured on October 29, 2007. The field-measured water quality parameters are presented in Table 2-2. Table 2-3 summarizes the samples collected and the analyses performed; sample log sheets are presented in Appendix A.

All wells were sampled following the EPA Region 1 procedure, *Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells* (EPA SOP No. GW 001), as summarized below:

- Peristaltic pumps and dedicated ¼-inch inner diameter [I.D.] Teflon-lined tubing were used to purge the wells.

- Wells were purged at flow rates between 90 and 350 mL/min to minimize drawdown. The drawdown, when stabilized, did not exceed 0.3 feet in the wells sampled, except for DB-07, DB-10, DB-11, and MW-NASB-250.

- The water level, pumping rate, turbidity, dissolved oxygen (DO), oxygen reduction potential (ORP), specific conductance, temperature, pH, and any other relevant observations were recorded every 3 to 5 minutes. The groundwater parameters were measured using a Horiba U-22 multi-parameter meter along with a separate turbidity meter. Stabilization was considered to be

achieved when three consecutive readings, taken at 3- to 10-minute intervals, were within the defined limits. The final readings are presented in Table 2-2.

- Groundwater samples were obtained from the sample tubing filled with water to the sample point, and free of air bubbles or air pockets, to minimize changes in the water chemistry upon contact with the atmosphere.

A separate sample was collected for each analysis from each monitoring well. Groundwater samples were submitted to Katahdin Analytical Services, Inc. (Katahdin) of Westbrook, Maine for 21-day turnaround analysis of GRO (Maine HETL Method 4.2.17), VPH (Massachusetts DEP Method Revision 1.1), VOCs (EPA Method 8260B) and nitrate/nitrite (EPA Method 353.2). Groundwater from the six additional wells (MW-NASB series) was also analyzed for diesel-range organics (DRO) using Maine HETL Method 4.1.25. Katahdin is approved by the State of Maine for GRO and DRO analysis and by the Commonwealth of Massachusetts for VPH analysis. Quality assurance/quality control (QA/QC) samples including field duplicates, rinsate blanks, trip blanks, and laboratory QC samples were also collected.

Water level measurements for the wells sampled were converted into elevations and a water-table surface map was prepared, as depicted in Figure 2-1. In general, groundwater in the upper sand unit is generally migrating from north to south, based on interpretation of the water-table surface, similar to that in previous rounds. Based on water-level measurements, the depth to groundwater ranged from approximately 2.5 to 8.2 feet across the site.

Table 2-2 presents the summary of field groundwater quality parameters measured prior to the sampling of the wells. Inspection of the table indicates that the dissolved oxygen (DO) levels ranged from 0 (MW-NASB-9) to 20 mg/L (DB-11), with an average of 6.7 mg/L. The oxidation-reduction potential (ORP) ranged from 273 millivolts (mV) at MW-NASB-8 to -176 mV (MW-300), indicating reducing conditions at some locations and oxidizing conditions at others. The ORP at DB-11, where the highest DO was recorded, was 207 mV in Round 4, compared to 75 mV in Round 3.

2.2 SOIL SAMPLING

For Round 4, soil samples were collected from the same borehole locations (except for MW-302) sampled during the Round 3 event. The soil samples were collected within one foot northeast of 16 borehole locations (DB-01, DB-03, DB-05, DB-08, DB-09, DB-10, DB-12 through DB-19, and MW-300 through MW-301). Previously, during Rounds 2 and 3, the soil samples were collected within 1 foot southeast and southwest, respectively, of the selected borings. This approach allowed for collection of undisturbed soil samples that would be representative of subsurface conditions at each borehole location.

Appendix B presents the soil boring logs. For these borings, soil samples were logged from most of the same intervals identified in the Round 3 sampling event; a few soil samples were also collected from other depth intervals. Soil samples were collected using a 1.5-inch I.D. sampler with a 4-foot disposable plastic liner sleeve. Refer to the *Baseline Summary Report* (TtNUS, February 2005) for the complete soil profiles for these borings.

During the baseline, Round 1, and Round 2 events, TtNUS personnel selected the intervals based on the highest concentration of organic vapors as determined by the photoionization detector (PID) readings, or from portions showing visual or olfactory evidence of potential petroleum hydrocarbon contamination. For Round 3, because of humidity problems, the PID was unreliable and could not be used; therefore, sample selection was based on visual and olfactory observations. During Round 4, samples were again collected based on PID readings and/or visual and olfactory evidence of contamination.

Table 2-3 presents the sample summary, which lists the soil samples collected and the analyses performed.

Yarmouth Environmental Services, Inc. (YES) of Yarmouth, Maine, the TtNUS drilling subcontractor, used a direct-push technology (DPT) rig to advance sleeved samplers into the subsurface. YES retrieved the sleeved samplers, sliced open the acetate sleeves containing the soil cores, and provided the opened samplers to TtNUS. Soil samples were then collected by TtNUS personnel in accordance with TtNUS Standard Operating Procedure (SOP) SA-1.3 as described below. The TtNUS field sampler performed the following activities during soil sampling:

- Identified the sample depth interval and collected soils for laboratory analyses.
- Determined the amount of soil sloughed in the top of the sampler.
- Recorded observations for the intervals sampled including: the depth of change in each stratum and any other pertinent visual observations (i.e., discoloration, odors, residual product).
- Collected soil samples for GRO and VPH analyses.
- Decontaminated TtNUS soil sampling equipment prior to each use.

Two sample containers were filled for each sampling location for both GRO and VPH analysis. In order to limit variability between the VPH and GRO analyses due to heterogeneities inherent in soil and between different sub-samples, the analytical laboratory was instructed to obtain a methanol sample aliquot for

both GRO and VPH analyses from the same sample container. The soil sampling methodology is presented below:

- A pre-tare weighted 40-mL amber VOC vial containing 10 mL of methanol was labeled with the sample location number.
- A grab soil core (about 10 g) was collected with a 10-mL pre-cut syringe. The soil sample was extruded into the 40-mL VOC vial and immersed with 10 mL of methanol.
- The vial was capped and shaken to mix the preservative with the sample.
- The preserved sample was weighed and the value was recorded in the sample collection/ preservation log.

Samples were packed with ice and shipped to Katahdin Analytical at 4° Celsius for chemical analysis.

QA/QC samples were also collected as part of the soil investigation including field duplicates, rinsate (equipment) blanks, laboratory QC samples, and trip blanks. All quality control samples were collected according to the schedules outlined in the *Work Plan*.

All soil samples were labeled in accordance with the sample location identification system presented in the *Work Plan*. Soil samples were handled and delivered in accordance with the chain-of-custody procedures detailed in the *Work Plan*. Required data were recorded on the boring logs, which were used as sample log sheets. The data includes sampling device used, sampling personnel, date and time of sample collection, and analyses to be performed.

3.0 SAMPLING RESULTS

The Round 4 soil and groundwater chemical analytical results are presented in this section. Round 4 was performed approximately 36 months after the pilot test initiation.

3.1 GROUNDWATER

Table 3-1 presents the Round 4 groundwater analytical results, while Table 3-2 presents a chronological summary of the baseline and periodic sampling data for trend analysis. The results of the analysis for diesel range organics (DRO), performed on the six MW-NASB series wells not sampled previously, are also presented in Table 3-1. The interpreted extent of dissolved phase GRO, VPH aromatic hydrocarbons, and VPH aliphatic hydrocarbons in the pilot test area are depicted in Figures 3-1, 3-2, and 3-3, respectively. (Note: concentrations in Table 3-2 are presented in units of µg/L while units of mg/L are used in Figures 3-1 through 3-3). For those samples (DB-01 and MW-NASB-252) for which field duplicates were collected, the concentrations shown on the figures are the averages of the duplicate samples, while Table 3-2 presents the concentrations from the original samples.

3.1.1 Round 4 Groundwater Contamination

GRO - Groundwater GRO concentrations (Figure 3-1) detected during October to November 2007 (Round 4) ranged from non-detect (10 U µg/L at DB-07) to 43,000 µg/L (at DB-14). The highest GRO concentrations were detected in the area approximately between DB-01 and DB-14, as in earlier sampling rounds. GRO in groundwater is interpreted to extend from the three underground storage tanks (USTs) to the vicinity of MW-301 (Figure 3-1). In the vicinity of the UST area, near DP-13, GRO is elevated (18,000 µg/L). At MW-NASB-226, located further southwest of the N-Blend application zone, GRO was also elevated at 8,100 µg/L.

VPH – The VPH analytical results were evaluated separately as aromatic and aliphatic hydrocarbons. The purpose of this division is to allow for tracking and evaluation of potential preferential biodegradation effects during the pilot test. Changes in VPH aromatics or VPH aliphatics over time may provide insight into the types of petroleum hydrocarbons that can be degraded by the denitrifying bacteria.

The VPH aromatic hydrocarbon concentrations consist of the sum of the C9 – C10 aromatic hydrocarbons and the targeted aromatic analytes (including benzene, ethylbenzene, naphthalene, toluene, m&p-xylenes, and o-xylene). VPH aliphatic concentrations consist of the sum of the C5 - C8 and the C9 – C12 range concentrations.

Based on the Round 4 analytical results, the following were observed:

VPH vs. GRO

- Total VPH (as sum of aliphatics and aromatics) concentrations correlate well with the corresponding GRO concentrations, as presented in Table 3-1.

VPH Aromatics

- The total VPH aromatics ranged from non-detect (18 U µg/L at DB-07) to 38,527 µg/L (DB-14) which represents an increase from the 33,100 µg/L (average of 33,870 µg/L and 32,330 µg/L at DB-14) detected during the previous sampling round. The interpreted extent of the VPH aromatics is similar to that of the GRO, and extends from the three USTs to the vicinity of MW-NASB-226 (Figure 3-2).

- Total aromatics in the groundwater samples were present at higher concentrations than the total aliphatics. In all samples with detectable VPH, aromatics represented between 67 to 100 percent of the total VPH (Table 3-1).

- The highest total VPH contamination in the groundwater apparently exists between DB-01 and DB-14 (Figure 3-2).

- Evaluation of the VPH data in Table 3-1 indicates that, with the exception of DB-01 and DB-14, the C9-C10 aromatics accounted for more of the total VPH aromatics concentration than the targeted VPH analytes (comprising benzene, ethybenzene, naphthalene, toluene, and xylenes) did. At these two locations BTEX was the primary contributor to VPH aromatics and consisted mainly of total xylenes and ethylbenzene.

- No MTBE was detected in any of the Round 4 groundwater samples; however, trace amounts of benzene (0.6 µg/L and 0.9 µg/L) were estimated in samples from DB-14 and DB-18, respectively.

- VPH aromatics once again appear to be the predominant petroleum hydrocarbons detected in the dissolved phase during Round 4.

VPH Aliphatics

- The total VPH aliphatics ranged from non-detect (100 U µg/L) to 17,900 µg/L (DB-14).

- Aliphatics accounted for less of the total VPH detected in groundwater, than the aromatics.

- The interpreted extent of the VPH aliphatics (Figure 3-3) is similar to the GRO footprint (Figure 3-1).

Other VOCs

- Other VOCs including 1,2,4 and 1,3,5-trimethylbenzene, 2-butanone and N-propylbenzene were detected in some of the wells from DP-13 southward to MW-NASB-226.

Diesel Range Organics (DRO)

- As shown in Table 3-1, DROs were detected at concentrations ranging from 37 µg/L (estimated for MW-NASB-250), to 1,900 µg/L (MW-NASB-226) in all six of the samples analyzed for these compounds.

3.1.2 Groundwater Trend Analysis

Trends in the GRO, VPH aromatic, and VPH aliphatic concentrations were also evaluated. Table 3-2 presents the summary of groundwater GRO and VPH results for the baseline (2004) and periodic sampling events (through 2007). Figures 3-1 through 3-3 depict the interpreted extent of Round 4 GRO, VPH aromatics, and VPH aliphatics; Figures 3-4 through 3-6 depict trends for these three parameters in specific monitoring wells. Figure 3-7 presents “box plots” that depict trends for the plumes using GRO, VPH aromatics, and VPH aliphatics data. For the samples where duplicates were collected (DB-01 and MW-NASB-226), Table 3-1 presents both results, Figures 3-1 through 3-3 shows the average of the two samples, and Table 3-2 and Figures 3-4 through 3-7 show the results of the original sample.

Summary statistics for the groundwater results (Table 3-2) were used to prepare the “box plots” (Figure 3-7) for concentrations from the baseline event (August 2004) through Round 4 (October 2007). Non-detect values were set equal to 0 for calculation of the statistics. Box plots are used to provide graphical summaries of data including the minimum, first quartile (25th percentile), median (50th percentile), third quartile (75th percentile), and maximum concentrations for the plume during each of the monitoring events. The “box”, bracketed by the first and third quartiles, represents the middle 50 percent of the data set.

The baseline groundwater samples were obtained from existing monitoring wells installed before starting the pilot test. The Rounds 1, 2, and 3 samples were obtained primarily from new mini-wells (DB-series) situated within the pilot test area. Samples for Round 4 were obtained from these wells, plus six additional

existing wells located to` the south and southwest of MW-301 and downgradient of the contaminant plume identified previously.

Evaluation of VPH results is limited to Rounds 1, 2, 3 and 4 because this analytical method was included after the baseline event to supplement the GRO analysis.

GRO

The dissolved-phase GRO plume extent for Round 4 (Figure 3-1) was slightly larger in size than the baseline August 2004 (Figure 1-5) footprint, as represented by the 1000 µg/L (1 mg/L) concentration contour interval. The plume extended further in a south-westerly direction towards MW-301. A localized area of contamination was also identified at MW-NASB-226 during this sampling round. Within the plume, higher GRO concentrations were detected in the core of the plume during Round 4 when compared with the baseline results. A GRO concentration of up to 43,000 µg/L was detected during Round 4.

Review of Figure 3-4 indicates a decline in groundwater GRO concentrations between the baseline and Round 2, but by Rounds 3 and 4, GRO concentrations returned to baseline or even higher concentrations. For those wells which in Round 4 showed a significant decline from the Round 3 levels, GRO concentrations were equivalent to those detected during Round 2.

Review of the box plots, Figure 3-7, indicates that the median GRO concentration had declined between Rounds 1 and 2, increased by Round 3, and decreased again during Round 4. Although the results on this figure indicate that overall groundwater GRO concentrations in the plume decreased after Round 3 (July, 2006), note that the maximum concentration detected was similar for all four periodic sampling rounds. Also, conditions in Round 4 appear to be similar to those in Round 1 (March 2005).

VPH Aromatics

The dissolved-phase VPH aromatic plume extent for Round 4 (Figure 3-2) was slightly larger in size than the Round 1 footprint (Figure 1-8). Within the plume, the interpreted 10,000 µg/L (10 mg/L) contour area appeared to be larger during Round 4 than during the previous sampling events. Similar to Round 3, the Round 4 VPH aromatics at DP-13 totaled 18,837 µg/L, while 3,770 µg/L of VPH aromatics were detected during Round 1. VPH aromatics totaling 9,353 µg/L were also detected at MW-NASB-226. These results indicate an increase in VPH aromatics presence, north and southwest of the pilot test area.

From Figure 3-5 and Table 3-2, it is evident that VPH aromatics had initially declined between Rounds 1 and 2, but increased again by Rounds 3 and 4. For some locations, the Round 4 aromatics

concentrations were higher than those observed during Round 1. For two locations in particular, DB-01 and DB-14, the levels were also higher than those observed during Round 3.

Review of the box plots (Figure 3-7) and summary statistics (Table 3-2) indicates that the median total VPH aromatic hydrocarbon concentration decreased between Rounds 1 and 2, increased by Round 3, and decreased again by Round 4. The size of the "box" (data between the 1st and 3rd quartiles) was smaller than that for Round 3, but larger than those for Rounds 1 and 2, which suggests that there was greater spread in the data for the middle 50 percent of the VPH aromatic concentrations. These results indicate that overall groundwater VPH aromatic concentrations in the plume have increased.

VPH Aliphatics

The dissolved-phase VPH aliphatic plume extent for Round 4 (Figure 3-3) was interpreted to be slightly larger than the Round 1 footprint (Figure 1-9), as represented by the 1000 µg/L (1 mg/L) concentration contour. Within the plume, the interpreted 10,000 µg/L (10 mg/L) concentration contour appears to be slightly smaller in size. Examination of Round 1 data indicated elevated analytical detection limits for some non-detect values (i.e., 5000 U µg/L at DB-04 and 10,000 U µg/L at MW-SDP-05), which were higher than the detected concentrations (2,200 µg/L and 2,100 µg/L, respectively) for those wells in Round 4. The Round 1 footprint might have been different if the detection limits had been lower and aliphatics were present at or above those lower detection limits. The aliphatic concentration at DB-04, for Round 4, was consistent with those from Rounds 2 and 3, while at MW-SDP-05, the Round 4 result was higher than Round 3 and lower than Round 2 results.

Figure 3-6 shows some modest increases in some wells, and modest decreases in others, for aliphatics between Rounds 3 and 4. The greatest increases in groundwater aliphatics concentrations occurred at DP-13, situated north of the pilot test area, and at DB-14, within the test area. The levels in both of these wells were also higher than those detected in Round 1. Two other locations (DP-9, situated north of the test area, and DB-18, within the test area) which showed high levels during Round 3, had no detectable concentrations of aliphatics during Round 4.

Review of the box plots, Figure 3-7, indicates that the median VPH aliphatics hydrocarbon concentration increased slightly between Rounds 1 and 2, remained the same through Round 3, and decreased during Round 4. These results indicate there has been a slight decrease in overall VPH aliphatic concentrations within the plume, even though maximum concentrations are still between the Rounds 1 and 2 levels.

3.2 SOIL

The soil analytical results for Round 4 are presented in Table 3-3, while Table 3-4 presents a chronological summary of the baseline and periodic sampling data for trend analysis. The interpreted areal extent of GRO, VPH aromatics, and VPH aliphatics in the pilot test area are presented in Figures 3-8, 3-9, and 3-10, respectively. The concentrations reported on these figures are the maximum detected at any one location, regardless of depth, if no duplicate sample was collected. For those locations from which field duplicates were collected [DB-01 (8-9'), DB-09 (10-11'), DB-14 (9-10'), and DB-16 (8-9')], the maximum average concentrations are reflected on Figures 3-8, through 3-10, while Table 3-4 lists the concentrations found in the original sample.

3.2.1 Round 4 Soil Contamination

GRO - Soil GRO concentrations (Figure 3-8) measured during the Round 4 sampling event ranged from non-detect (2.5 U mg/Kg) to 9,700 mg/Kg (average at DB-09, 10-11 feet interval). The maximum concentration reported at DB-09 was 12,000 mg/Kg in the original of the two duplicate samples from that location. The areal extent of GRO contamination exceeding the site-specific 500 mg/Kg GRO cleanup goal is limited to the area bounded approximately by DB-18 (west), DB-06 (east), DB-14 (south), and DP-3 (north). The areal extent of GRO equal to, or greater than, 1 mg/Kg extends from the three USTs to the north, down to monitoring well MW-300 near the western perimeter of Building 27. Elevated GRO concentrations (greater than 1000 mg/Kg) were detected in soil in a localized area bounded by DB-05, DB-18, and DB-14.

GRO concentrations exceeding the 500 mg/Kg cleanup goal, as well as those exceeding 1000 mg/Kg, occur in soil samples collected between the 8 and 11 feet depth intervals for sample stations in the Lines 1, 2 and 3 well locations. None of samples collected from within the 11 to 15 feet depths showed GRO concentrations which exceeded 100 mg/Kg (Table 3-1). The results suggest that the elevated soil GRO concentrations are generally in the same depth intervals throughout the pilot test area.

VPH – The soil VPH analytical results were evaluated as aromatic and aliphatic hydrocarbons to assess the types of petroleum hydrocarbons present and to track and evaluate potential preferential biodegradation effects.

Comparison of the total VPH concentrations with corresponding GRO results (Table 3-4) for the same samples indicated generally good agreement between the numerical values. Minor differences in the data are likely the result of using two different analytical methods. By having both the GRO and VPH analyses

performed using an aliquot from the same sample containers, the effect of sample heterogeneity on analytical result has been greatly reduced.

VPH Aromatics

The total VPH aromatics ranged from non-detect (25 U mg/Kg) to 8,000 mg/Kg (DB-03). The interpreted extent of the VPH aromatics contamination is similar to that of the GRO, and extends from the three storage tanks to the vicinity of monitoring well MW-300 (Figure 3-9). The October 2007 extent of VPH aromatics was interpreted to be slightly smaller than the GRO extent.

For soil samples containing elevated GRO or total VPH concentrations (exceeding 500 mg/Kg), the total aromatic concentrations represent between 24 and 81 percent of the total VPH concentrations (Table 3-3). These results suggest that for the Round 4 soil samples, total aromatic concentrations are generally higher than, or sometimes comparable to, the total aliphatic concentrations.

Of the targeted aromatic analytes detected by the VPH method, ethylbenzene, xylenes, naphthalene, and toluene were detected in the soil samples. Toluene was only detected infrequently (2 out of 33 samples). Benzene and MTBE were not detected in any sample.

As presented in Table 3-3, for soil samples containing elevated GRO or total VPH concentrations (exceeding 500 mg/Kg), the detected target VPH analytes represent: 1) between 0 and 48 percent of the total VPH aromatic hydrocarbon presence, 2) between 0 to 21 percent of the total VPH concentrations, and 3) from 0 to 24 percent of the GRO concentrations. These results indicate that the target VPH compounds in soil samples are not major contributors to GRO or VPH presence.

VPH Aliphatics

The total VPH aliphatics ranged from non-detect (32 U mg/Kg) to 4,300 mg/Kg (DB-09). The interpreted extent of the VPH aliphatics contamination (Figure 3-10) is slightly smaller than that of the GRO (Figure 3-8). As presented in Table 3-3, for soil samples containing elevated GRO or total VPH concentrations (exceeding 500 mg/Kg), the total VPH aliphatics represent: 1) between 0 and 76 percent of the total VPH aromatic hydrocarbon presence. For the Round 4 VPH results, aliphatic hydrocarbon concentrations were generally comparable to aromatic hydrocarbon concentrations, except at DB-03 which showed a much higher aromatic concentration (8,000 mg/Kg) compared to its aliphatic concentration (1,900 mg/Kg).

3.2.2 Soil Trend Analysis

Trends in the soil GRO, VPH aromatic, and VPH aliphatic concentrations are discussed in the following narrative. Table 3-4 presents the summary of soil GRO and VPH results for the baseline and periodic events. Figures 3-8 through 3-10 depict the interpreted extent of Round 4 GRO, VPH aromatics, and VPH aliphatics listing the maximum concentration found at any depth, or the average of the maximum concentrations where duplicate samples were collected. Figures 3-11 though 3-13 depict the GRO trends for specific locations in Lines 1, 2, and 3, through November 2007, using results from the original samples.

Soil summary statistics (Table 3-4) were used to prepare box plots for concentrations from the baseline event (August 2004) through November 2007. These box plots for GRO, VPH aromatics, and VPH aliphatics are presented in Figure 3-14 to show changes in overall concentrations after the start of the pilot test. Non-detect values were set equal to 0 for calculation of the statistics.

The baseline and Rounds 1, 2, 3, and 4 samples were obtained from borings located adjacent to the monitoring and mini-wells. The two locations (DB-14 and DB-16) sampled only during Round 3 were also sampled during Round 4. MW-302, which was sampled during all previous sampling rounds, was dropped from this round. As stated earlier, evaluation of VPH results is limited to Rounds 1 through 4 because this analytical method was included after the baseline event, to supplement the GRO analysis.

GRO

The areal extent of GRO-contaminated soil exceeding the 500 mg/Kg cleanup goal in October 2007 (Figure 3-8) appears to be larger than the 2004 baseline conditions (Figure 1-6), and the Rounds 1, 2 and 3 conditions (Figures 1-10, 1-14 and 1-16). The core area of GRO contamination, demarcated by the 5,000 mg/Kg concentration contour also appear to have increased, compared to that for Round 3. The maximum concentrations at the core ranged from 7,300 mg/Kg (DB-03) to 9,700 mg/KG (DB-09), which represents an increase from the maximum concentration (7,200 mg/Kg at DB-03) detected in any of the Round 3 samples. These levels are comparable to those reported during Round 1.

Figures 3-11 to 3-13 depict changes in GRO for samples obtained from the three rows of mini-wells (Lines 1 through 3). Line 1, consisting of DB-01 through DB-08, DB-18, and DB-19, showed the greatest reductions in GRO between the baseline and Round 2 sampling events. By Round 3, GRO concentrations rebounded at DB-03 and DB-05, and increased slightly at DB-01. This trend was confirmed by the Round 4 data (Table 3-4 and Figure 3-11) for DB-01, DB-03 and one other location (DB-18), which was sampled at the 8 to 9 feet depth for the first time, and showed a significant increase over those samples collected from the other depth intervals (9-10 feet and 14 to 15 feet) during all earlier

sampling rounds. Line 2, consisting of DB-09 through DB-12, did not experience significant GRO changes between Rounds 2 and 3; however, GRO concentrations at DB-09 rebounded drastically during Round 4, especially at the 10 to 11 feet depth interval, sampled for the first time during this round. In Line 3, consisting of DB-13 through DB-17, GRO concentrations at DB-15 (8 to 9 feet interval) increased between the baseline and Round 3 events, and increased slightly again in Round 4. Comparison of the samples collected at DB 14 (also in Line 3) during Rounds 3 and 4, showed significant increases in GRO during Round 4, even though these samples were collected at shallower depths than in Round 3. Other Line 3 soil GRO results remained essentially unchanged.

Figure 3-14 depicts the box plots for soil GRO between the baseline event (September 2004) and November, 2007). The box plots are useful graphical summaries that depict data distribution. The median GRO concentrations declined between Rounds 1 and 3, where they remained for Round 4 (Figure 3-14 and Table 3-4). The “boxes” represent data between the 1st and 3rd quartiles. The Round 4 “box” is slightly smaller than that for Round 3, but larger than those for the previous sampling events. This indicates a greater distribution of GRO values or higher concentrations in the sample set when compared with previous sampling events.

Overall, the results indicate increases in GRO concentrations at several Line 1 well locations, one Line 2 location and in three Line 3 locations since the Round 3 sampling event. Line 1 is situated in the most contaminated portion of the pilot test area. Although measurable decreases in GRO soil concentrations were noted between the baseline and Round 2 event, GRO concentrations increased by Rounds 3 and 4.

VPH Aromatics

The sorbed-phase VPH aromatic extent for Round 4 (Figure 3-9) was slightly larger in size when compared with the Round 1 footprint (Figure 1-11), as represented by the 10 mg/Kg concentration contour. Review of Table 3-4 and Figure 3-15 shows that the VPH aromatics had declined between Rounds 1 and 2, but increased again by Rounds 3 and 4, especially in those samples where GRO concentrations exceeded 500 mg/Kg.

Review of the box plots (Figure 3-14) and the summary statistics (Table 3-4) indicates that median VPH aromatic hydrocarbon concentrations decreased between Round 1 (1.7 mg/Kg) and Round 2 (0 mg/Kg), but increased again to 2.1 mg/Kg by Round 3, and were even higher (31 mg/Kg) by Round 4. The “boxes”, representing data between the 1st and 3rd quartiles, increased in size between Round 1 and Round 3, and increased even more for Round 4, indicating a greater spread in the data. This observation is supported by the higher concentrations detected at several sampling locations during Round 4 and by the large range in concentrations - from non-detect at DB-08 to 5500 mg/Kg (maximum at DB-09) – as shown in Tables 3-3 and 3-4.

VPH Aliphatics

The sorbed-phase VPH aliphatic extent for Round 3 (Figure 3-10) was larger in size than the Round 1 footprint (Figure 1-12), but was comparable in size with the Round 3 footprint, as represented by the 1 mg/Kg concentration contour. Round 1's interpreted 5,000 mg/Kg contour was previously eliminated by Round 2 as the result of decreases in the petroleum hydrocarbon concentrations, but was re-established by Round 3 due to increased aliphatics presence in the Line 1 sampling locations. This continuing aliphatics presence was confirmed during Round 4 by the increases in detected concentrations (Table 3-3 and 3-4) at several locations including DB-09, DB-15, DB-05 and DB-18 (which previously had no detection). Average concentration for the duplicate samples collected from DB-09 (10 – 11 feet) exceeded the 5,000 mg/Kg range and caused a shift in this contour from the Line 1 location in Round 3, to the Line 3 location during Round 4.

Review of Table 3-4 and Figure 3-16 show that the VPH aliphatics declined in most sample stations between Rounds 1 and 2, for locations with elevated petroleum hydrocarbon presence. By Round 3, aliphatics hydrocarbon concentrations had rebounded to higher levels for several sample stations, some of which again decreased by Round 4. A few locations, at which no aliphatics were detected during Round 3, were sampled again in Round 4 at different depths, and yielded results which exceeded the 500 mg/Kg action level.

Review of the box plots, Figure 3-14, indicates that median VPH aliphatic hydrocarbon concentrations remained the same between all four sampling events. The "box", representing 50 percent of the aliphatic data between the 1st and 3rd quartiles, decreased in size between the Round 1 and Round 2, increased by Round 3, and increased drastically by Round 4. These results indicate an overall increase in aliphatic concentrations for the sample stations being evaluated, as well as a large spread in the data concentration levels.

3.2.3 Top-of-Clay Samples

The MEDEP in their May 25, 2006 correspondence to Navy requested that soil samples be collected from the top-of-clay at locations immediately adjacent to DB-14 and DB-16 to better assess the effectiveness of the in-situ biodegradation process. These samples were collected during July 2006 to address this concern.

Previously soil samples had not been collected from either DB-14 or DB-16; however, soil samples had been acquired from adjacent locations at DB-13, DB-15, and DB-17 for the periodic assessments. Depth intervals selected for sampling at DB-14 and DB-16 were based on the interpreted top-of-clay presented in

the boring logs (Appendix B of the Baseline Summary Report, TtNUS, 2004). These two locations (DB-14 and DB-16) were again sampled in October 2007 for comparison with the Round 3 results.

For Round 3, the DB-14 (11 to 12 feet interval) sample contained 1,300 mg/Kg of GRO while the DB-16 (9 to 10 feet interval) sample contained 40 mg/Kg of GRO (average of two field duplicates). Ethylbenzene, xylenes, and naphthalene were also detected in the DB-14 sample during Round 3. Round 4 sampling results for these two locations indicated a slightly higher concentration (160 mg/Kg) of GRO at DB-16 (9 to10 feet interval), but a much higher concentration (8,550 mg/Kg – average of duplicates – at the 8 to 9 feet interval). DB-14 was not sampled at the 11 to 12 feet interval during Round 4, but one sample was collected between 10 and 11 feet, while two duplicate samples were collected from the 9 to 10 feet interval. The GRO concentration was 2,400 mg/Kg for the 10 to 11 feet sample, while the average GRO concentration at the 9 to 10 feet interval was 4,250 mg/Kg for DB-14 during Round 4. Ethylbenzene, xylenes and naphthalene were again detected at DB-14 at higher concentrations than in Round 3, and also in trace amounts at DB-16 (9 -10 feet). The DB-16 (8 – 9 feet) sample also contained slightly higher concentrations of ethylbenzene and xylenes.

Review of Figure 3-4 indicates that GRO was detected in DB-14 groundwater samples during Rounds 1 through 4 at concentrations that ranged from 40,000 µg/L to 44,000 µg/L. These results and the Round 4 DB-14 data suggest that the dissolved-phase GRO are likely associated residual petroleum hydrocarbons sorbed to the soil in the vicinity of DB-14.

Past discussions with Geovation indicated that only limited quantities of N-Blend were applied to the DB-14 location, because of its location near the downgradient edge of the plume, and the desire to minimize offsite migration of nitrates. Although N-Blend has been added into the Line 3 wells, these wells are closest to the footing drain located near the northern perimeter of Building 27's foundation wall. It is possible that reagent added into the Line 3 mini-wells is preferentially diverted into the drain and is not being used to foster microbial activity (TtNUS,2007).

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

The Round 4 sampling occurred approximately 36 months after the initial reagent applications. Based on the Round 4 sampling program, the following conclusions were reached:

Groundwater Contamination

- The Round 4 groundwater GRO concentrations ranged from non-detect (10 U µg/L at DB-07) to 43,000 µg/L (at DB-14). The highest GRO concentrations were detected in the area approximately between DB-01 and DB-14. A localized elevated GRO presence (18,000 µg/L) continues to be present between DP-3 and DP-13.

- Round 4 sample results identified an area (MW-NASB-226) downgradient, and to the southwest of the pilot test area, which had a GRO concentration level of 8,100 µg/L) and also contained diesel range organics (DRO) at a concentration of 1,900 µg/L). It is not clear if the source of this contamination is the pilot test area, or more likely, the fueling islands to the west of the pilot test area.

- Total VPH (as sum of aliphatics and aromatics) concentrations are in good correlation with the corresponding GRO concentrations.

- Aromatics in the groundwater samples were present at higher concentrations than the aliphatics and the primary contributors were the xylenes and ethylbenzene

- Trace amounts of benzene were identified in two of the groundwater samples (DB-14 and DB-18) at locations from which corresponding soil samples showed significant increases in GRO, as well as aromatic and aliphatic VPH concentrations during Round 4.

- The presence of various aromatics, including 1,2,4 and 1,3,5-trimethylbenzene which are typically found in petroleum products and were identified by VOC analysis, correlate well with the increased levels of GRO and VPH at certain locations. These compounds were not found in any of the accompanying QC samples.

- Groundwater GRO and VPH aromatic concentrations declined between the baseline and Round 2, but by Round 3, concentrations returned to baseline or even higher concentrations. The

results from Round 4 confirm this increase in concentration and suggest that there may be a continuing release to the groundwater, and/or, the DBB process will not effectively remove the petroleum contamination from this area.

Soil Contamination

- Round 4 soil GRO concentrations ranged from non-detect (2.5 U mg/Kg) to 9,700 mg/Kg at DB-09 in the center of the pilot test area.

- The areal extent of GRO contamination exceeding the site-specific 500 mg/Kg GRO cleanup goal is limited to the area bounded approximately by DB-18 (west), DB-07 (east), DB-14 (south), and DP-3 (north).

- The Round 4 total VPH concentrations were generally in good agreement with corresponding GRO results.

- The total VPH aromatics ranged from non-detect (25 U mg/Kg) to 8,000 mg/Kg and are generally comparable to total aliphatic concentrations, except at DB-03 where aromatics were 800 mg/Kg and aliphatics were 1,900 mg/Kg.

- Of the targeted VPH aromatics, ethylbenzene, xylenes, and naphthalene were detected in most of the soil samples with GRO. Toluene was only detected in one sample, while benzene and MTBE were not detected in any sample. These analytes accounted for 0 to 21 percent of the total VPH concentrations, indicating that the BTEX compounds in soil are not major contributors to GRO or VPH presence.

- For trend analysis, GRO and VPH concentrations at various Lines 1, 2 and 3 sampling locations increased between Round 2 and Round 4 indicating that a southward migration in the saturated zone soil is still occurring.

- Following analysis of the Round 3 sampling results, it was proposed that possible causes for increases in GRO (and VPH) concentrations may have been attributable to: 1) previous residual petroleum hydrocarbons situated upgradient or in shallower intervals being mobilized as the results of increased precipitation and infiltration during 2005 and 2006, or 2) the increases in the microbial population, resulting from the addition of nitrate reagents and degradation of petroleum hydrocarbons, may have affected the GRO analysis. The Round 4 sampling results were similar

to, and in some cases higher than, those from Round 3 even though precipitation was significantly less in 2007.

- After the Round 3 results were reviewed, it was suggested that soils be also analyzed for VOCs using EPA Method 8260B, to determine if the GRO and VPH results truly reflected gasoline components, or if biodegradation compounds such as alcohols, aldehydes, or fatty acids were being included. It was believed that such compounds could affect the GRO and VPH results. The soil VOC results from Round 4 confirm the presence of other gasoline components. The only non-gasoline component identified was methylene chloride which was also present in some of the QC samples.

- Although the DBB process appears to have been effective in decreasing the BTEX compounds, other aromatic hydrocarbons, and aliphatics at some locations, the increased concentrations of other aromatic and aliphatic hydrocarbons at other locations (especially within the core area) suggest that the process will not effectively reduce the petroleum hydrocarbons to the 500 mg/Kg level at this site in a reasonable time period.

- Samples obtained from the top-of-clay at the DB-14 and DB-16 locations indicated that there is a localized petroleum hydrocarbon presence at these locations. One possible reason proposed (at the end of Round 3) for the lack of adequate treatment is the proximity of the footing drain near the Line 3 wells and preferential flow into the drain. Results from Round 4 showed that concentrations continue to increase at these locations; therefore, a different remedial action may be needed to mitigate the situation at these locations.

4.2 RECOMMENDATIONS

Based on the Round 4 findings, these recommendations are proposed:

- A determination should be made as to whether or not there is a continuous release of petroleum into the soils and groundwater at this site.

- Pilot testing of the DBB process should be discontinued and another soil removal and/or treatment action should be implemented to mitigate the contamination at the source area.

TABLES

TABLE 2-1

GROUNDWATER ELEVATION SUMMARY
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

WELL IDENTIFICATION	WELL INSIDE DIAMETER (inch)	WATER LEVEL MP ELEVATION (feet-NGVD)	TOP OF SCREEN (feet-BGS)	BOTTOM OF SCREEN (feet-BGS)	DEPTH TO GROUNDWATER October 29, 2007 (feet-BMP)	GROUNDWATER ELEVATION October 29, 2007 (feet-NGVD)
B27-DP2	1.00	61.44	2.0	9.0	3.63	57.81
B27-DP4	1.00	60.19	2.0	9.0	2.80	57.39
DP-1	1.25	67.11	5.0	15.0	7.70	59.41
DP-2	1.25	66.97	5.0	15.0	7.63	59.34
DP-3	1.25	66.79	5.0	15.0	7.62	59.17
DP-9	1.00	66.15	5.0	10.0	7.21	58.94
DP-13	1.25	66.89	5.0	15.0	ND	ND
DP-15	1.25	67.05	5.0	15.0	7.66	59.39
DB-01	1.00	66.06	5.0	13.8	7.38	58.68
DB-02	1.00	66.27	5.0	14.5	7.57	58.7
DB-03	1.00	66.28	5.0	13.0	7.55	58.73
DB-04	1.00	66.58	5.0	11.5	7.75	58.83
DB-05	1.00	66.75	5.0	10.5	7.89	58.86
DB-06	1.00	66.72	5.0	10.0	7.85	58.87
DB-07	1.00	67.00	5.0	12.0	8.05	58.95
DB-08	1.00	67.18	5.0	11.5	8.21	58.97
DB-09	1.00	65.64	5.0	13.0	7.06	58.58
DB-10	1.00	65.92	5.0	12.0	7.20	58.72
DB-11	1.00	66.16	5.0	11.5	7.36	58.8
DB-12	1.00	66.21	5.0	10.0	4.32	61.89
DB-13	1.00	65.83	5.0	15.5	7.60	58.23
DB-14	1.00	66.11	5.0	13.5	7.80	58.31
DB-15	1.00	66.08	5.0	12.0	7.78	58.3
DB-16	1.00	65.94	5.0	11.0	7.51	58.43
DB-17	1.00	65.90	5.0	9.5	7.34	58.56
DB-18*	1.00	66.10	5.0	15.7	7.29	58.81
DB-19*	1.00	ND	5.0	13.6	7.33	ND
MW-NASB-8	2.00	59.22	3.5	13.5	2.45	56.77
MW-NASB-9	2.00	59.00	3.0	13.0	3.51	55.49
MW-NASB-23	2.00	67.29	5.0	21.0	7.60	59.69
MW-NASB-24	4.00	65.31	4.0	14.0	6.18	59.13
MW-NASB-25	4.00	64.29	5.0	15.0	6.42	57.87
MW-NASB-26	2.00	66.67	5.0	13.0	7.40	59.27
MW-NASB-225	2.00	64.61	5.0	15.0	6.45	58.16
MW-NASB-226	2.00	62.22	8.0	13.0	4.71	57.51
MW-NASB-250	1.00	60.54	0.5	12.5	3.32	57.22
MW-NASB-251	1.00	62.39	3.0	15.0	ND	ND
MW-NASB-252	1.00	59.86	2.0	12.0	2.96	56.9
MW-300	1.00	65.92	5.0	14.0	7.85	58.07
MW-301	1.00	64.49	5.0	12.0	6.59	57.9
MW-302	1.00	59.89	3.0	7.0	2.55	57.34
MW-SDP-5	1.00	65.93	4.0	14.0	7.02	58.91

*Water level MP estimated; well not surveyed.

Abbreviations:
BGS - below ground surface
MP - measuring point
BMP - below measuring point
ND - no data
NGVD - National Geodetic Vertical Datum of 1929

TABLE 2-2

OCTOBER/NOVEMBER 2007 GROUNDWATER FIELD PARAMETER MEASUREMENTS SUMMARY
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

Well ID	Sample Date	Depth Sampled (feet)	Pump Type	Start of Purging (Time)	End of Purging (Time)	Depth to Groundater Below MP (ft)	Purge Rate (mL/min)	Cum. Volume Purged (gal)	Temp (ºC)	Spec. Cond. (µS/cm)	pH	ORP (mV)	DO (mg/L)	Turbidity (NTU)	Comments
DB01	10/30/2007	12.8	Peristaltic	1510	1600	7.38	240	2.5	15.9	0.784	6.90	-42	0.08	4.5	
DB04	10/31/2007	10.5	Peristaltic	1020	1150	7.75	150	3.5	16.3	99.90	6.35	-79	0.38	4	
DB07	10/31/2007	11	Peristaltic	1026	1222	8.05	90	2	14.61	5.26	7.46	101	16.55	40.0	
DB10	10/31/2007	11	Peristaltic	1245	1335	7.20	120	2	14.8	99.9	6.25	-84	0.94	4.7	
DB11	10/31/2007	10.5	Peristaltic	1304	1339	7.36	200	1.25	14.39	2.23	6.11	207	19.99	16.0	
DB14	10/31/2007	12.5	Peristaltic	1330	1450	7.80	275	3	14.8	1.27	6.36	22	0.11	1.0	
DB18	10/31/2007	14.7	Peristaltic	1055	1205	7.29	350	5	15.9	1.99	7.51	-31	0.16	0.8	
DP09	10/31/2007	9	Peristaltic	1657	1738	7.21	220	1.25	15.6	55.3	7.15	-61	2.05	4.7	
DP13	10/31/2007	14.5	Peristaltic	1618	1730	ND	230	4	16.4	0.528	7.84	-57	0.40	11.0	
MW300	10/31/2007	13	Peristaltic	1420	1536	7.85	220	4	15.5	2.49	7.39	-176	2.75	0.2	
MW301	10/31/2007	11	Peristaltic	1530	1620	6.59	300	2	14.8	0.638	6.59	71	0.14	0.6	
NASB-008	11/1/2007	12.5	Peristaltic	1327	1408	2.45	240	1.5	13.5	0.511	5.78	273	3.49	1.0	
NASB-009	11/1/2007	12	Peristaltic	1043	1220	3.51	240	4.5	14.24	0.152	5.74	190	0.00	0	
NASB-226	11/1/2007	12	Peristaltic	0910	1045	4.71	300	5	15.6	0.198	6.32	53	0.17	1.2	
NASB-250	11/1/2007	11.5	Peristaltic	1109	1252	3.32	100	2.5	13.4	0.185	6.07	134	5.63	2.1	
NASB-251	11/1/2007	14	Peristaltic	0930	1135	ND	230	7	14.4	0.098	6.46	66	7.02	20.8	
NASB-252	11/1/2007	11	Peristaltic	1250	1400	2.96	220	4	13.9	0.351	6.68	29	0.04	6.42	
SDP-5	10/31/2007	13	Peristaltic	1502	1636	7.02	180	4	14.29	0.591	6.14	55	16.13	1.9	

Abbreviation: NR - Not reported
MP - Measuring point.
Cum. - Cumulative.
Spec. Cond.- Specific conductivity.
µS/cm - Microsiemens per centimeter.
ORP - Oxidation/reduction potential.
mV - Millivolts.
mg/L - Milligrams per liter.
NTU - Nephelometric turbidity units.

TABLE 2-3

SAMPLE SUMMARY
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

MATRIX	LOCATION	SAMPLE ID	DATE	QC TYPE	GRO	N	VPH	VOC	DRO
Groundwater	MW-NASB-008	NEX-GW4-NASB-8	01-Nov-07	None	X	X	X	X	X
Groundwater	MW-NASB-009	NEX-GW4-NASB-9	01-Nov-07	None	X	X	X	X	X
Groundwater	MW-NASB-226	NEX-GW4-NASB-226	01-Nov-07	None	X	X	X	X	X
Groundwater	MW-NASB-250	NEX-GW4-NASB-250	01-Nov-07	None	X	X	X	X	X
Groundwater	MW-NASB-251	NEX-GW4-NASB-251	01-Nov-07	None	X	X	X	X	X
Groundwater	MW-NASB-252	NEX-GW4-NASB-252	01-Nov-07	None	X	X	X	X	X
Groundwater	MW-NASB-252	NEX-GW4-NASB-252-D	01-Nov-07	Field Dup. of NEX-GW4-NASB-252	X	X	X	X	X
Groundwater	NEX-DB01	NEX-GW4-DB01	30-Oct-07	None	X	X	X	X	
Groundwater	NEX-DB01	NEX-GW4-DB01-D	30-Oct-07	Field Dup. of NEX-GW4-DB01	X	X	X	X	
Groundwater	NEX-DB04	NEX-GW4-DB04	31-Oct-07	None	X	X	X	X	
Groundwater	NEX-DB07	NEX-GW4-DB07	31-Oct-07	None	X	X	X	X	
Groundwater	NEX-DB10	NEX-GW4-DB10	31-Oct-07	None	X	X	X	X	
Groundwater	NEX-DB11	NEX-GW4-DB11	31-Oct-07	None	X	X	X	X	
Groundwater	NEX-DB14	NEX-GW4-DB14	31-Oct-07	None	X	X	X	X	
Groundwater	NEX-DB18	NEX-GW4-DB18	31-Oct-07	None	X	X	X	X	
Groundwater	NEX-DP09	NEX-GW4-DP09	31-Oct-07	None	X	X	X	X	
Groundwater	NEX-DP13	NEX-GW4-DP13	31-Oct-07	None	X	X	X	X	
Groundwater	NEX-MW-SDP-5	NEX-GW4-SDP5	31-Oct-07	None	X	X	X	X	
Groundwater	NEX-MW300	NEX-GW4-MW300	31-Oct-07	None	X	X	X	X	
Groundwater	NEX-MW301	NEX-GW4-MW301	31-Oct-07	None	X	X	X	X	
Soil	NEX-DB01	NEX-SO4-DB01-0809	29-Oct-07	None	X		X	X	
Soil	NEX-DB01	NEX-SO4-DB01-0809-D	29-Oct-07	Field Dup. of NEX-SO4-DB01-0809	X		X	X	
Soil	NEX-DB01	NEX-SO4-DB01-1213	29-Oct-07	None	X		X	X	
Soil	NEX-DB03	NEX-SO4-DB03-1011	29-Oct-07	None	X		X	X	
Soil	NEX-DB03	NEX-SO4-DB03-1213	29-Oct-07	None	X		X	X	
Soil	NEX-DB05	NEX-SO4-DB05-0809	29-Oct-07	None	X		X	X	
Soil	NEX-DB05	NEX-SO4-DB05-0910	29-Oct-07	None	X		X	X	
Soil	NEX-DB08	NEX-SO4-DB08-0809	29-Oct-07	None	X		X	X	
Soil	NEX-DB08	NEX-SO4-DB08-0910	29-Oct-07	None	X		X	X	
Soil	NEX-DB09	NEX-SO4-DB09-0809	29-Oct-07	None	X		X	X	
Soil	NEX-DB09	NEX-SO4-DB09-1011	29-Oct-07	None	X		X	X	
Soil	NEX-DB09	NEX-SO4-DB09-1011-D	29-Oct-07	Field Dup. of NEX-SO4-DB09-1011	X		X	X	
Soil	NEX-DB10	NEX-SO4-DB10-0809	30-Oct-07	None	X		X	X	
Soil	NEX-DB10	NEX-SO4-DB10-0910	30-Oct-07	None	X		X	X	
Soil	NEX-DB12	NEX-SO4-DB12-0910	30-Oct-07	None	X		X	X	
Soil	NEX-DB13	NEX-SO4-DB13-1011	30-Oct-07	None	X		X	X	
Soil	NEX-DB13	NEX-SO4-DB13-1213	30-Oct-07	None	X		X	X	
Soil	NEX-DB14	NEX-SO4-DB14-0910	30-Oct-07	None	X		X	X	
Soil	NEX-DB14	NEX-SO4-DB14-0910-D	30-Oct-07	Field Dup. of NEX-SO4-DB14-0910	X		X	X	
Soil	NEX-DB14	NEX-SO4-DB14-1011	30-Oct-07	None	X		X	X	
Soil	NEX-DB15	NEX-SO4-DB15-0809	30-Oct-07	None	X		X	X	
Soil	NEX-DB15	NEX-SO4-DB15-0910	30-Oct-07	None	X		X	X	
Soil	NEX-DB16	NEX-SO4-DB16-0809	30-Oct-07	None	X		X	X	
Soil	NEX-DB16	NEX-SO4-DB16-0809-D	30-Oct-07	Field Dup. of NEX-SO4-DB16-0809	X		X	X	
Soil	NEX-DB16	NEX-SO4-DB16-0910	30-Oct-07	None	X		X	X	
Soil	NEX-DB17	NEX-SO4-DB17-0809	30-Oct-07	None	X		X	X	
Soil	NEX-DB17	NEX-SO4-DB17-0910	30-Oct-07	None	X		X	X	
Soil	NEX-DB18	NEX-SO4-DB18-0809	29-Oct-07	None	X		X	X	
Soil	NEX-DB18	NEX-SO4-DB18-1415	29-Oct-07	None	X		X	X	
Soil	NEX-DB19	NEX-SO4-DB19-0809	29-Oct-07	None	X		X	X	
Soil	NEX-DB19	NEX-SO4-DB19-1213	29-Oct-07	None	X		X	X	
Soil	NEX-MW300	NEX-SO4-MW300-0910	30-Oct-07	None	X		X	X	
Soil	NEX-MW300	NEX-SO4-MW300-1213	30-Oct-07	None	X		X	X	
Soil	NEX-MW301	NEX-SO4-MW301-0708	30-Oct-07	None	X		X	X	
Soil	NEX-MW301	NEX-SO4-MW301-0910	30-Oct-07	None	X		X	X	
Blank	Blank	NEX-GW4-TB01	31-Oct-07	Trip Blank	X		X	X	
Blank	Blank	NEX-GW4-TB02	01-Nov-07	Trip Blank	X		X	X	
Blank	Blank	NEX-GW4-TB03	01-Nov-07	Trip Blank				X	
Blank	Blank	NEX-SO4-FB01	30-Oct-07	Field Blank	X		X	X	
Blank	Blank	NEX-SO4-FB02-DIUF	31-Oct-07	Field Blank	X		X	X	
Blank	Blank	NEX-SO4-RB01	30-Oct-07	Rinsate Blank	X		X	X	
Blank	Blank	NEX-SO4-RB02	30-Oct-07	Rinsate Blank	X		X	X	
Blank	Blank	NEX-SO4-TB01	30-Oct-07	Trip Blank	X		X	X	

abbr:
GRO - gasoline range organics by Maine HETL Method 4.2.17
DRO - diesel range organic analysis by Maine HETL Method 4.1.25
VPH - MADEP volatile petroleum hydrocarbons method
VOC - volatile organic compound analysis by method 8260
N - nitrate/nitrite

TABLE 3-1

ROUND 4 GROUNDWATER ANALYTICAL RESULTS
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE
PAGE 1 OF 2

LOCATION_ID		NEX-DB01	NEX-DB01	NEX-DB04	NEX-DB07	NEX-DB10	NEX-DB11	NEX-DB14	NEX-DB18	NEX-DP09	NEX-DP13	NEX-MW300	NEX-MW301	MW-NASB-226	MW-NASB-250	MW-NASB-251	MW-NASB-252	MW-NASB-252	MW-NASB-008	MW-NASB-009	NEX-MW-SDP-5
SAMPLE_DATE		10/30/07	10/30/07	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	11/01/07	11/01/07	11/01/07	11/01/07	11/01/07	11/01/07	11/01/07	10/31/07
SAMPLE_ID		NEX-GW4-DB01	NEX-GW4-DB01-D	NEX-GW4-DB04	NEX-GW4-DB07	NEX-GW4-DB10	NEX-GW4-DB11	NEX-GW4-DB14	NEX-GW4-DB18	NEX-GW4-DP09	NEX-GW4-DP13	NEX-GW4-MW300	NEX-GW4-MW301	NEX-GW4-NASB-226	NEX-GW4-NASB-250	NEX-GW4-NASB-251	NEX-GW4-NASB-252	NEX-GW4-NASB-252-D	NEX-GW4-NASB-8	NEX-GW4-NASB-9	NEX-GW4-SDP5
QC_TYPE			DUPLICATE															DUPLICATE			
	CRITERIA Maine Guidelines [2]																				
GASOLINE RANGE ORGANICS (ug/L)	50	37000	30000	8300	10 U	7600	3800	43000	5000	4800	18000	4400	120	8100	10 U	10 U	10 U	10 U	10 U	10 U	8100
DIESEL RANGE ORGANICS (ug/L)	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1900	37 J	65	68	73	56	66	NA
VOLATILE PETROLEUM HYDROCARBONS (ug/L) [3]																					
C5-C8 ALIPHATICS-UNADJ		6000	6000	2200	100 U	1800 J	1000 J	6900	1600 J	2000 U	4300	2000 U	52 J	4700	100 U	100 U	100 U	100 U	100 U	100 U	2100
C9-C12 ALIPHATICS-UNADJ		45000	43000	7600	100 U	9200	3500	45000	5600	6000	21000	5300	110	9400	100 U	100 U	100 U	100 U	100 U	NA	9000
VPH Ranges (ug/L)																					
C5-C8 ALIPHATICS		5800	5800	2200	100 U	1800 J	1000 J	6900	2000 U	2000 U	4200	2000 U	52	4700	100 U	100 U	100 U	100 U	100 U	100 U	2100
C9-C10 AROMATICS		14000 J	13000	9200 J	100 U	8800 J	3700	14000 J	3200	3300	11000	4200	120 J	8900	100 U	100 U	100 U	100 U	100 U	100 U	8600 J
C9-C12 ALIPHATICS		7000	7200	2000 U	100 U	2000 U	2000 U	11000	2000 U	2000 U	3700	2000 U	100 U	2000 U	100 U	100 U	100 U	100 U	100 U	100 U	2000 U
Targeted VPH Analysis (ug/L)																					
BENZENE	5	20 U	20 U	1 U	1 U	2 U	1 U	0.6 J	0.9 J	1 U	2 U	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ETHYLBENZENE		2100	2000	1 U	1 U	83	1 U	2800	220	270	1200	310	1 U	53	1 U	1 U	1 U	1 U	1 U	1 U	140
M+P-XYLENES		13000	13000	3	2 U	590	2 U	15000	840	1100	5700	380	2 U	250	2 U	2 U	2 U	2 U	2 U	2 U	1200
NAPHTHALENE		590	640	2	1 U	150	1 U	710	85 J	120	390	140	1 U	140 J	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	180
O-XYLENE		5200	5200	0.6 J	1 U	93	1 U	6200	230	290	530	160	1 U	12	1 U	1 U	1 U	1 U	1 U	1 U	280
TOLUENE		140	130	1 U	1 U	2 U	1 U	16	800	15	47	150	1 U	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U
METHYL TERT-BUTYL ETHER	35	20 U	20 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	2 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total Aliphatics (C5-C8 & C9-C12)		12800	13000	2200	100 U	1800 J	1000 J	17900	2000 U	2000 U	7900	2000 U	52	4700	100 U	100 U	100 U	100 U	100 U	100 U	2100
Sum of Aromatics (w/o BTEX)		14000 J	13000	9200 J	100 U	8800 J	3700	14000 J	3200	3300	11000	4200	120 J	8900	100 U	100 U	100 U	100 U	100 U	100 U	8600 J
Sum of BTEX [4]		20240	20130	4	1.5 U	763	1.5 U	23816.6 J	2120.9 J	1685	7447	1001	1.5 U	313 J	1.5 UJ	1.5 UJ	1.5 UJ	1.5 UJ	1.5 UJ	1.5 UJ	1540
Total Aromatics (C9-C10 Aromatics & BTEX)		34830 J	33770	9206 J	18 U	9713 J	3700	38526.6 J	5405.9 J	5105	18837	5341	120 J	9353 J	18 UJ	18 UJ	18 UJ	18 UJ	18 UJ	18 UJ	10320 J
Total VPH[5]		47630 J	46770	11406 J	38 U	11513 J	4700 J	56426.6 J	5405.9 J	5105	26737	5341	172 J	14053 J	38 UJ	38 UJ	38 UJ	38 UJ	38 UJ	38 UJ	12420 J
BTEX as % of Total Aromatics		58%	60%	0%	NA	8%	0%	62%	39%	33%	40%	19%	0%	3%	NA	NA	NA	NA	NA	NA	15%
BTEX as % of Total VPH		42%	43%	0%	NA	7%	0%	42%	39%	33%	28%	19%	0%	2%	NA	NA	NA	NA	NA	NA	12%
BTEX as % of GRO		55%	67%	0%	NA	10%	0%	55%	42%	35%	41%	23%	0%	4%	NA	NA	NA	NA	NA	NA	19%
Total Aromatics as % of Total VPH		73%	72%	81%	NA	84%	79%	68%	100%	100%	70%	100%	70%	67%	NA	NA	NA	NA	NA	NA	83%
Total Aromatics as % of GRO[6]		94%	113%	111%	NA	128%	97%	90%	108%	106%	105%	121%	100%	115%	NA	NA	NA	NA	NA	NA	127%
WET CHEMISTRY (mg/L)																					
NITRATE-N		14	15	59	450	190	180	36	180	300	7.5	76	17	0.1 U	0.058	0.065	0.1 U	0.1 U	3.9	1.5	20
NITRITE-N		0.28 J	0.27 J	0.37 J	1.4 J	2.3 J	0.77 J	0.24 J	1.5 J	0.96 J	0.26 J	0.57 J	0.013 J	0.1 U	0.05 U	0.05 U	0.1 U	0.1 U	0.1 U	0.1 U	0.73 J
OTHER VOCs (ug/L)																					
1,2,4-TRIMETHYLBENZENE		2300	2200	680	1 U	1300	300	2900	250	410	1300	810	1 U	1500	1 U	1 U	1 U	1 U	1 U	1 U	1200
1,3,5-TRIMETHYLBENZENE		610	590	360	1 U	360	130	790	67 J	130	400	210	1 U	370	1 UJ	1 U	1 U	1 U	1 U	1 U	310
2-BUTANONE		420	450	5 U	5 U	140	5 U	340	55	98	170	38	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	150
2-HEXANONE		100 U	100 U	8	5 U	5 J	6	3 J	3 J	5 U	10 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5
4-ISOPROPYLTOLUENE		20 U	20 U	17	1 U	5	4	10	3	3	9	4	1 U	8	1 U	1 U	0.8 J	1	1 U	1 U	6
CHLOROFORM		20 U	20 U	1 U	0.5 J	2 U	1 U	1 U	1 U	1 U	2 U	1 U	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
ISOPROPYLBENZENE		120	110	27	1 U	100	19	150	32 J	38	62	40	2	94	1 U	1 U	1 U	1 U	1 U	1 U	67
LOW MOLECULAR WEIGHT PAHS		590	640	2	1 U	150	1 U	710	85 J	120	390	140	1 U	140 J	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	180
N-BUTYLBENZENE		22	21	37	1 U	20	32	24	9	7	16	7	1 U	19	1 U	1 U	1 U	1 U	1 U	1 U	16
N-PROPYLBENZENE		280	280	200	1 U	230	85	340	48 J	48	120	83	1 U	210	1 U	1 U	1 U	1 U	1 U	1 U	130
SEC-BUTYLBENZENE		20 U	11 J	26	1 U	12	23	13	7	4	6	5	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	8
TERT-BUTYLBENZENE		20 U	20 U	3	1 U	2 J	1	1	0.6 J	1 U	2 U	0.9 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.9 J
TOTAL CHLORINATED VOCS		27 U	27 U	1.3 U	0.5 J	2.7 U	1.3 UJ	1.3 UJ	1.3 U	1.3 U	2.7 U	1.3 U	5	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 UJ	1.3 U
TOTAL PAHS		590	640	2	1 U	150	1 U	710	85 J	120	390	140	1 U	140 J	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	180
TOTAL XYLENES		18000	18000	4	3 U	680	3 U	21000	1100	1400	6200	540	3 U	260	3 U	3 U	3 U	3 U	3 U	3 U	1400

TABLE 3-1

ROUND 4 GROUNDWATER ANALYTICAL RESULTS
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE
PAGE 2 OF 2

LOCATION_ID		NEX-DB01	NEX-DB01	NEX-DB04	NEX-DB07	NEX-DB10	NEX-DB11	NEX-DB14	NEX-DB18	NEX-DP09	NEX-DP13	NEX-MW300	NEX-MW301	MW-NASB-226	MW-NASB-250	MW-NASB-251	MW-NASB-252	MW-NASB-252	MW-NASB-008	MW-NASB-009	NEX-MW-SDP-5
SAMPLE_DATE		10/30/07	10/30/07	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	10/31/07	11/01/07	11/01/07	11/01/07	11/01/07	11/01/07	11/01/07	11/01/07	10/31/07
SAMPLE_ID		NEX-GW4-DB01	NEX-GW4-DB01-D	NEX-GW4-DB04	NEX-GW4-DB07	NEX-GW4-DB10	NEX-GW4-DB11	NEX-GW4-DB14	NEX-GW4-DB18	NEX-GW4-DP09	NEX-GW4-DP13	NEX-GW4-MW300	NEX-GW4-MW301	NEX-GW4-NASB-226	NEX-GW4-NASB-250	NEX-GW4-NASB-251	NEX-GW4-NASB-252	NEX-GW4-NASB-252-D	NEX-GW4-NASB-8	NEX-GW4-NASB-9	NEX-GW4-SDP5
QC_TYPE			DUPLICATE															DUPLICATE			
	CRITERIA Maine Guidelines [2]																				

Notes:
1) Maine HETL Method 4.2.17
2) Procedural Guidelines for Establishing Action Levels and Remediation Goals for the Remediation of Oil Contaminated Soil and Groundwater in Maine, Maine DEP, Revised March 13, 2000.
3) Massachusetts VPH Method May 2004, r 1.1
4) Sum of benzene, ethylbenzene, xylenes, toluene, and napthalene without MTBE
5) Sum of C5-C8+C9-C12 aliphatics, C9-C10 aromatics, BTEX, and naphthalene
6) Percentages > 100 are possible because GRO and aromatics were analyzed separately by different methods

Abbr:
* - From dilution analysis
E - Exceeded calibration range
J - Quantitation approximate
UJ - Detection limit approximate
NA - Not applicable
ND - Not detected
R - Rejected
U - Not detected;
GRO - gasoline range organics
VPH - volatile petroleum hydrocarbon (Maine)
black background = criterion exceeded

TABLE 3-2

SUMMARY OF GROUNDWATER DATA
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE
PAGE 1 OF 3

WELL	SAMPLE ROUND	DATE	GRO [1]	VPH [2]	VPH Aro [3]	VPH Ali [4]
DB-01	Baseline	Aug-04	NA	NA	NA	NA
DB-01	1	Mar-05	45000	49630	32350	17100
DB-01	2	Oct-05	20000	44000	25800	18200
DB-01	3	Jul-06	39000	42310	27510	14800
DB-01	4	Oct-07	37000	47630	34830	12800
DB-04	Baseline	Aug-04	NA	NA	NA	NA
DB-04	1	Mar-05	14000	13000	13000	5000 U
DB-04	2	Oct-05	5800	5900	3800	2100
DB-04	3	Jul-06	12000	9600	6800	2800
DB-04	4	Oct-07	8300	11406	9206	2200
DB-07	Baseline	Aug-04	NA	NA	NA	NA
DB-07	1	Mar-05	75	100 U	100 U	100 U
DB-07	2	Oct-05	10 U	100 U	100 U	100 U
DB-07	3	Jul-06	10 U	100 U	100 U	100 U
DB-07	4	Oct-07	10 U	38 U	18 U	100 U
DP-9	Baseline	Aug-04	14000	NA	NA	NA
DP-9	1	Mar-05	12000	16940	11400	5500
DP-9	2	Oct-05	3900	3120	2020	1100
DP-9	3	Jul-06	14000	12500	9800	2700
DP-9	4	Oct-07	4800	5105	5105	2000 U
DB-10	Baseline	Aug-04	NA	NA	NA	NA
DB-10	1	Mar-05	12000	18660	13360	5300
DB-10	2	Oct-05	8800	8570	5270	3300
DB-10	3	Jul-06	13000	12520	10520	2000
DB-10	4	Oct-07	7600	11513	9713	1800
DB-11	Baseline	Aug-04	NA	NA	NA	NA
DB-11	1	Mar-05	5700	7700	3600	4100
DB-11	2	Oct-05	4300	4000	2200	1800
DB-11	3	Jul-06	4800	4671	2771	1900
DB-11	4	Oct-07	3800	4700	3700	1000
DP-13	Baseline	Aug-04	25000	NA	NA	NA
DP-13	1	Mar-05	12000	8870	3770	5100
DP-13	2	Oct-05	15000	11900	8600	3300
DP-13	3	Jul-06	26000	23640	19240	4400
DP-13	4	Oct-07	18000	26737	18837	7900
DB-14	Baseline	Aug-04	NA	NA	NA	NA
DB-14	1	Mar-05	40000	51320	34820	16500
DB-14	2	Oct-05	43000	48800	29100	19700
DB-14	3	Jul-06	44000	40930	32330	8600
DB-14	4	Oct-07	43000	56426.6	38526.6	17900

TABLE 3-2

SUMMARY OF GROUNDWATER DATA
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE
PAGE 2 OF 3

WELL	SAMPLE ROUND	DATE	GRO [1]	VPH [2]	VPH Aro [3]	VPH Ali [4]
DB-18	Baseline	Aug-04	NA	NA	NA	NA
DB-18	1	Mar-05	14000	13860	10560	3300
DB-18	2	Oct-05	9500	12860	7360	5500
DB-18	3	Jul-06	24000	23130	15930	7200
DB-18	4	Oct-07	5000	5405.9	5405.9	2000 U
MW-300	Baseline	Sep-04	28000	NA	NA	NA
MW-300	1	Mar-05	6200	6930	6930	2000 U
MW-300	2	Oct-05	8200	5000	3410	1590
MW-300	3	Jul-06	3500	4090	3130	960
MW-300	4	Oct-07	4400	5341	5341	2000 U
MW-301	Baseline	Sep-04	27	NA	NA	NA
MW-301	1	Mar-05	630	570	570	500 U
MW-301	2	Oct-05	290	500 U	500 U	500 U
MW-301	3	Jul-06	460	446	56	390
MW-301	4	Oct-07	120	172	120	52
MW-302	Baseline	Sep-04	19	NA	NA	NA
MW-302	1	Mar-05	28	100 U	100 U	100 U
MW-302	2	Oct-05	14	100 U	100 U	100 U
MW-302	3	Jul-06	13 U	5.6	5.6	100 U
MW-302	4	Oct-07	NA	NA	NA	NA
MW-SDP-5	Baseline	Aug-04	25000	NA	NA	NA
MW-SDP-5	1	Mar-05	9600	4100	4100	10000 U
MW-SDP-5	2	Oct-05	14000	12580	7780	4800
MW-SDP-5	3	Jul-06	11000	9730	8330	1400
MW-SDP-5	4	Oct-07	8100	12420	10320	2100
MW-NASB-8	Baseline	Sep-99	NA	1 U	1 U	NA
MW-NASB-8	4	Nov-07	10 U	38 U	18 U	100 U
MW-NASB-9	Baseline	Sep-99	NA	1 U	1 U	NA
MW-NASB-9	4	Nov-07	10 U	38 U	18 U	100 U
MW-NASB-226	4	Nov-07	8100	14053	9353	4700
MW-NASB-250	4	Nov-07	10 U	38 U	18 U	100 U
MW-NASB-251	4	Nov-07	10 U	38 U	18 U	100 U
MW-NASB-252	4	Nov-07	10 U	38 U	18 U	100 U

TABLE 3-2

SUMMARY OF GROUNDWATER DATA
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE
PAGE 3 OF 3

WELL	SAMPLE ROUND	DATE	GRO [1]	VPH [2]	VPH Aro [3]	VPH Ali [4]
GROUNDWATER SUMMARY STATISTICS [5]						
		1st Quartile	Min.	Median	Max.	3rd Quartile
GRO Aug 2004	Baseline	0	0	2100	28000	17000
GRO Mar 2005	1	5700	28	12000	45000	14000
GRO Oct 2005	2	3900	0	8200	43000	14000
GRO Jul 2006	3	3500	0	12000	44000	24000
GRO Oct 2007	4	0	0	4600	43000	8100
VPH ARO Mar 2005	1	3600	0	6930	34820	13000
VPH ARO Oct 2005	2	2020	0	3800	29100	7780
VPH ARO Jul 2006	3	2771	0	8330	32210	15930
VPH ARO Oct 2007	4	0	0	5223	38526.6	9623
VPH ALI Aug 2005	1	0	0	1650	16500	5150
VPH ALI Oct 2005	2	1100	0	2100	19700	4400
VPH ALI Jul 2006	3	960	0	2000	14800	4400
VPH ALI Oct 2007	4	0	0	26	17900	2175

Notes:

1. GRO - gasoline range organics, by Maine HETL Method 4.2.17 (ug/L)
2. Total VPH - volatile petroleum hydrocarbons, Massachusetts VPH Method (May 2004, rev. 1.1) (ug/L). Total VPH = sum of C5-C12 aliphatics, C9-C10 aromatics, and targeted VPH analytes w/o MTBE.
3. VPH - Aro - C9-C10 aromatics & targeted analytes w/o MTBE (ug/L)
4. VPH - Ali - C5-C8 & C9-C12 aliphatics w/o MTBE (ug/L)
5. Non-detect values = 0 for statistical analysis. Data in ug/L

Abbr: NA - Not Analyzed

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TABLE 3-3

ROUND 4 SOIL ANALYTICAL RESULTS
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

LOCATION_ID		NEX-DB01	NEX-DB01	NEX-DB01	NEX-DB03	NEX-DB03	NEX-DB05	NEX-DB05	NEX-DB08	NEX-DB08	NEX-DB09	NEX-DB09	NEX-DB09	NEX-DB10	NEX-DB10	NEX-DB12	NEX-DB13	NEX-DB13	NEX-DB14	NEX-DB14	NEX-DB14	NEX-DB15	NEX-DB15	NEX-DB16
SAMPLE_DATE		10/29/07	10/29/07	10/29/07	10/29/07	10/29/07	10/29/07	10/29/07	10/29/07	10/29/07	10/29/07	10/29/07	10/29/07	10/30/07	10/30/07	10/30/07	10/30/07	10/30/07	10/30/07	10/30/07	10/30/07	10/30/07	10/30/07	10/30/07
SAMPLE_ID		NEX-SO4-DB01-0809	NEX-SO4-DB01-0809-D	NEX-SO4-DB01-1213	NEX-SO4-DB03-1011	NEX-SO4-DB03-1213	NEX-SO4-DB05-0809	NEX-SO4-DB05-0910	NEX-SO4-DB08-0809	NEX-SO4-DB08-0910	NEX-SO4-DB09-0809	NEX-SO4-DB09-1011	NEX-SO4-DB09-1011-D	NEX-SO4-DB10-0809	NEX-SO4-DB10-0910	NEX-SO4-DB12-0910	NEX-SO4-DB13-1011	NEX-SO4-DB13-1213	NEX-SO4-DB14-0910	NEX-SO4-DB14-0910-D	NEX-SO4-DB14-1011	NEX-SO4-DB15-0809	NEX-SO4-DB15-0910	NEX-SO4-DB16-0809
TOP_DEPTH		8	8	12	10	12	8	9	8	9	8	10	10	8	9	9	10	12	9	9	10	8	9	8
BOTTOM_DEPTH		9	9	13	11	13	9	10	9	10	9	11	11	9	10	10	11	13	10	10	11	9	10	9
QC_TYPE			FD										FD							FD				
SACODE			DUPLICATE										DUPLICATE							DUPLICATE				
	CRITERIA																							
Gasoline Range Organic Analysis (mg/Kg) [1]	**500 [2]**	8400	8600	78	7300	3.9 U	760	1200	2.8 U	2.6 U	3400	12000	7400	25 J	42 J	2.9 U	8.9	4.3 U	5400 J	3100 J	2400	1300	43	7800
Volatile Petroleum Hydrocarbons (mg/Kg)[3]																								
C5-C8 ALIPHATICS-UNADJ		2700 J	3200 J	32 U	1900 J	31 U	180	600	28 U	26 U	820 J	2500 J	3600 J	30 U	25 U	28 U	31 UJ	43 UJ	2600 J	1600 J	1200 J	710 J	34 UJ	1600 J
C9-C12 ALIPHATICS-UNADJ		5400 J	5700 J	56	5600 J	31 U	470	550	28 U	26 U	2600 J	8600 J	7800 J	30 U	32	28 U	31 UJ	43 UJ	3900 J	1800 J	1900 J	810 J	34 UJ	4100 J
Total VPH (Sum of unadjusted C5 - C12 Aliphatics)		8100	8900	56	7500	31 U	650	1150	28 U	26 U	3420	11100	11400	30 U	32	28 U	31 UJ	43 UJ	6500	3400	3100	1520	34 UJ	5700
VPH Ranges (mg/Kg)																								
C5-C8 ALIPHATICS		2700 J	3200 J	32 U	1900 J	31 U	180	650	28 U	26 U	820 J	2500 J	3600 J	30 U	25 U	28 U	31 UJ	43 U	2600 J	1600 J	1200 J	710 J	34 UJ	1600 J
C9-C10 AROMATICS		3300 J	3700 J	41	8000 J	31 U	250	280	28 U	26 UJ	2300 J	5500 J	4100 J	30 U	31 J	28 UJ	31 U	43 UJ	2200 J	960 J	1000 J	630 J	34 U	3600 J
C9-C12 ALIPHATICS		1600 UJ	1600 UJ	32 U	1500 UJ	31 U	180	220	28 U	26 U	610 J	1800 J	2300 J	30 U	25 U	28 U	31 UJ	43 UJ	1400 UJ	520 J	550 UJ	310 UJ	34 UJ	1500 UJ
Targeted VPH Analytes (mg/Kg)																								
BENZENE		2.9 U	14 U	0.18 U	2.7 U	0.17 U	0.17 U	0.15 U	0.16 U	0.15 U	1.2 U	25 U	25 U	0.17 U	0.14 U	0.16 U	0.17 U	0.24 U	13 U	1.2 U	1.9 U	0.18 U	0.19 U	26 U
ETHYLBENZENE		66	76	0.78	36	0.12 J	0.17 U	0.15 U	0.16 U	0.15 U	2.2	200	130	0.091 J	0.19	0.16 U	0.27	0.14 J	130 J	55 J	53	0.47	0.2	26 U
M+P-XYLENES		740	650	4.9	340	0.84	0.35 U	0.3 U	0.31 U	0.3 U	230	1300	910	0.79	1.2	0.32 U	1.6	0.75	610 J	300 J	260	4.4	1.5	30 J
NAPHTHALENE		53	54	0.25	64	0.17 U	0.17 U	0.15 U	0.16 U	0.15 U	4.7	63	55	0.17 U	0.25	0.16 U	0.18	0.24 U	27	21	14	1.4	0.19 U	26 U
O-XYLENE		160	150	1.6	33	0.16 J	0.17 U	0.15 U	0.16 U	0.15 U	77	520	360	0.24	0.28	0.16 U	0.26	0.53	240 J	100 J	100	0.5	0.38	26 U
TOLUENE		2.9 U	14 U	0.18 U	2.7 U	0.17 U	0.17 U	0.15 U	0.16 U	0.15 U	1.2 U	25 U	25 U	0.17 U	0.14 U	0.16 U	0.11 J	0.24 U	13 U	1.2 U	1.9 U	0.18 U	0.19 U	26 U
METHYL TERT-BUTYL ETHER		2.9 U	14 U	0.18 U	2.7 U	0.17 U	0.17 U	0.15 U	0.16 U	0.15 U	1.2 U	25 U	25 U	0.17 U	0.14 U	0.16 U	0.17 U	0.24 U	13 U	1.2 U	1.9 U	0.18 U	0.19 U	26 U
Total Aliphatics (C5-C8, C9-C12) (mg/Kg)		2700 J	3200 J	32 U	1900 J	31 U	360	870	28 U	26 U	1430 J	4300 J	5900 J	30 U	25 U	28 U	31 UJ	43 UJ	2600 J	2120 J	1200 J	710 J	34 UJ	1600 J
Sum of Aromatics (w/o BTEX)		3300 J	3700 J	41	8000 J	31 U	250	280	28 U	26 UJ	2300 J	5500 J	4100 J	30 U	31 J	28 UJ	31 U	43 UJ	2200 J	960 J	1000 J	630 J	34 U	3600 J
Sum of BTEX		966	866	7.28	306	1.12 J	0.26 U	0.22 U	0.24 U	0.22 U	302.2	2100	1430	1.091 J	1.69	0.24 U	2.18 J	1.44 J	980 J	465 J	413	5.47	2.1	30 J
Total Aromatics (C9-C10 & targeted analytes)[4] (mg/Kg)		3300 J	3700 J	41	8000 J	31 U	250	280	28 U	26 UJ	2300 J	5500 J	4100 J	30 U	31 J	28 UJ	31 U	43 UJ	2200 J	960 J	1000 J	630 J	34 U	3600 J
Total VPH		6000 J	6900 J	41	9900 J	31 U	610	1150	28 U	26 UJ	3730 J	9800 J	10000 J	30 U	31 J	28 UJ	31 UJ	43 UJ	4800 J	3080 J	2200 J	1340 J	34 UJ	5200 J
BTEX as % of Total Aromatics		29%	23%	18%	4%	NA	0%	0%	NA	NA	13%	38%	35%	NA	5%	NA	NA	NA	45%	48%	41%	1%	NA	1%
BTEX as % of Total VPH		16%	13%	18%	3%	NA	0%	0%	NA	NA	8%	21%	14%	NA	5%	NA	NA	NA	20%	15%	19%	0%	NA	1%
BTEX as % of GRO		12%	10%	9%	4%	NA	0%	0%	NA	NA	9%	18%	19%	4%	4%	NA	24%	NA	18%	15%	17%	0%	5%	0%
Total Aromatics as % of Total VPH		55%	54%	100%	81%	NA	41%	24%	NA	NA	62%	56%	41%	NA	100%	NA	NA	NA	46%	31%	45%	47%	NA	69%
Total Aromatics as % of GRO		39%	43%	53%	110%	NA	33%	23%	NA	NA	68%	46%	55%	0%	74%	NA	0%	NA	41%	31%	42%	48%	0%	46%
Total Aliphatics as % of Total VPH		45%	46%	0%	19%	NA	59%	76%	NA	NA	38%	44%	59%	NA	0%	NA	NA	NA	54%	69%	55%	53%	NA	31%
Total Aliphatics as % of GRO		32%	37%	0%	26%	NA	47%	73%	NA	NA	42%	36%	80%	0%	0%	NA	0%	NA	48%	68%	50%	55%	0%	21%
TOTAL SOLIDS %		79	80	77	82	79	82	81	82	81	81	83	84	82	82	80	82	76	84	81	86	83	82	82
OTHER VOCs (mg/Kg)																								
1,2,4-TRIMETHYLBENZENE		570	520	3.8	720	0.54	0.17 U	0.15 U	0.16 U	0.15 U	NA	900	660	1.8	3.2	0.16 U	1.1	0.47	320 J	180 J	130	39	2.2	480
1,3,5-TRIMETHYLBENZENE		200	180	1.3	270	0.16 J	0.17 U	0.15 U	0.16 U	0.15 U	100	310	230	0.63	1.1	0.16 U	0.41	0.13 J	110 J	57 J	43	22	0.71	180
4-ISOPROPYLTOLUENE		4.4	4.7 J	0.053 J	6.2	0.17 U	0.17 U	0.069 J	0.16 U	0.15 U	2.8	9.6 J	7.9 J	0.17 U	0.05 J	0.16 U	0.12 J	0.24 U	4 J	2	1.8 J	1.1	0.19 U	6.1 J
ISOPROPYLBENZENE		15	16	0.17 J	27	0.17 U	0.17 U	0.15 U	0.16 U	0.15 U	2.2	34	21 J	0.087 J	0.2	0.16 U	0.17 U	0.24 U	17 J	9 J	7.5	1.3	0.1 J	22 J
LOW MOLECULAR WEIGHT PAHS		53	54	0.25	64	0.17 U	0.17 U	0.15 U	0.16 U	0.15 U	4.7	63	55	0.17 U	0.25	0.16 U	0.18	0.24 U	27	21	14	1.4	0.19 U	26 U
N-BUTYLBENZENE		19	22	0.23	30	0.17 U	0.17 U	1.4	0.16 U	0.15 U	7.9	40	31	0.084 J	0.22	0.16 U	0.049 J	0.24 U	18 J	8.7 J	7.1	4.7	0.098 J	25 J
N-PROPYLBENZENE		45	64	0.55	84	0.053 J	0.17 U	0.15 U	0.16 U	0.15 U	8.4	130	89	0.31	0.59	0.16 U	0.14 J	0.067 J	54 J	26 J	23	10	0.33	70
SEC-BUTYLBENZENE		5.7	14 U	0.078 J	9.1	0.17 U	0.17 U	0.12 J	0.16 U	0.15 U	2.6	14 J	25 U	0.17 U	0.08 J	0.16 U	0.17 U	0.24 U	13 U	1.2 U	1.9 U	1.6	0.19 U	7.2 J
TERT-BUTYLBENZENE		2.9 U	14 U	0.18 U	2.7 U	0.17 U	0.17 U	0.15 U	0.16 U	0.15 U	1.2 U	25 U	25 U	0.17 U	0.14 U	0.16 U	0.17 U	0.24 U	13 U	1.2 U	1.9 U	0.18 U	0.19 U	26 U
TOTAL PAHS		53	54	0.25	64	0.17 U	0.17 U	0.15 U	0.16 U	0.15 U	4.7	63	55	0.17 U	0.25	0.16 U	0.18	0.24 U	27	21	14	1.4	0.19 U	26 U
TOTAL XYLENES		900	790	6.5	270	1	0.52 U	0.44 U	0.46 U	0.44 U	300	1900	1300	1	1.5	0.47 U	1.8	1.3	850 J	410 J	360	5	1.9	30 J

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TABLE 3-3

ROUND 4 SOIL ANALYTICAL RESULTS
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

LOCATION_ID		NEX-DB16	NEX-DB16	NEX-DB17	NEX-DB17	NEX-DB18	NEX-DB18	NEX-DB19	NEX-DB19	NEX-MW300	NEX-MW300	NEX-MW301	NEX-MW301
SAMPLE_DATE		10/30/07	10/30/07	10/30/07	10/30/07	10/29/07	10/29/07	10/29/07	10/29/07	10/30/07	10/30/07	10/30/07	10/30/07
SAMPLE_ID		NEX-SO4-DB16-0809-D	NEX-SO4-DB16-0910	NEX-SO4-DB17-0809	NEX-SO4-DB17-0910	NEX-SO4-DB18-0809	NEX-SO4-DB18-1415	NEX-SO4-DB19-0809	NEX-SO4-DB19-1213	NEX-SO4-MW300-0910	NEX-SO4-MW300-1213	NEX-SO4-MW301-0708	NEX-SO4-MW301-0910
TOP_DEPTH		8	9	8	9	8	14	8	12	9	12	7	9
BOTTOM_DEPTH		9	10	9	10	9	15	9	13	10	13	8	10
QC_TYPE		FD											
SACODE		DUPLICATE											
	CRITERIA												
Gasoline Range Organic Analysis (mg/Kg) [1]	**500 [2]**	9300	160 J	2.5 U	2.9 U	3400	3.1 U	1500 J	12	230	15	2.5 U	3.0 U
Volatile Petroleum Hydrocarbons (mg/Kg)[3]													
C5-C8 ALIPHATICS-UNADJ		5200 J	110 UJ	25 U	29 U	1200 J	31 U	670 UJ	30 U	87 J	31 UJ	25 UJ	30 UJ
C9-C12 ALIPHATICS-UNADJ		5700 J	110 UJ	25 U	29 U	2400 J	31 U	960 J	30 U	200 J	31 UJ	25 UJ	30 UJ
Total VPH (Sum of unadjusted C5 - C12 Aliphatics)		10900	110 UJ	25 U	29 U	3600	31 U	960	30 U	287	31 UJ	25 UJ	30 UJ
VPH Ranges (mg/Kg)													
C5-C8 ALIPHATICS		5200 J	110 UJ	25 U	29 U	1200 J	31 U	670 UJ	30 U	91 J	31 UJ	25 UJ	30 UJ
C9-C10 AROMATICS		3900 J	140 J	25 U	29 UJ	1600 J	31 U	860 J	30 U	120	31 UJ	25 UJ	30 UJ
C9-C12 ALIPHATICS		1700 UJ	110 UJ	25 U	29 U	680 J	31 U	670 UJ	30 U	89 J	31 UJ	25 UJ	30 UJ
Targeted VPH Analytes (mg/Kg)													
BENZENE		30 U	0.14 U	0.14 U	0.16 U	0.17 UJ	0.17 U	0.19 UJ	0.17 U	0.17 U	0.17 U	0.14 U	0.17 U
ETHYLBENZENE		27 J	0.48 J	0.14 U	0.16 U	31	0.17 U	4.6 J	0.041 J	1.8	0.17 U	0.14 U	0.17 U
M+P-XYLENES		220 J	4.4 J	0.28 U	0.32 U	110	0.35 U	NA	0.26 J	2.2	0.34 U	0.29 U	0.33 U
NAPHTHALENE		30 U	0.79	0.14 U	0.16 U	3.4 J	0.17 U	3 J	0.17 U	0.81	0.17 U	0.14 U	0.17 U
O-XYLENE		25 J	0.7	0.14 U	0.16 U	20	0.17 U	0.53 J	0.17 U	0.54	0.17 U	0.14 U	0.17 U
TOLUENE		30 U	0.14 U	0.14 U	0.16 U	2.7 J	0.17 U	0.19 UJ	0.17 U	0.76	0.17 U	0.14 U	0.17 U
METHYL TERT-BUTYL ETHER		30 U	0.14 U	0.14 U	0.16 U	0.17 UJ	0.17 U	0.19 UJ	0.17 U	0.17 U	0.17 U	0.14 U	0.17 U
Total Aliphatics (C5-C8, C9-C12) (mg/Kg)		5200 J	110 UJ	25 U	29 U	1880 J	31 U	670 UJ	30 U	180 J	31 UJ	25 UJ	30 UJ
Sum of Aromatics (w/o BTEX)		3900 J	140 J	25 U	29 UJ	1600 J	31 U	860 J	30 U	120	31 UJ	25 UJ	30 UJ
Sum of BTEX		277 J	5.48 J	0.21 U	0.24 U	163.7 J	0.26 U	24.6 J	0.301 J	5.26	0.26 U	0.21 U	0.25 U
Total Aromatics (C9-C10 & targeted analytes)[4] (mg/Kg)		3900 J	140 J	25 U	29 UJ	1600 J	31 U	860 J	30 U	120	31 UJ	25 UJ	30 UJ
Total VPH		9100 J	140 J	25 U	29 UJ	3480 J	31 U	860 J	30 U	300 J	31 UJ	25 UJ	30 UJ
BTEX as % of Total Aromatics		7%	4%	NA	NA	10%	NA	3%	NA	4%	NA	NA	NA
BTEX as % of Total VPH		3%	4%	NA	NA	5%	NA	3%	NA	2%	NA	NA	NA
BTEX as % of GRO		3%	3%	NA	NA	5%	NA	2%	3%	2%	0%	NA	NA
Total Aromatics as % of Total VPH		43%	100%	NA	NA	46%	NA	100%	NA	40%	NA	NA	NA
Total Aromatics as % of GRO		42%	88%	NA	NA	47%	NA	57%	0%	52%	0%	NA	NA
Total Aliphatics as % of Total VPH		57%	0%	NA	NA	54%	NA	0%	NA	60%	NA	NA	NA
Total Aliphatics as % of GRO		56%	0%	NA	NA	55%	NA	0%	0%	78%	0%	NA	NA
TOTAL SOLIDS %		82	82	85	79	81	80	78	79	82	80	91	84
OTHER VOCs (mg/Kg)													
1,2,4-TRIMETHYLBENZENE		540	13	0.14 U	0.16 U	160	0.17 U	NA	0.28	4.3	0.037 J	0.14 U	0.17 U
1,3,5-TRIMETHYLBENZENE		190	4.5 J	0.14 U	0.16 U	64	0.17 U	NA	0.11 J	0.9	0.17 U	0.14 U	0.17 U
4-ISOPROPYLTOLUENE		7.4 J	0.21	0.14 U	0.16 U	3.9 J	0.17 U	1.3 J	0.17 U	0.17 U	0.17 U	0.14 U	0.17 U
ISOPROPYLBENZENE		27 J	0.7 J	0.14 U	0.16 U	4.9 J	0.17 U	4.8 J	0.17 U	0.15 J	0.17 U	0.14 U	0.17 U
LOW MOLECULAR WEIGHT PAHS		30 U	0.79	0.14 U	0.16 U	3.4 J	0.17 U	3 J	0.17 U	0.81	0.17 U	0.14 U	0.17 U
N-BUTYLBENZENE		29 J	0.85 J	0.14 U	0.16 U	6.6 J	0.17 U	4.9 J	0.17 U	0.095 J	0.17 U	0.14 U	0.17 U
N-PROPYLBENZENE		83	2.1 J	0.14 U	0.16 U	14 J	0.17 U	NA	0.042 J	0.26	0.17 U	0.14 U	0.17 U
SEC-BUTYLBENZENE		30 U	0.14 UJ	0.14 U	0.16 U	2.6	0.17 U	1.6 J	0.17 U	0.17 U	0.17 U	0.14 U	0.17 U
TERT-BUTYLBENZENE		30 U	0.14 UJ	0.14 U	0.16 U	0.23 J	0.17 U	0.1 J	0.17 U	0.17 U	0.17 U	0.14 U	0.17 U
TOTAL PAHS		30 U	0.79	0.14 U	0.16 U	3.4 J	0.17 U	3 J	0.17 U	0.81	0.17 U	0.14 U	0.17 U
TOTAL XYLENES		250 J	5 J	0.42 U	0.48 U	130	0.52 U	20 J	0.26 J	2.7	0.52 U	0.43 U	0.5 U

Notes:
1) Maine HETL Method 4.2.17
2) Site-specific Remediation Goal of 500 mg/Kg
3) Massachusetts DEP Method for Determining Volatile Petroleum Hydrocarbons, May 2004, Rev. 1.1
4) without MTBE

Abbr:
* - From dilution analysis
J - Quantitation approximate
NA - Not Applicable
U - Not detected;
UJ - Detection limit approximate
TB - trip blank
RB - rinsate blank
black background = criterion

TABLE 3-4

SUMMARY OF SOIL GRO AND VPH DATA
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE
PAGE 1 OF 5

LOCATION-DEPTH	SAMPLE ROUND	DATE	GRO[1]	VPH[2]	VPH Aro[3]	VPH Ali[4]
DB01-0809	Baseline	Sep-04	10000	NA	NA	NA
DB01-0809	1	Mar-05	11000	16000	8240	7000
DB01-0809	2	Oct-05	6100	3333	3333	2300 U
DB01-0809	3	Jul-06	6300	7900	4700	3200
DB01-0809	4	Oct-07	8400	6000	3300	2700
DB01-1213	Baseline	Sep-04	3.5 U	NA	NA	NA
DB01-1213	1	Mar-05	52	31 U	3.2	30 U
DB01-1213	2	Oct-05	5.3	27 U	27 U	27 U
DB01-1213	3	Jul-06	28	3.3	3.3	32 U
DB01-1213	4	Oct-07	78	41	41	32 U
DB03-1011	Baseline	Sep-04	8900	NA	NA	NA
DB03-1011	1	Mar-05	8800	6800	2799	3400
DB03-1011	2	Oct-05	120	133.9	72.9	61
DB03-1011	3	Jul-06	7200	10510	4710	5800
DB03-1011	4	Oct-07	7300	9900	8000	1900
DB03-1213	Baseline	Sep-04	11 U	NA	NA	NA
DB03-1213	1	Mar-05	52	31	2.9	28
DB03-1213	2	Oct-05	3.2U	29 U	29 U	29 U
DB03-1213	3	Jul-06	6.3	42 U	42 U	27 U
DB03-1213	4	Oct-07	3.9 U	31 U	31 U	31 U
DB05-0809	Baseline	Sep-04	5300	NA	NA	NA
DB05-0809	1	Mar-05	220	340	42	290
DB05-0809	2	Oct-05	370	720	120	580
DB05-0809	3	Jul-06	580	413	150	263
DB05-0809	4	Oct-07	760	610	250	360
DB05-0910	Baseline	Sep-04	18 U	NA	NA	NA
DB05-0910	1	Mar-05	2.5 U	31	2.9	28
DB05-0910	2	Oct-05	32	31 U	31 U	31 U
DB05-0910	3	Jul-06	3500	4900	1700	3200
DB05-0910	4	Oct-07	1200	1150	280	870
DB08-0809	Baseline	Sep-04	3.0 U	NA	NA	NA
DB08-0809	1	Mar-05	2.6 U	28 U	1.3 U	27 U
DB08-0809	2	Oct-05	0.9	27 U	27 U	27 U
DB08-0809	3	Jul-06	3.6 U	42 U	42 U	42 U
DB08-0809	4	Oct-07	2.8 U	28 U	28 U	28 U
DB08-1011	Baseline	Sep-04	2.5 U	NA	NA	NA
DB08-1011	1	Mar-05	2.8 U	28 U	2.6 U	27 U
DB08-1011	2	Oct-05	3.1 U	27 U	27 U	27 U
DB08-1011	3	Jul-06	3.1 U	42 U	42 U	42 U
DB08-0910	4	Oct-07	2.6 U	26 U	26 U	26 U
DB09-0809	Baseline	Sep-04	9000	NA	NA	NA
DB09-0809	1	Mar-05	11000	9800	2240	3400
DB09-0809	2	Oct-05	820	1000	1000	1000 U
DB09-0809	3	Jul-06	540	330	160	170
DB09-0809	4	Oct-07	3400	3730	2300	1430

TABLE 3-4

SUMMARY OF SOIL GRO AND VPH DATA
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE
PAGE 2 OF 5

LOCATION-DEPTH	SAMPLE ROUND	DATE	GRO[1]	VPH[2]	VPH Aro[3]	VPH Ali[4]
DB09-1112	Baseline	Sep-04	19 U	NA	NA	NA
DB09-1112	1	Mar-05	17	32 U	1.3 U	32 U
DB09-1112	2	Oct-05	4.9 U	53 U	53 U	53 U
DB09-1112	3	Jul-06	370	319	209	110
DB09-1011	4	Oct-07	12000	9800	5500	4300
DB10-0708	Baseline	Sep-04	3 U	2.9 U	1.7 U	6.4 U
DB10-0708	2	Oct-05	3 U	12 U	6.3 U	30 U
DB10-0809	4	Oct-07	25	30 U	30 U	30 U
DB10-0910	Baseline	Sep-04	5.6	30	1.8 U	30
DB10-0910	1	Mar-05	720	610	242	27 U
DB10-0910	2	Oct-05	1600	1120	480	640
DB10-0910	3	Jul-06	2200	1667	727	940
DB10-0910	4	Oct-07	42	31	31	25 U
DB10-1212	Baseline	Sep-04	3.4 U	NA	NA	NA
DB10-1212	1	Mar-05	2.5 U	27 U	1.3 U	27 U
DB10-1212	2	Oct-05	2.7 U	29 U	29 U	29 U
DB10-1212	3	Jul-06	3 U	38 U	38 U	38 U
DB12-0910	Baseline	Sep-04	3.1 U	NA	NA	NA
DB12-0910	1	Mar-05	3.3 U	33 U	1.6 U	33 U
DB12-0910	2	Oct-05	2.5 U	27 U	27 U	27 U
DB12-0910	3	Jul-06	2.7 U	37 U	37 U	37 U
DB12-0910	4	Oct-07	2.9 U	28 U	28 U	28 U
DB13-0910	Baseline	Sep-04	12	NA	NA	NA
DB13-0910	1	Mar-05	17	30 U	1.4 U	30 U
DB13-0910	2	Oct-05	14	4.3	4.3	27 U
DB13-0910	3	Jul-06	6.7	9.6	9.6	33 U
DB13-1011	4	Oct-07	8.9	31 U	31 U	31 U
DB13-1213	Baseline	Sep-04	3.7 U	NA	NA	NA
DB13-1213	1	Mar-05	6.2	30 U	1.5 U	30 U
DB13-1213	2	Oct-05	2.5 U	27 U	27 U	27 U
DB13-1213	3	Jul-06	3.9 J	5.6	5.6	42 U
DB13-1213	4	Oct-07	4.3 U	43 U	43 U	43 U
DB14-0910	4	Oct-07	5400	4800	2200	2600
DB14-1011	4	Oct-07	2400	2200	1000	1200
DB14-1112	3	Jul-06	1300	1388	698	690
DB15-0809	Baseline	Sep-04	76	NA	NA	NA
DB15-0809	1	Mar-05	260	320	130	170
DB15-0809	2	Oct-05	250	139	110	29
DB15-0809	3	Jul-06	1200	1217	697	520
DB15-0809	4	Oct-07	1300	1340	630	710
DB15-1011	Baseline	Sep-04	14	NA	NA	NA
DB15-1011	1	Mar-05	18	30 U	1.4 U	30 U

TABLE 3-4

SUMMARY OF SOIL GRO AND VPH DATA
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE
PAGE 3 OF 5

LOCATION-DEPTH	SAMPLE ROUND	DATE	GRO[1]	VPH[2]	VPH Aro[3]	VPH Ali[4]
DB15-1011	2	Oct-05	36	27 U	27 U	27 U
DB15-1011	3	Jul-06	3.4 U	2.1	2.1	34 U
DB15-0910	4	Oct-07	43	34 U	34 U	34 U
DB16-0809	4	Oct-07	7800	5200	3600	1600
DB16-0910	3	Jul-06	38	49.3	3.3	46
DB16-0910	4	Oct-07	160	140	140	110 U
DB17-0809	Baseline	Sep-04	5.4	NA	NA	NA
DB17-0809	1	Mar-05	2.5 U	27 U	1.3 U	27 U
DB17-0809	2	Oct-05	3.1 U	36 U	36 U	36 U
DB17-0809	3	Jul-06	4.3 U	42 U	42 U	42 U
DB17-0809	4	Oct-07	2.5 U	25 U	25 U	25 U
DB17-0910	Baseline	Sep-04	2.8 U	NA	NA	NA
DB17-0910	1	Mar-05	3.4	30 U	1.4 U	30 U
DB17-0910	2	Oct-05	2.5 U	27 U	27 U	27 U
DB17-0910	3	Jul-06	3.4	37 U	37 U	37 U
DB17-0910	4	Oct-07	2.9 U	29 U	29 U	29 U
DB18-0910	Baseline	Sep-04	NA	NA	NA	NA
DB18-0910	1	Mar-05	16	28 U	6.1	29 U
DB18-0910	2	Oct-05	20	27 U	27 U	27 U
DB18-0910	3	Jul-06	53	18	18	37 U
DB18-0809	4	Oct-07	3400	3480	1600	1880
DB18-1415	Baseline	Sep-04	NA	NA	NA	NA
DB18-1415	1	Mar-05	5.9	29 U	18.6	29 U
DB18-1415	2	Oct-05	7.9	27 U	27 U	27 U
DB18-1415	3	Jul-06	3.5 U	2	2	34 U
DB18-1415	4	Oct-07	3.1 U	31 U	31 U	31 U
DB19-0809	Baseline	Sep-04		NA	NA	NA
DB19-0809	1	Mar-05	7000	12100	6830	3300
DB19-0809	2	Oct-05	4600	7316	3316	4000
DB19-0809	3	Jul-06	1200	1606	716	890
DB19-0809	4	Oct-07	1500	860	860	670 U
DB19-1213	Baseline	Sep-04	NA	NA	NA	NA
DB19-1213	1	Mar-05	5.7	30 U	1.4 U	30 U
DB19-1213	2	Oct-05	2.5 U	27 U	27 U	27 U
DB19-1213	3	Jul-06	4.2	31 U	31 U	31 U
DB19-1213	4	Oct-07	12	30 U	30 U	30 U
MW300-0910	Baseline	Sep-04	10	NA	NA	NA
MW300-0910	1	Mar-05	16	28 U	1.4 U	28 U
MW300-0910	2	Oct-05	220	711.8	191.9	520
MW300-0910	3	Jul-06	51	36	30 U	36
MW300-0910	4	Oct-07	230	300	120	180
MW300-1213	Baseline	Sep-04	2.6 U	NA	NA	NA
MW300-1213	1	Mar-05	7.5	31 U	1.5 U	31 U

TABLE 3-4

SUMMARY OF SOIL GRO AND VPH DATA
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE
PAGE 4 OF 5

LOCATION-DEPTH	SAMPLE ROUND	DATE	GRO[1]	VPH[2]	VPH Aro[3]	VPH Ali[4]
MW300-1213	2	Oct-05	22	27 U	27 U	27 U
MW300-1213	3	Jul-06	3.7 U	36 U	36 U	36 U
MW300-1213	4	Oct-07	15	31 U	31 U	31 U
MW301-0708	Baseline	Sep-04	3.3 U	9.5	2.4	9.5
MW301-0708	1	Mar-05	13	30 U	1.4 U	30 U
MW301-0708	2	Oct-05	0.82	27 U	27 U	27 U
MW301-0708	3	Jul-06	3.5 U	34 U	34 U	34 U
MW301-0708	4	Oct-07	2.5 U	25 U	25 U	25 U
MW301-0910	Baseline	Sep-04	2.9 U	NA	NA	NA
MW301-0910	1	Mar-05	7	27 U	1.7	27 U
MW301-0910	2	Oct-05	2.5 U	27 U	27 U	27 U
MW301-0910	3	Jul-06	2.9 U	28 U	28 U	28 U
MW301-0910	4	Oct-07	3 U	30 U	30 U	30 U
MW302-0304	Baseline	Sep-04	2.5 U	NA	NA	NA
MW302-0304	1	Mar-05	2.8 U	28 U	1.7	28 U
MW302-0304	2	Oct-05	2.5 U	27 U	27 U	27 U
MW302-0304	3	Jul-06	3.1 U	31 U	31 U	31 U
MW302-0506	Baseline	Sep-04	2.9 U	NA	NA	NA
MW302-0506	1	Mar-05	3.1 U	33	3.2	33
MW302-0506	2	Oct-05	2.5 U	27 U	27 U	27 U
MW302-0506	3	Jul-06	2.8 U	28 U	28 U	28 U
SOIL SUMMARY STATISTICS						
		1st Quartile	**Min.**	**Median**	**Max.**	**3rd Quartile**
GRO Sep 2004	Baseline	0	0	0	10000	11.5
GRO Mar 2005	1	0	0	13	11000	52
GRO Oct 2005	2	0	0	3.1	6100	99
GRO Jul 2006	3	0	0	6.3	6300	560
GRO Oct 2007	4	0	0	5.25	6100	497.5
VPH ARO Mar 2005	1	0	0	1.7	8240	18.6
VPH ARO Oct 2005	2	0	0	0	3333	55.75
VPH ARO Jul 2006	3	0	0	2.1	4820	184.5
VPH ARO Oct 2007	4	0	0	31	8000	930
VPH ALI Mar 2005	1	0	0	0	7000	28
VPH ALI Oct 2005	2	0	0	0	4000	0
VPH ALI Jul 2006	3	0	0	0	5200	216.5
VPH ALI Oct 2007	4	0	0	0	4300	1035
VPH ARO Mar 2005 (GRO or VPH > 500)	1	1889	242	3536	6830	5183
VPH ARO Oct 2005 (GRO or VPH > 500)	2	1579	150	3324.5	4820	4358.25
VPH ARO Jul 2006 (GRO or VPH > 500)	3	488.5	250	716	8000	2013.5
VPH ARO Oct 2007 (GRO or VPH > 500)	4	930	630	1600	5500	2900
VPH ALI Mar 2005 (GRO or VPH > 500)	1	290	0	580	3300	1940
VPH ALI Oct 2005 (GRO or VPH > 500)	2	130	0	1860	5200	3800

TABLE 3-4

SUMMARY OF SOIL GRO AND VPH DATA
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE
PAGE 5 OF 5

LOCATION-DEPTH	SAMPLE ROUND	DATE	GRO[1]	VPH[2]	VPH Aro[3]	VPH Ali[4]
VPH ALI Jul 2006 (GRO or VPH > 500)	3	695	360	890	2700	1420
VPH ALI Oct 2007 (GRO or VPH > 500)	4	955	0	1600	4300	2240

Notes:
1. GRO - gasoline range organics, by Maine HETL Method 4.2.17 (mg/Kg).
2. VPH - volatile petroleum hydrocarbons, Massachusetts VPH Method (May 2004, rev. 1.1) (mg/Kg). Total VPH = sum of C5-C12 aliphatics, C9-C10 aromatics, and targeted VPH aromatics w/o MTBE.
3. VPH Aro - C9-C10 aromatics & targeted analytes w/o MTBE. (mg/Kg).
4. VPH Ali - C5-C8 & C9-C12 aliphatics (mg/Kg).
5. Non-detect values = 0 for statistical analysis. Data in mg/Kg.
Abbr: NA - Not Analyzed

TABLE 3-5

ROUND 4 BLANK ANALYTICAL RESULTS
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE
PAGE 1 OF 2

LOCATION_ID	QC	QC	QC	QC	QC	QC	QC	QC
SAMPLE_DATE	10/31/07	11/01/07	11/01/07	10/30/07	10/31/07	10/30/07	10/30/07	10/30/07
SAMPLE_ID	NEX-GW4-TB01	NEX-GW4-TB02	NEX-GW4-TB03	NEX-SO4-FB01	NEX-SO4-FB02-DIUF	NEX-SO4-RB01	NEX-SO4-RB02	NEX-SO4-TB01
QC_TYPE	TB	TB	TB	FB	FB	RB	RB	TB
UNITS	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/Kg
Gasoline Range Organic Analysis [1]	10 U	10 U	NA	10 U	7.3 J	10 U	10 U	2.5 U
C5-C8 ALIPHATICS-UNADJ	100 U	100 U	NA	100 U	100 U	100 U	100 U	25 UJ
C9-C12 ALIPHATICS-UNADJ	100 U	100 U	NA	100 U	100 U	100 U	100 U	25 UJ
VPH Ranges (mg/Kg)								
C5-C8 ALIPHATICS	100 U	100 U	NA	100 U	100 U	100 U	100 U	25 UJ
C9-C10 AROMATICS	100 U	100 U	NA	100 U	100 U	100 U	100 U	25 U
C9-C12 ALIPHATICS	100 U	100 U	NA	100 U	100 U	100 U	100 U	25 UJ
Targeted VPH Analytes								
BENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
ETHYLBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
M+P-XYLENES	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.25 U
NAPHTHALENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
O-XYLENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
TOLUENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
METHYL TERT-BUTYL ETHER	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
Total Aliphatics (C5-C8, C9-C12)	100 U	100 U	NA	100 U	100 U	100 U	100 U	25 UJ
Sum of Aromatics (w/o BTEX)	100 U	100 U	NA	100 U	100 U	100 U	100 U	25 U
Sum of BTEX	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	0.18 U
Total Aromatics (C9-C10 & targeted analytes)[4] (mg/Kg)	18 U	18 U	1.4 U	18 U	18 U	18 U	18 U	25 U
Total VPH	38 U	38 U	1.4 U	38 U	38 U	38 U	38 U	25 UJ
OTHER VOCs								
1,1,1,2-TETRACHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,1,1-TRICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,1,2,2-TETRACHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,1,2-TRICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,1-DICHLOROETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,1-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,1-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,2,3-TRICHLOROBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,2,3-TRICHLOROPROPANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,2,4-TRICHLOROBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,2,4-TRIMETHYLBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,2-DIBROMO-3-CHLOROPROPANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,2-DIBROMOETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,2-DICHLOROBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,2-DICHLOROETHANE	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U	0.12 U
1,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,3,5-TRICHLOROBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,3,5-TRIMETHYLBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,3-DICHLOROBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,3-DICHLOROPROPANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
1,4-DICHLOROBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
2,2-DICHLOROPROPANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
2-BUTANONE	5 U	5 U	5 U	5 U	4 J	4 J	4 J	0.62 U
2-CHLOROTOLUENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
2-HEXANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.62 U
4-CHLOROTOLUENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
4-ISOPROPYLTOLUENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
4-METHYL-2-PENTANONE	5 U	5 U	5 U	5 U	5 U	5 U	5 U	0.62 U
ACETONE	5 U	5 U	5 U	5 U	13	14	12	0.62 U
BROMOBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
BROMOCHLOROMETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
BROMODICHLOROMETHANE	1 U	1 U	1 U	24	1 U	1 U	1 U	0.12 U
BROMOFORM	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
BROMOMETHANE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.25 U
CARBON DISULFIDE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
CARBON TETRACHLORIDE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
CHLOROBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
CHLORODIBROMOMETHANE	1 U	1 U	1 U	8	1 U	1 U	1 U	0.12 U

TABLE 3-5

ROUND 4 BLANK ANALYTICAL RESULTS
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE
PAGE 2 OF 2

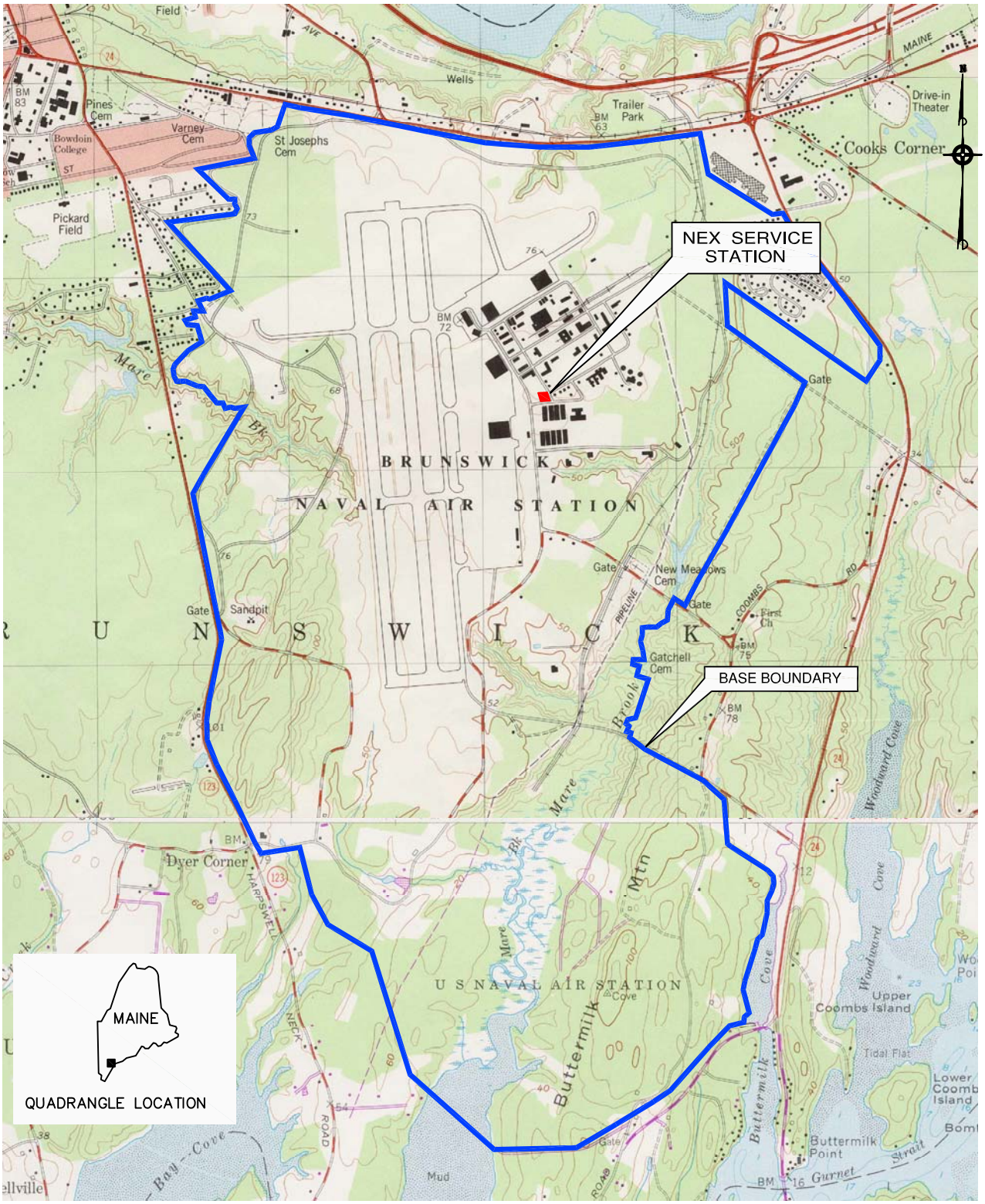
LOCATION_ID	QC	QC	QC	QC	QC	QC	QC	QC
SAMPLE_DATE	10/31/07	11/01/07	11/01/07	10/30/07	10/31/07	10/30/07	10/30/07	10/30/07
SAMPLE_ID	NEX-GW4-TB01	NEX-GW4-TB02	NEX-GW4-TB03	NEX-SO4-FB01	NEX-SO4-FB02-DIUF	NEX-SO4-RB01	NEX-SO4-RB02	NEX-SO4-TB01
QC_TYPE	TB	TB	TB	FB	FB	RB	RB	TB
UNITS	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	mg/Kg
OTHER VOCs (cont.)								
CHLOROETHANE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.25 U
CHLOROFORM	1 U	1 U	1 U	54	0.5 J	0.4 J	0.4 J	0.12 U
CHLOROMETHANE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.25 U
CIS-1,2-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
CIS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
DIBROMOMETHANE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
DICHLORODIFLUOROMETHANE	2 U	2 UJ	2 U	2 U	2 U	2 U	2 U	0.25 U
DIETHYL ETHER	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
HEXACHLOROBUTADIENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
ISOPROPYLBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
LOW MOLECULAR WEIGHT PAHS	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
METHYLENE CHLORIDE	0.6 J	7	6	5 U	5 U	5 U	5 U	0.62 U
N-BUTYLBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
N-PROPYLBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
SEC-BUTYLBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
STYRENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
TERT-BUTYLBENZENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
TETRACHLOROETHENE	1 UJ	1 U	1 U	1 UJ	1 UJ	1 UJ	1 UJ	0.12 U
TETRAHYDROFURAN	5 U	5 U	5 U	5 U	5 U	5 U	5 U	1.2 U
TOTAL 1,2-DICHLOROETHENE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.25 U
TOTAL CHLORINATED ETHENES	1.5 UJ	1.5 U	1.5 U	1.5 UJ	1.5 UJ	1.5 UJ	1.5 UJ	0.18 U
TOTAL CHLORINATED VOCS	0.6 J	7 J	6	86 J	0.5 J	0.4 J	0.4 J	0.16 U
TOTAL PAHS	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
TOTAL XYLENES	3 U	3 U	3 U	3 U	3 U	3 U	3 U	0.38 U
TRANS-1,2-DICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
TRANS-1,3-DICHLOROPROPENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
TRICHLOROETHENE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
TRICHLOROFLUOROMETHANE	2 U	2 UJ	2 U	2 U	2 U	2 U	2 U	0.25 U
VINYL ACETATE	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.12 U
VINYL CHLORIDE	2 U	2 U	2 U	2 U	2 U	2 U	2 U	0.25 U

Notes:
1) Maine HETL Method 4.2.17

3) Massachusetts DEP Method for Determining Volatile Petroleum Hydrocarbons, May 2004, Rev. 1.1
4) without MTBE

Abbr:
* - From dilution analysis
J - Quantitation approximate
NA - Not Applicable
U - Not detected;
UJ - Detection limit approximate
TB - trip blank
RB - rinsate blank

FIGURES



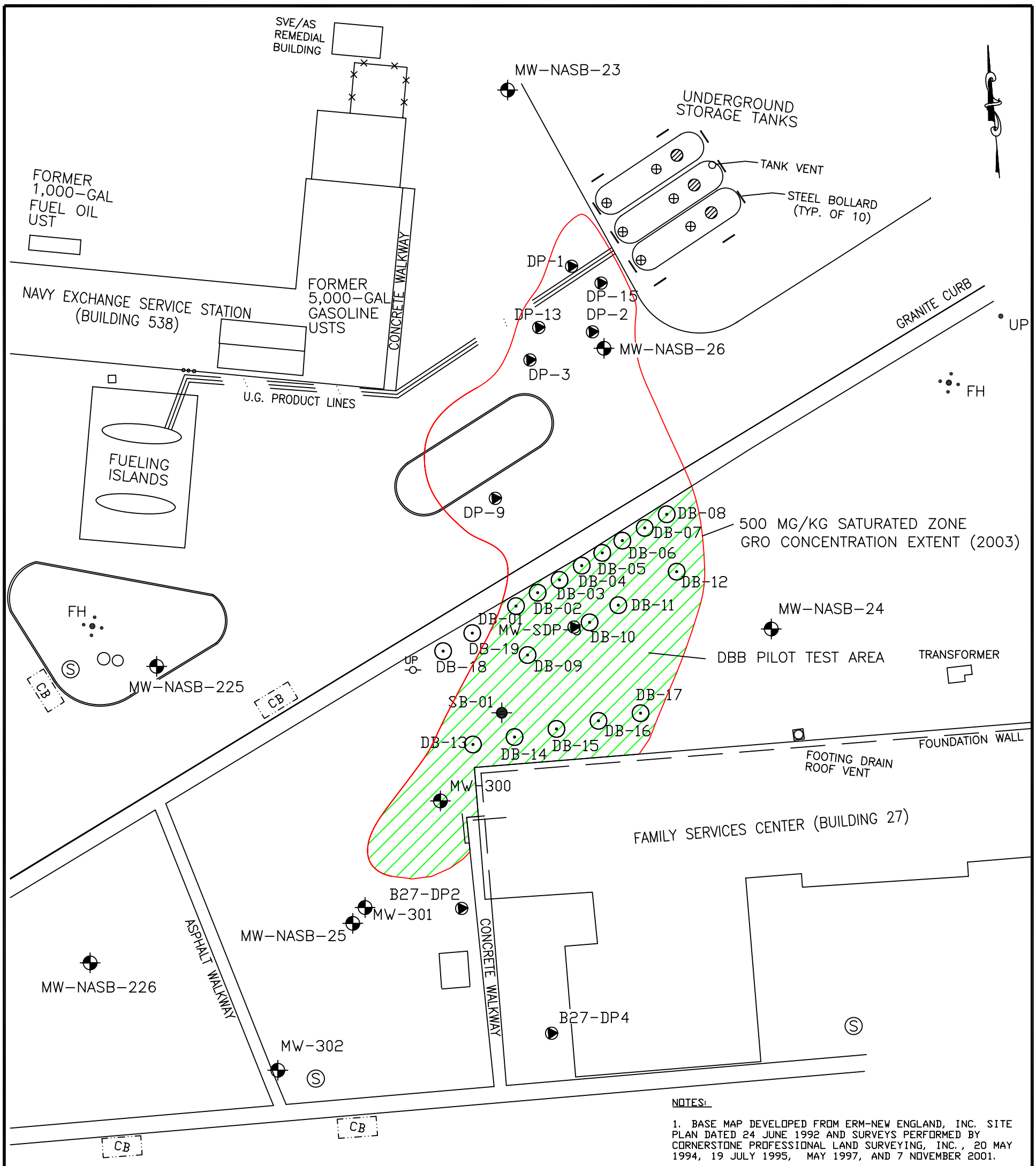
SOURCE: A PORTION OF THE FOLLOWING USGS QUADRANGLE SHEETS – BRUNSWICK, MAINE (1980) AND ORRS ISLAND, MAINE (1957, PHOTOREVISITED 1978)

1000′ 0′ 2000′ 4000′

TETRA TECH NUS, INC.

SITE LOCATION MAP
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

SCALE	AS NOTED
FILE	\4590\3515\FIG_1-1.DWG
REV	0
DATE	02/11/08
FIGURE NUMBER	1–1



NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 11 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

3. LOCATIONS NAD ELEVATIONS FOR ADDITION WELLS (DB-01 TO DB-17) AND NEW MONITORING WELLS (MW-300, -301, -302) SURVEYED BY OEST ASSOCIATES, INC. ON NOVEMBER 2, 2004.

4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-0	DIRECT-PUSH N-BLEND ADDITION WELL (2004)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
—— ——	UNDERGROUND STRUCTURE
	PILOT TEST AREA

GRAPHIC SCALE

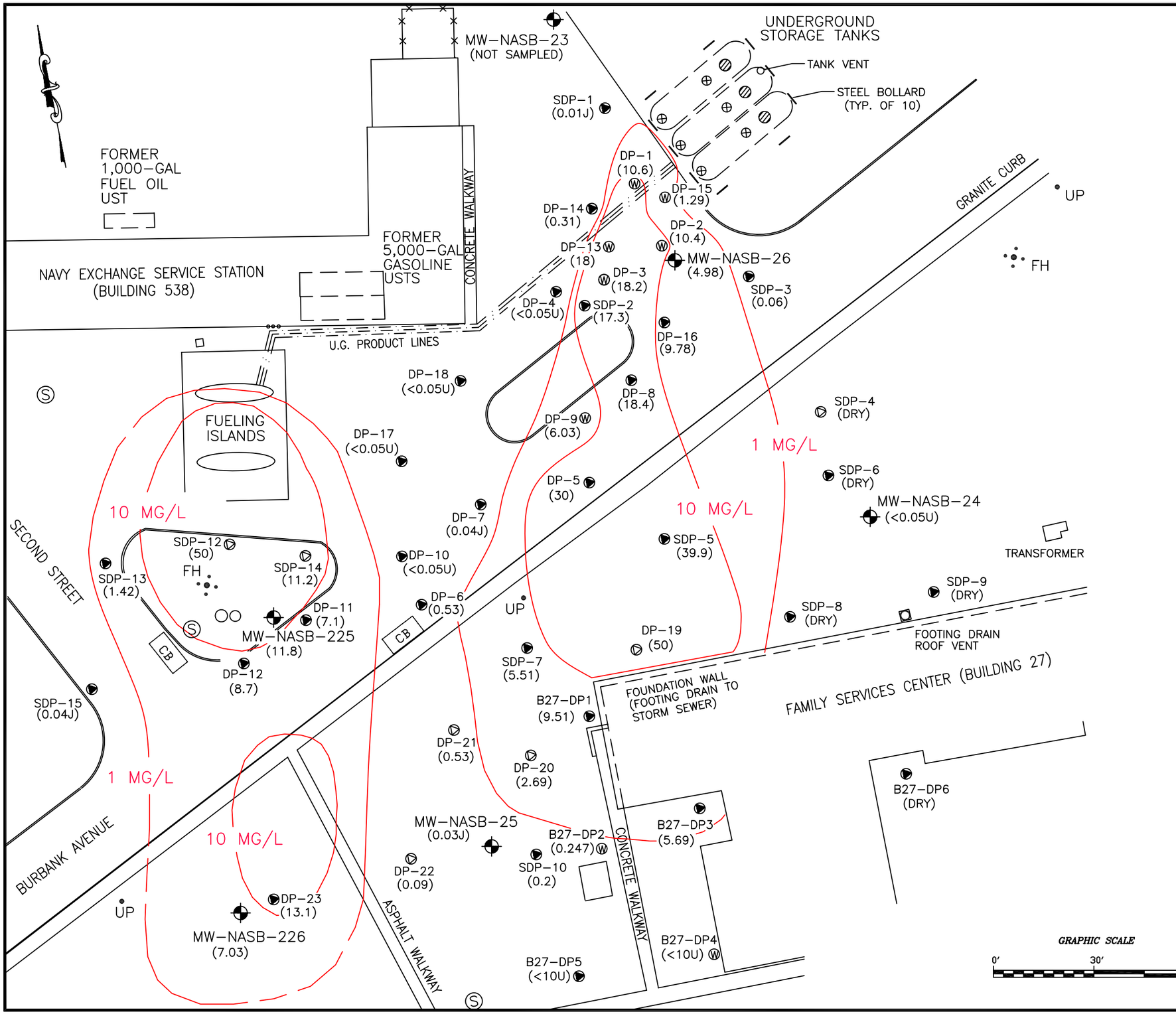
0′ 30′ 60′

TETRA TECH NUS, INC.

SITE PLAN & PILOT TEST
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-2.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
1-2	0	02/11/08



LEGEND

- MONITORING WELL
- FH — FIRE HYDRANT WITH BOLLARDS
- UP — UTILITY POLE
- CB — STORMWATER CATCH BASIN
- MANHOLE
- EXISTING CHAIN LINK FENCE
- UNDERGROUND STRUCTURE
- DIRECT-PUSH SOIL BORING (LOCATION CONFIRMED BY SURVEY)
- DIRECT-PUSH SOIL BORING (LOCATION BASED ON FIELD NOTES)
- DIRECT-PUSH SOIL BORING COMPLETED AS 1.5-IN. FLUSH MOUNT MONITORING WELL
- B27 = LIMITED DIRECT-PUSH INVESTIGATION AT BUILDING 27 (9-10 JUNE 2003).
- DP = POST-ISCO DIRECT PUSH SOIL BORING (22-24 MAY 2002).
- SDP = POST-ISCO SUPPLEMENTAL DIRECT-PUSH SOIL BORING (18-20 JUNE 2002).
- 1 MG/L — TOTAL DISSOLVED-PHASE TPH-GRO CONCENTRATION ISOPLETH (DASHED WHERE INFERRED)

NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 18 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

3. 1-IN. FLUSH MOUNTED MICRO-WELLS WERE INSTALLED AT POST-ISCO DIRECT-PUSH SOIL BORING LOCATION DP-19 AND POST-ISCO SUPPLEMENTAL DIRECT-PUSH SOIL BORING LOCATION SDP-5 ON 10 JUNE 2003.

4. NEWLY INSTALLED MICRO-WELLS (AT LOCATIONS DP-19 AND SPD-5) AND ALL B27 DIRECT-PUSH SOIL BORINGS (B27-DP1 THROUGH B27-DP6) WERE SURVEYED BY BRIAN SMITH SURVEYORS ON 10 JUNE 2003.

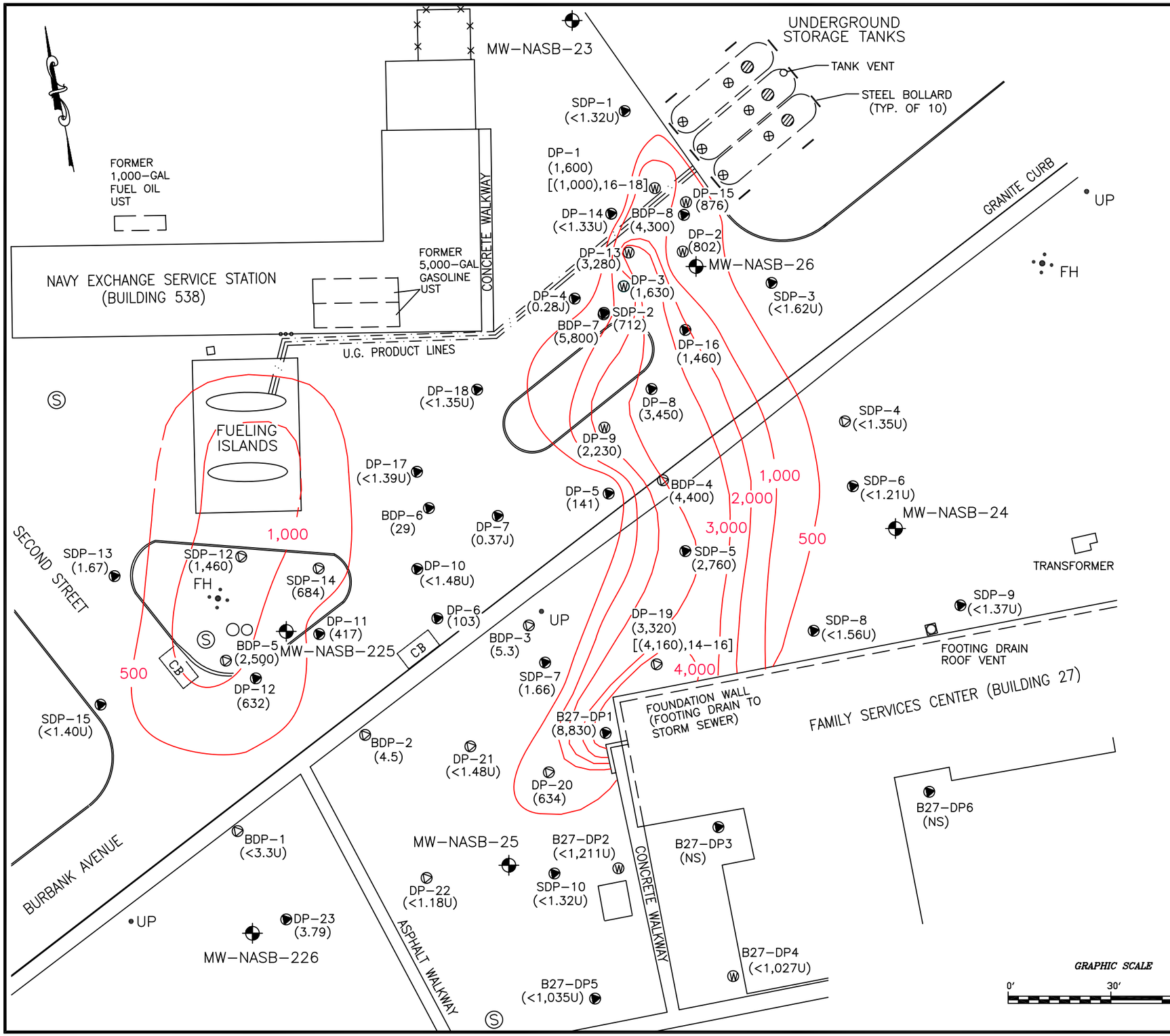
SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

TETRA TECH NUS, INC.

DISSOLVED-PHASE TPH-GRO CONCENTRATIONS FOLLOWING IN-SITU CHEMICAL OXIDATION INJECTION NAVAL EXCHANGE SERVICE STATION NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-3.DWG	AS NOTED
FIGURE NUMBER	**REV** / **DATE**
1-3	0 / 02/11/08



LEGEND

	MONITORING WELL
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORMWATER CATCH BASIN
S	MANHOLE
	EXISTING CHAIN LINK FENCE
	UNDERGROUND STRUCTURE
	DIRECT-PUSH SOIL BORING (LOCATION CONFIRMED BY SURVEY)
	DIRECT-PUSH SOIL BORING (LOCATION BASED ON FIELD NOTES)
	DIRECT-PUSH SOIL BORING COMPLETED AS 1.5-IN FLUSH MOUNT MONITORING WELL
DP-1 (1,600) [(1,000),16-18]	(TPH-GRO CONCENTRATION) (mg/kg) NS = NOT SAMPLED NOTE: UNLESS OTHERWISE NOTED, SOIL SAMPLING INTERVAL IS 8-12 FT BGS. [TPH-GRO CONCENTRATION AT 16-18 FT BGS]
500	TOTAL SORBED-PHASE TPH-GRO CONCENTRATION ISOPLETH (DASHED WHERE INFERRED)

B27 = LIMITED DIRECT-PUSH INVESTIGATION AT BUILDING 27 (9-10 JUNE 2003).
BDP = BASELINE DIRECT-PUSH SOIL BORING (20 MARCH 2002).
DP = POST-ISCO DIRECT PUSH SOIL BORING (22-24 MAY 2002).
SDP = POST-ISCO SUPPLEMENTAL DIRECT-PUSH SOIL BORING (18-20 JUNE 2002).

NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 11 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

3. BASELINE DIRECT-PUSH POINTS MAY OVER-REPRESENT CURRENT SATURATED ZONE TPH-GRO CONCENTRATIONS. TPH-GRO CONCENTRATION ISOPLETHS WERE DEVELOPED PRIMARILY BASED ON POST-ISCO DIRECT-PUSH DATA (i.e., DP AND SDP SOIL BORINGS).

4. 1-IN. FLUSH MOUNTED MICRO-WELLS WERE INSTALLED AT POST-ISCO DIRECT-PUSH SOIL BORING LOCATION DP-19 AND POST-ISCO SUPPLEMENTAL DIRECT-PUSH SOIL BORING LOCATION SDP-5 ON 10 JUNE 2003.

5. NEWLY INSTALLED MICRO-WELLS (AT LOCATIONS DP-19 AND SPD-5) AND ALL B27 DIRECT-PUSH SOIL BORINGS (B27-DP1 THROUGH B27-DP6) WERE SURVEYED BY BRIAN SMITH SURVEYORS ON 10 JUNE 2003.

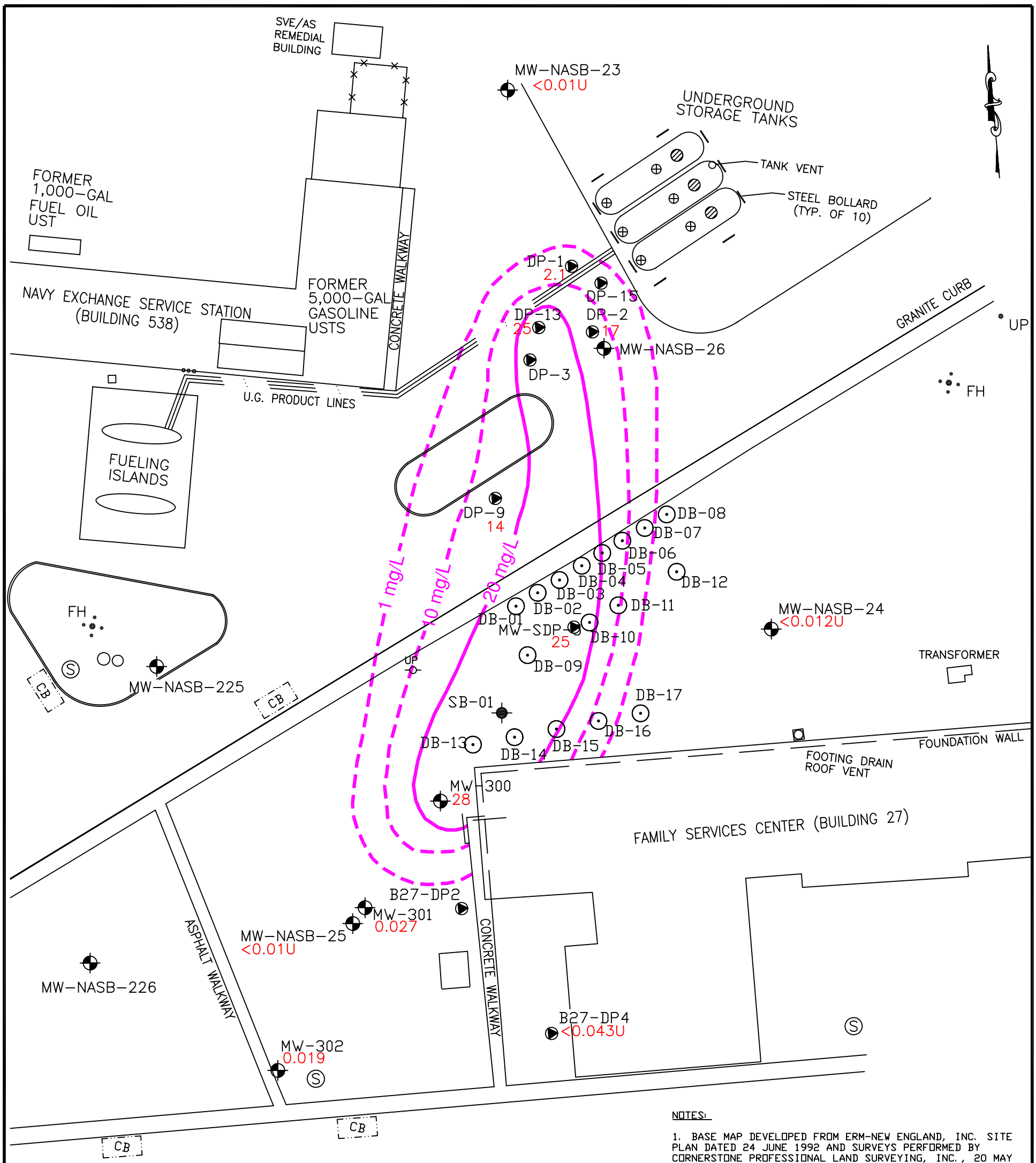
SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

TETRA TECH NUS, INC.

SATURATED ZONE SOIL TPH-GRO CONCENTRATIONS FOLLOWING IN-SITU CHEMICAL OXIDATION INJECTION NAVAL EXCHANGE SERVICE STATION NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-4.DWG	AS NOTED
FIGURE NUMBER	**REV** / **DATE**
1-4	0 / 02/11/08



LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-0	DIRECT-PUSH N-BLEND ADDITION WELL (2004)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
	EXISTING CHAIN LINK FENCE
	UNDERGROUND STRUCTURE
	LINE OF EQUAL GRO CONCENTRATION IN GROUNDWATER (mg/L) – DASHED WHERE ESTIMATED

GRAPHIC SCALE

0′ 30′ 60′

NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 11 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

3. LOCATIONS NAD ELEVATIONS FOR ADDITION WELLS (DB-01 TO DB-17) AND NEW MONITORING WELLS (MW-300,-301,-302) SURVEYED BY DEST ASSOCIATES, INC. ON NOVEMBER 2, 2004.

SOURCE:

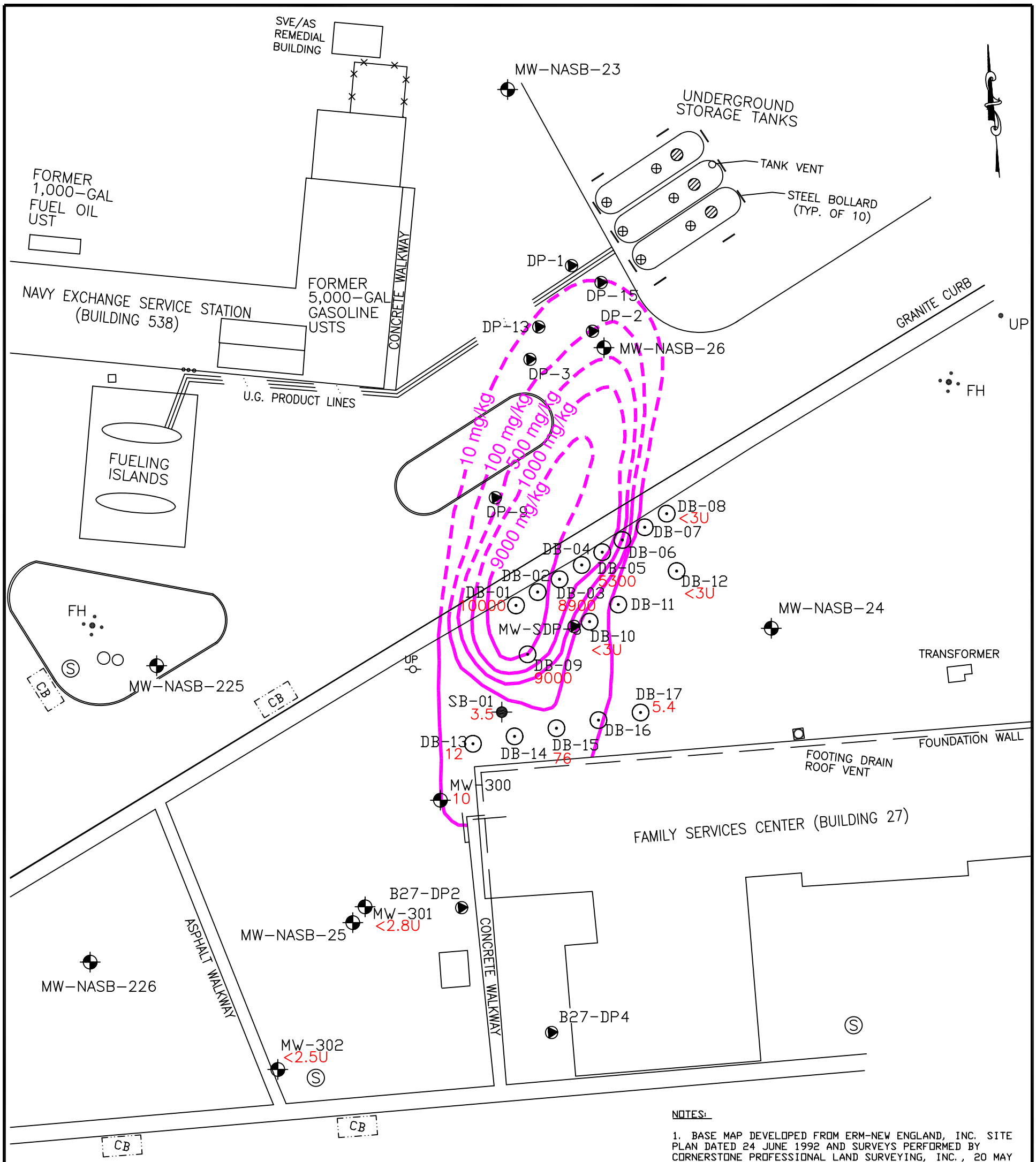
CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

TETRA TECH NUS, INC.

BASELINE 2004 DISSOLVED PHASE GRO CONCENTRATIONS IN GROUNDWATER
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-5.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
1-5	0	02/11/08



LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-0	DIRECT-PUSH N-BLEND ADDITION WELL (2004)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
	EXISTING CHAIN LINK FENCE
	UNDERGROUND STRUCTURE
	LINE OF EQUAL GRO CONCENTRATION IN SOIL (mg/kg) – DASHED WHERE ESTIMATED

GRAPHIC SCALE
0′ 30′ 60′

NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 11 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

3. LOCATIONS NAD ELEVATIONS FOR ADDITION WELLS (DB-01 TO DB-17) AND NEW MONITORING WELLS (MW-300,-301,-302) SURVEYED BY OEST ASSOCIATES, INC. ON NOVEMBER 2, 2004.

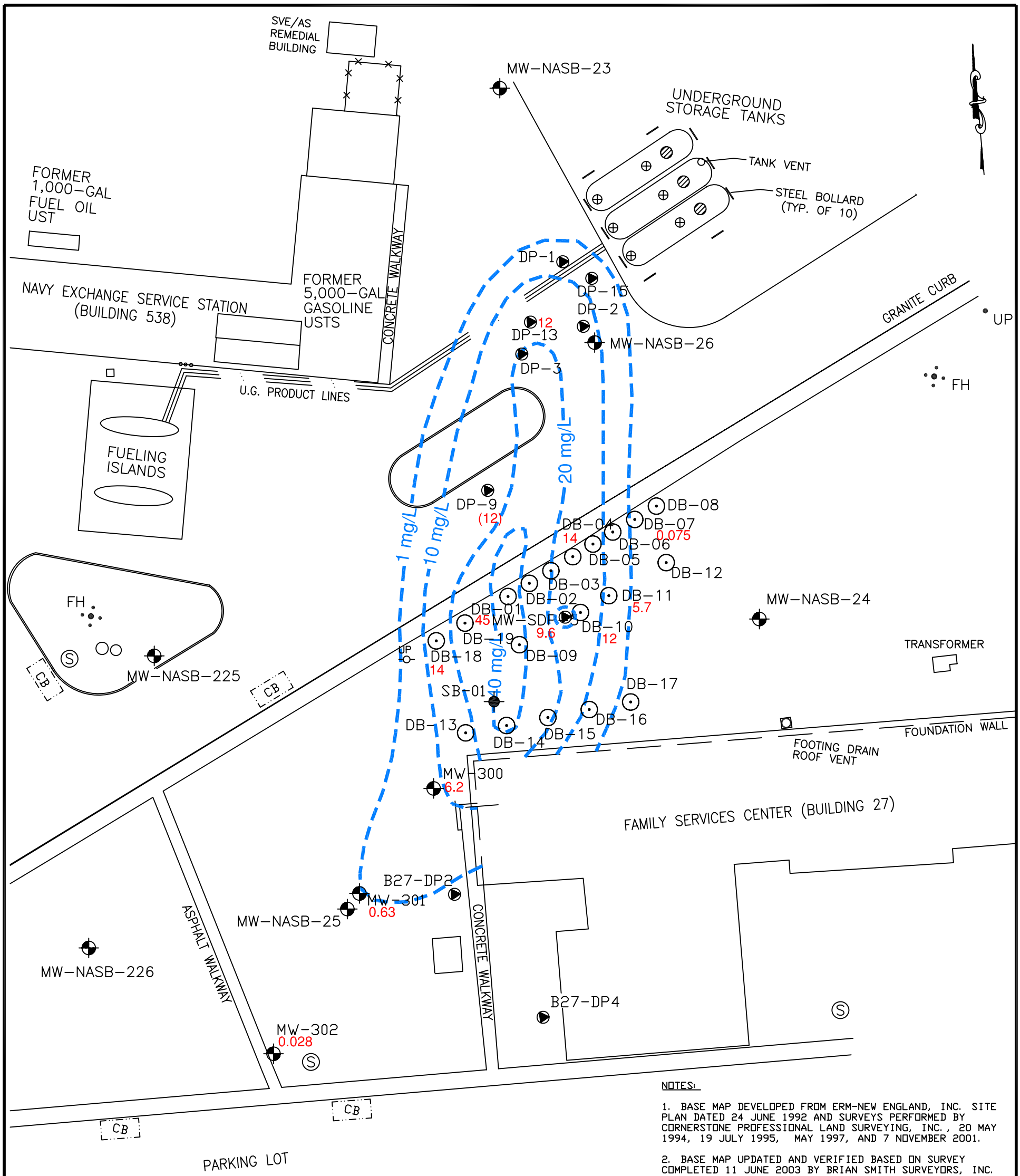
SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

TETRA TECH NUS, INC.

BASELINE (2004) SOIL GRO CONCENTRATIONS
UPPER SATURATED ZONE
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-6.DWG	AS NOTED
FIGURE NUMBER 1-6	REV 0 / DATE 02/11/08



NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 11 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

3. LOCATIONS NAD ELEVATIONS FOR ADDITION WELLS (DB-01 TO DB-17) AND NEW MONITORING WELLS (MW-300,-301,-302) SURVEYED BY DEST ASSOCIATES, INC. ON NOVEMBER 2, 2004.

4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-01	DIRECT-PUSH N-BLEND ADDITION WELL (2004/2005)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
	UNDERGROUND STRUCTURE
	LINE OF EQUAL GRO CONCENTRATION IN GROUNDWATER (mg/L) – DASHED WHERE ESTIMATED

GRAPHIC SCALE

0′ 30′ 60′

TETRA TECH NUS, INC.

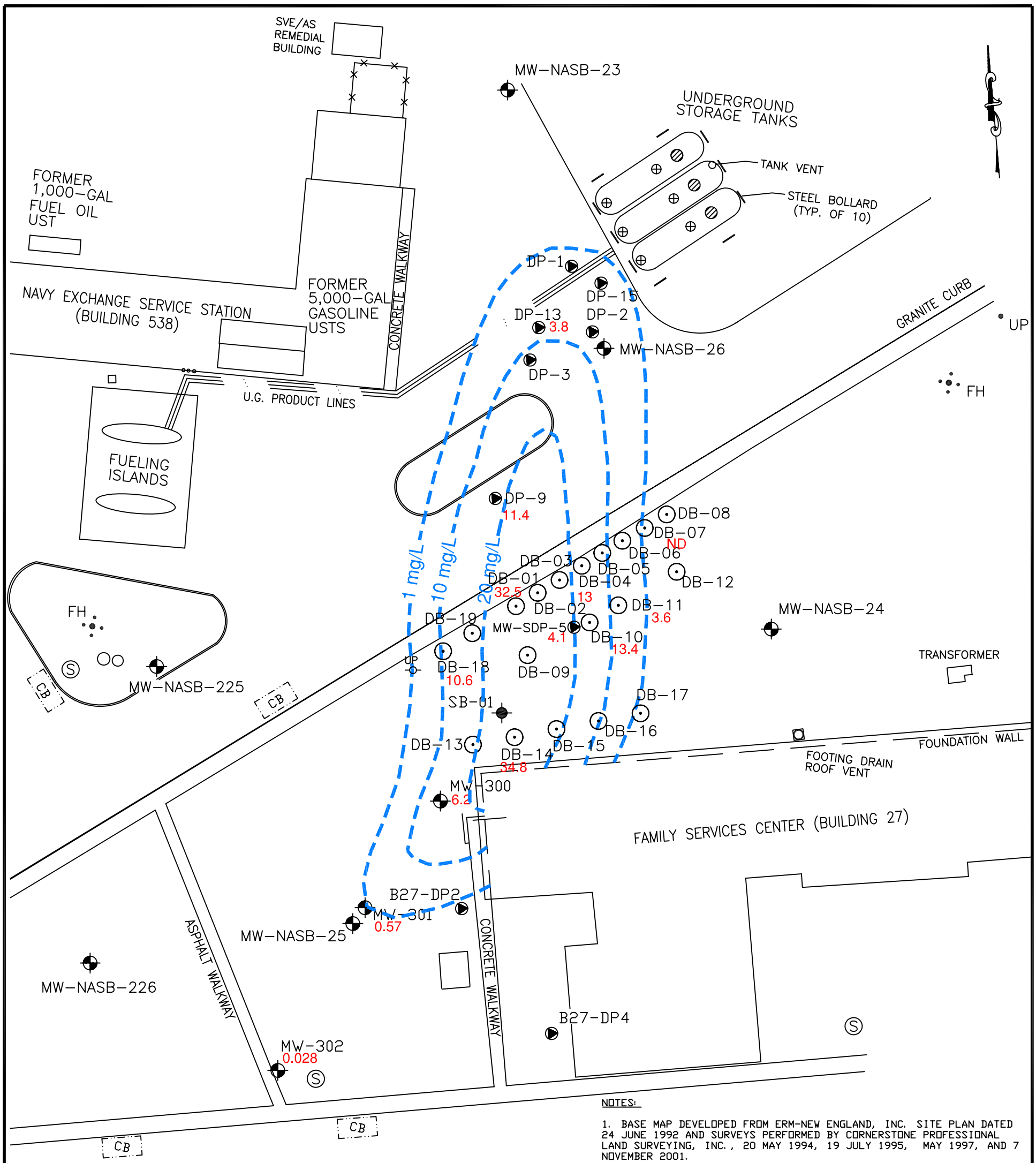
ROUND 1 (MARCH 2005) GROUNDWATER GRO CONCENTRATIONS

NAVAL EXCHANGE SERVICE STATION

NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-7.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
1-7	0	02/11/08



NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 11 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

3. LOCATIONS NAD ELEVATIONS FOR ADDITION WELLS (DB-01 TO DB-17) AND NEW MONITORING WELLS (MW-300,-301,-302) SURVEYED BY DEST ASSOCIATES, INC. ON NOVEMBER 2, 2004.

4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

5. VPH - MASSACHUSETTS VOLATILE PETROLEUM HYDROCARBON METHOD

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-0	DIRECT-PUSH N-BLEND ADDITION WELL (2004/2005)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
	UNDERGROUND STRUCTURE
	LINE OF EQUAL VPH AROMATICS CONCENTRATION IN GROUNDWATER (mg/L) – DASHED WHERE ESTIMATED

GRAPHIC SCALE

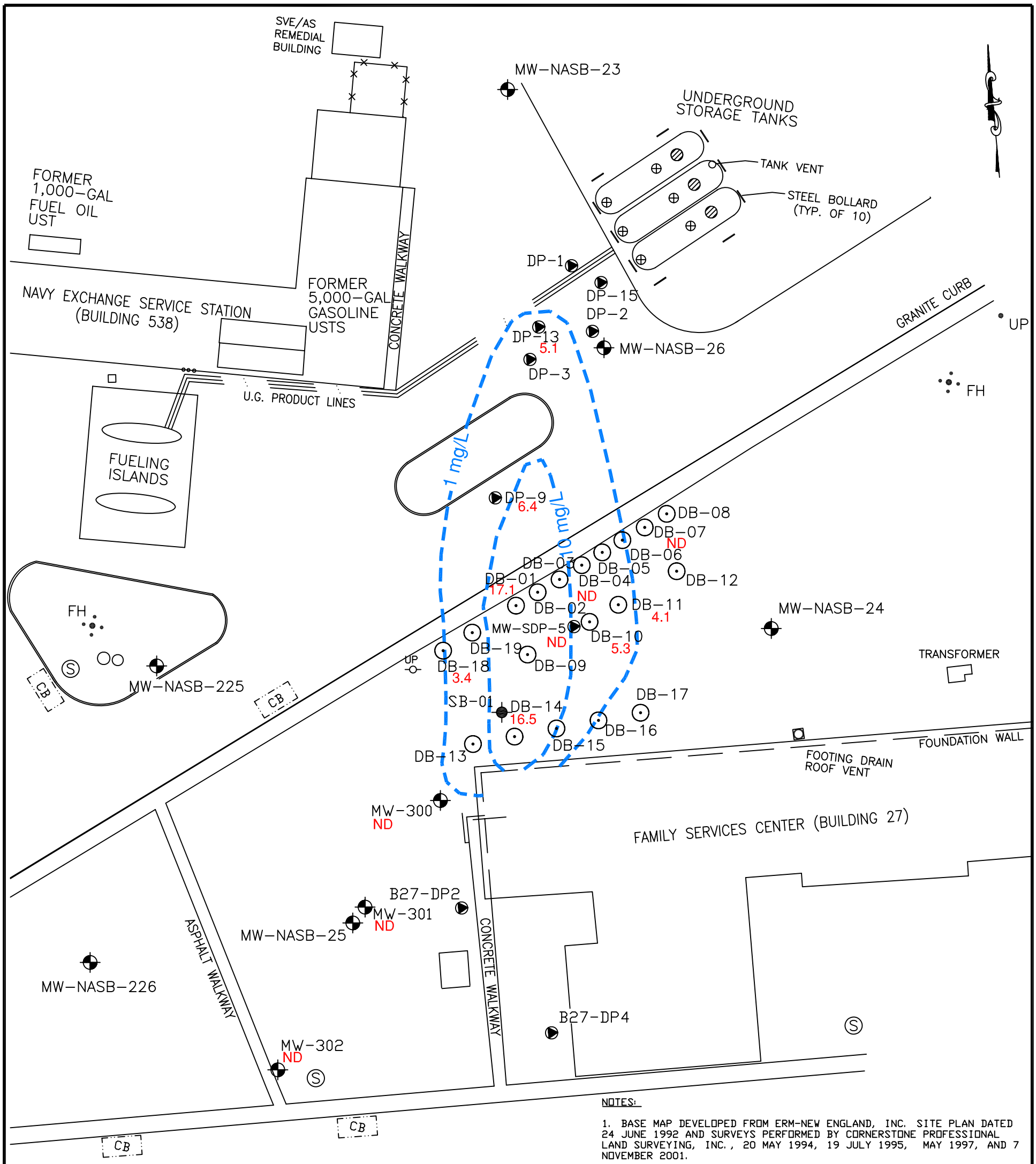
0′ 30′ 60′

TETRA TECH NUS, INC.

ROUND 1 (MARCH 2005) GROUNDWATER
VPH AROMATIC HYDROCARBON CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-8.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
1-8	0	02/11/08



NOTES:

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2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 11 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

3. LOCATIONS NAD ELEVATIONS FOR ADDITION WELLS (DB-01 TO DB-17) AND NEW MONITORING WELLS (MW-300,-301,-302) SURVEYED BY DEST ASSOCIATES, INC. ON NOVEMBER 2, 2004.

4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

5. VPH - MASSACHUSETTS VOLATILE PETROLEUM HYDROCARBON METHOD

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-0	DIRECT-PUSH N-BLEND ADDITION WELL (2004/2005)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
	UNDERGROUND STRUCTURE
	LINE OF EQUAL VPH ALIPHATIC (C5-C8,C9-C12) CONCENTRATION IN GROUNDWATER (mg/L) - DASHED WHERE ESTIMATED

GRAPHIC SCALE

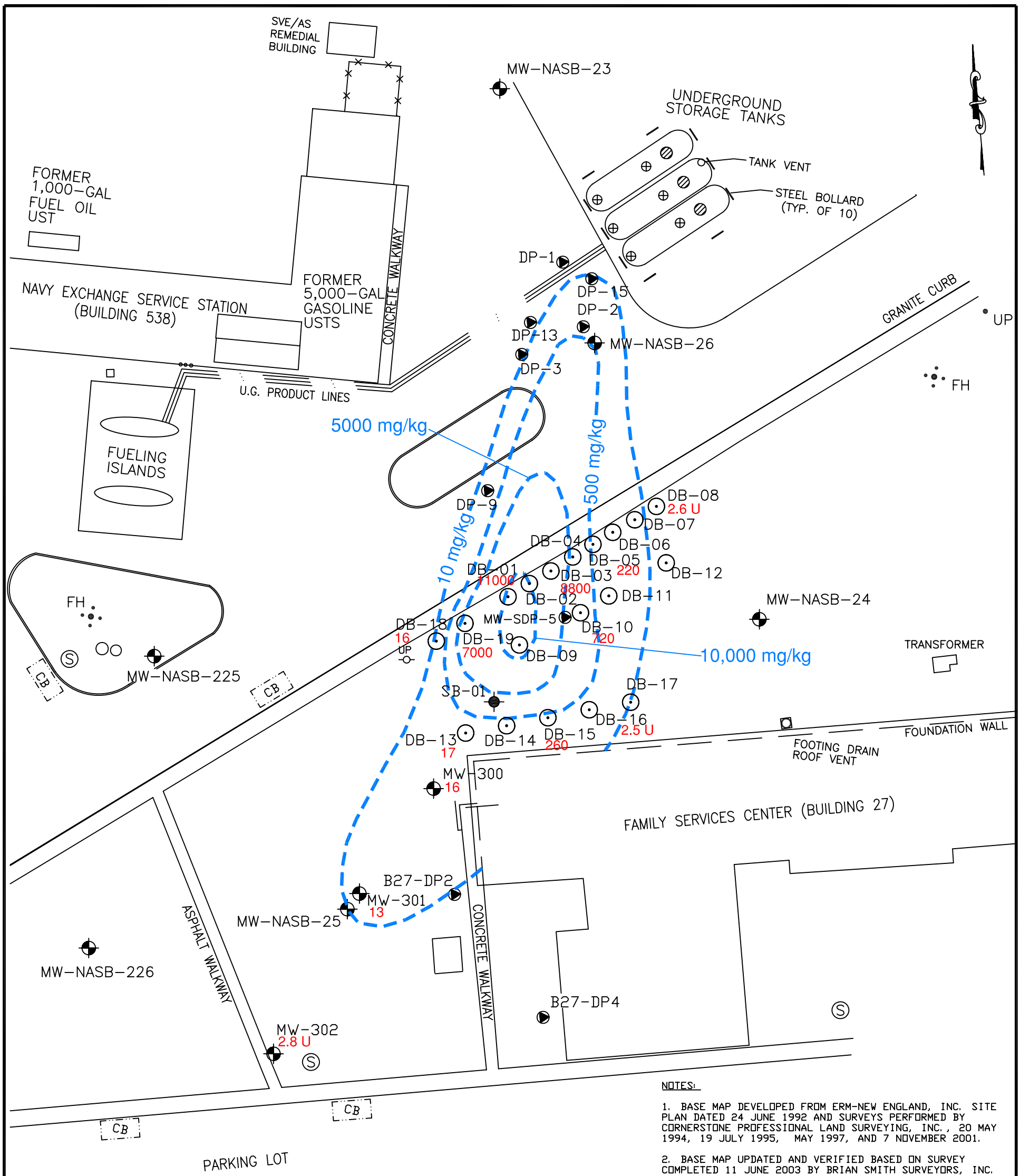
0' 30' 60'

TETRA TECH NUS, INC.

ROUND 1 (MARCH 2005) GROUNDWATER
VPH ALIPHATIC HYDROCARBON CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-9.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
1-9	0	02/11/08



NOTES:

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2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 11 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

3. LOCATIONS NAD ELEVATIONS FOR ADDITION WELLS (DB-01 TO DB-17) AND NEW MONITORING WELLS (MW-300,-301,-302) SURVEYED BY DEST ASSOCIATES, INC. ON NOVEMBER 2, 2004.

4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-0	DIRECT-PUSH N-BLEND ADDITION WELL (2004/2005)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
	UNDERGROUND STRUCTURE
	LINE OF EQUAL GRO CONCENTRATION IN SOIL (mg/kg) – DASHED WHERE ESTIMATED

GRAPHIC SCALE

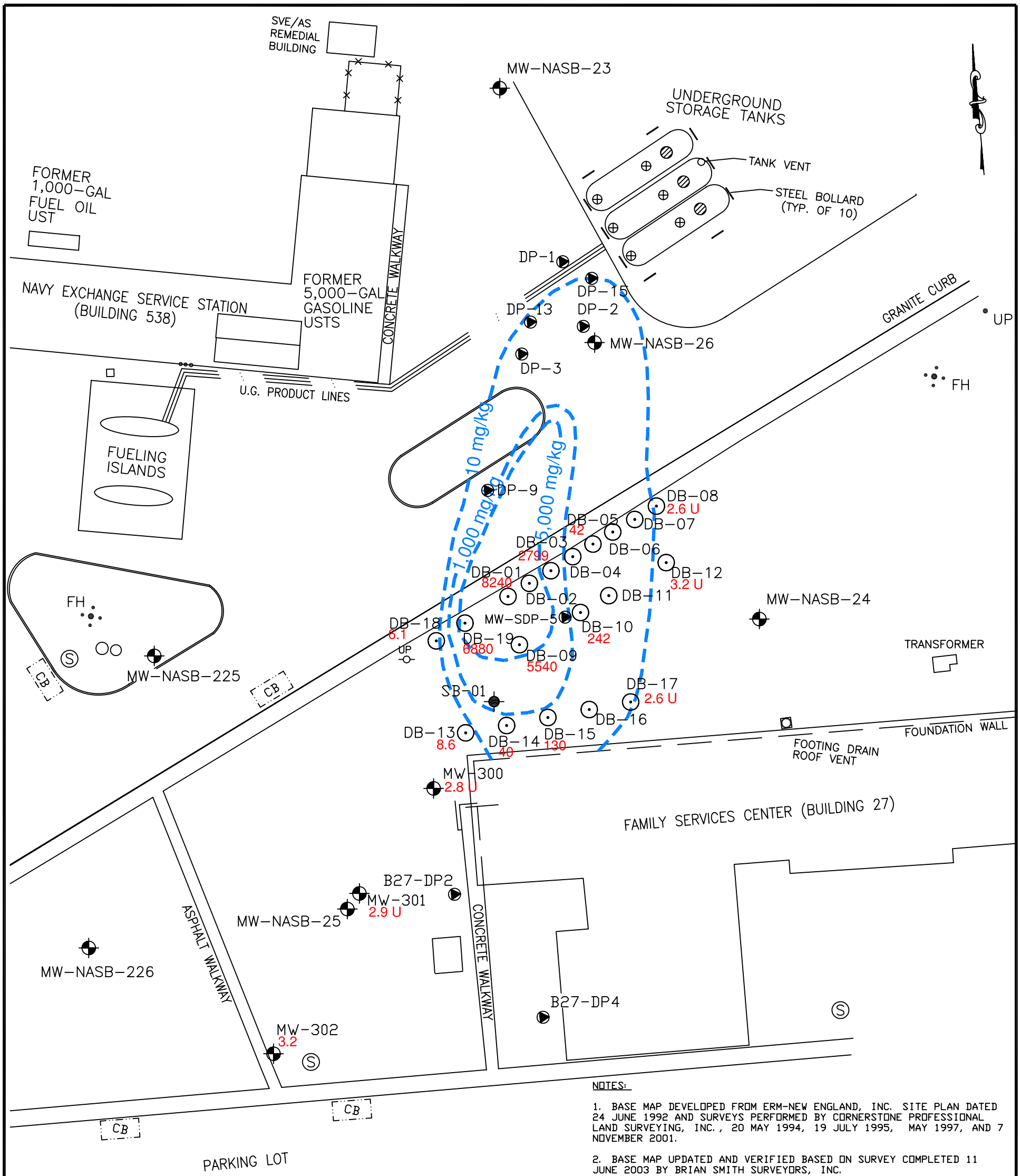
0′ 30′ 60′

TETRA TECH NUS, INC.

ROUND 1 (MARCH 2005) SOIL GRO CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-10.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
1-10	0	02/11/08



NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 11 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

3. LOCATIONS NAD ELEVATIONS FOR ADDITION WELLS (DB-01 TO DB-17) AND NEW MONITORING WELLS (MW-300,-301,-302) SURVEYED BY DEST ASSOCIATES, INC. ON NOVEMBER 2, 2004.

4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

5. VPH - MASSACHUSETTS VOLATILE PETROLEUM HYDROCARBON METHOD

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-0	DIRECT-PUSH N-BLEND ADDITION WELL (2004/2005)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
	UNDERGROUND STRUCTURE
	LINE OF EQUAL VPH AROMATICS CONCENTRATION IN SOIL (mg/kg) - DASHED WHERE ESTIMATED

GRAPHIC SCALE

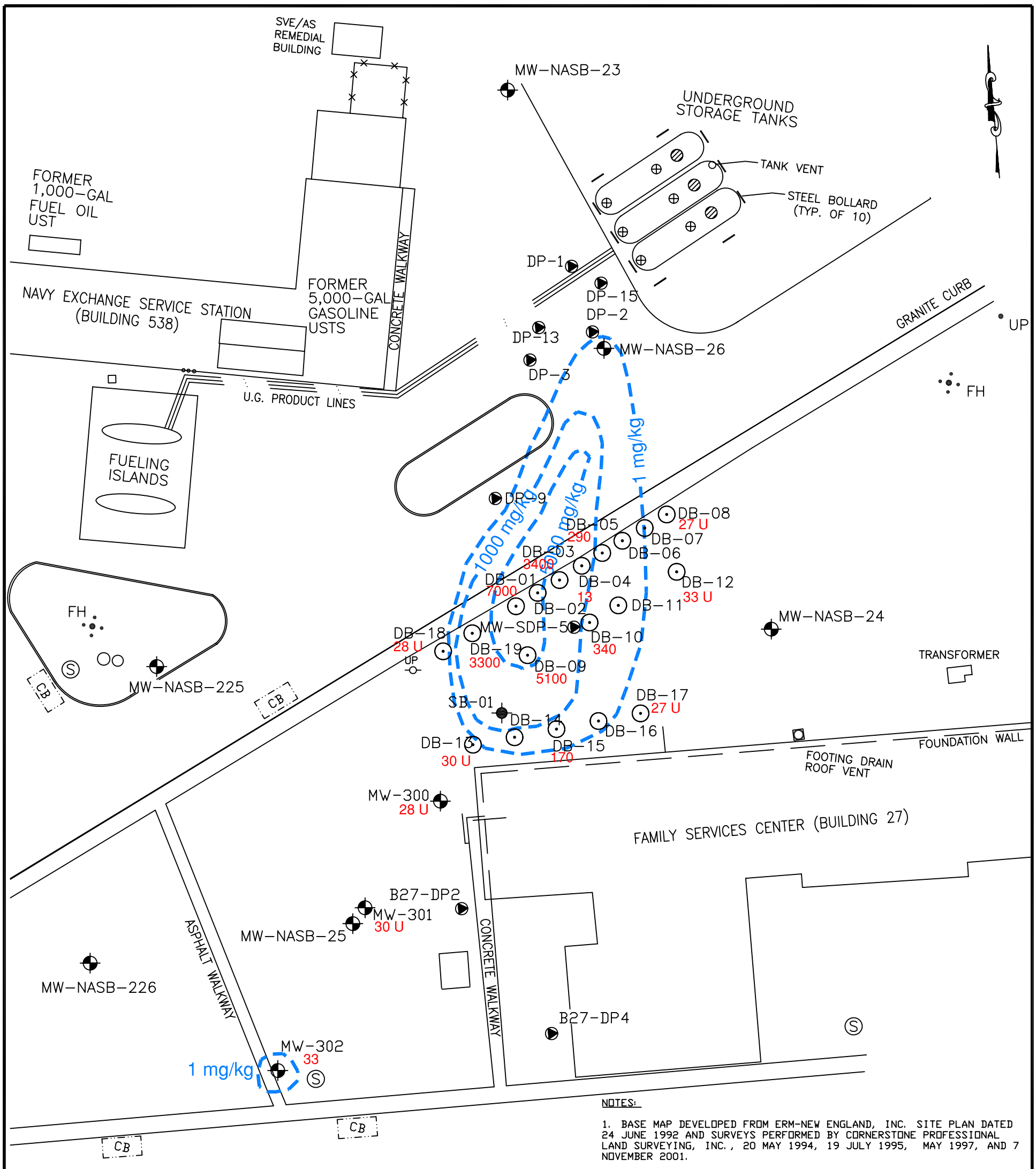
0' 30' 60'

TETRA TECH NUS, INC.

ROUND 1 (MARCH 2005) SOIL
VPH AROMATIC HYDROCARBON CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-11.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
1-11	0	02/11/08



NOTES:

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4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

5. VPH - MASSACHUSETTS VOLATILE PETROLEUM HYDROCARBON METHOD

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-01	DIRECT-PUSH N-BLEND ADDITION WELL (2004/2005)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
	UNDERGROUND STRUCTURE
	LINE OF EQUAL VPH ALIPHATIC (C5-C8,C9-C12) CONCENTRATION IN SOIL (mg/kg) - DASHED WHERE ESTIMATED

GRAPHIC SCALE

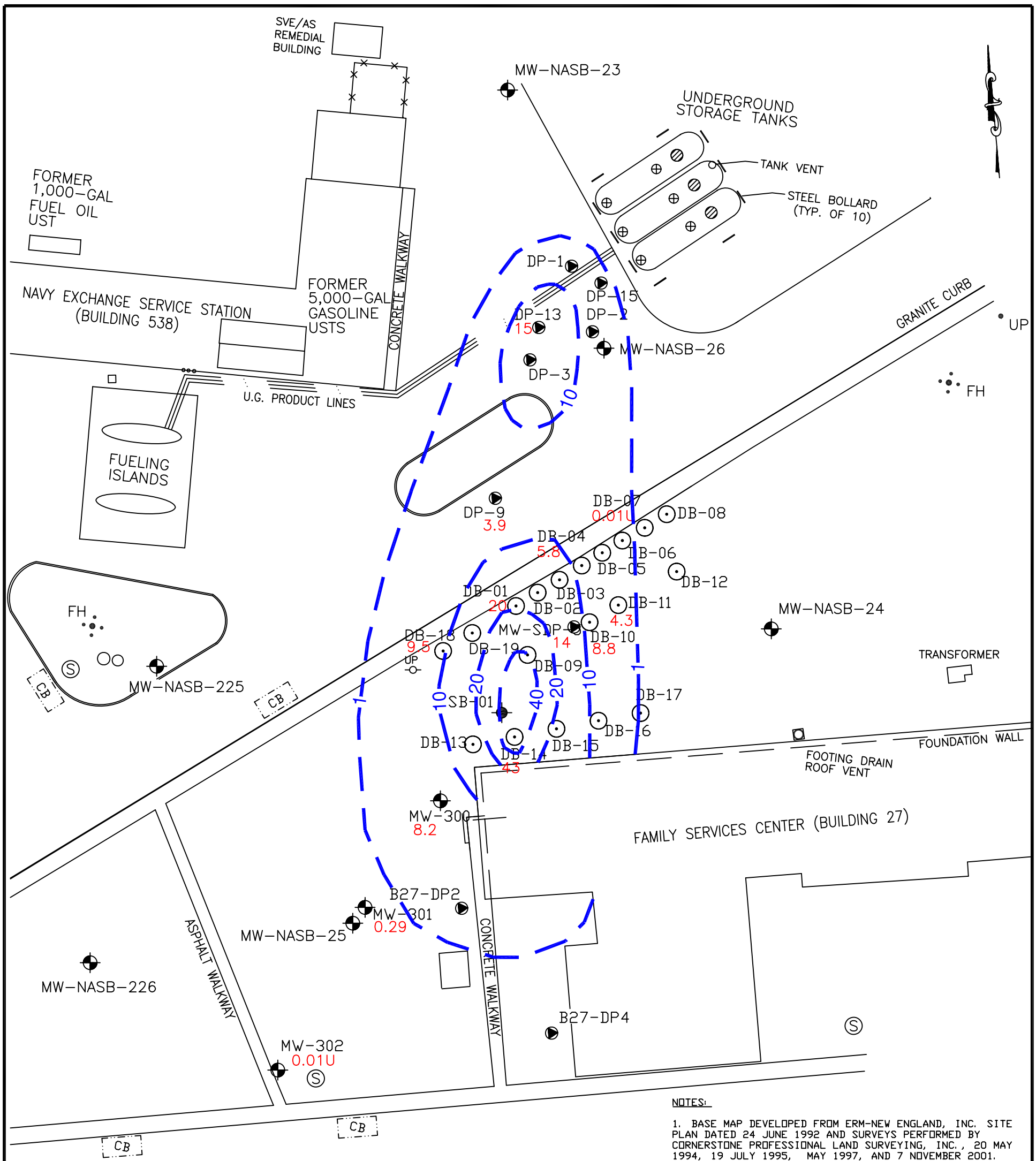
0' 30' 60'

TETRA TECH NUS, INC.

ROUND 1 (MARCH 2005) SOIL
VPH ALIPHATIC HYDROCARBON CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-12.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
1-12	0	02/11/08



NOTES:

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4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-0	DIRECT-PUSH N-BLEND ADDITION WELL (2004)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
—— ——	UNDERGROUND STRUCTURE
—— ——	LINE OF EQUAL GRO CONCENTRATION IN GROUNDWATER (mg/L) – DASHED WHERE APPROXIMATE

GRAPHIC SCALE

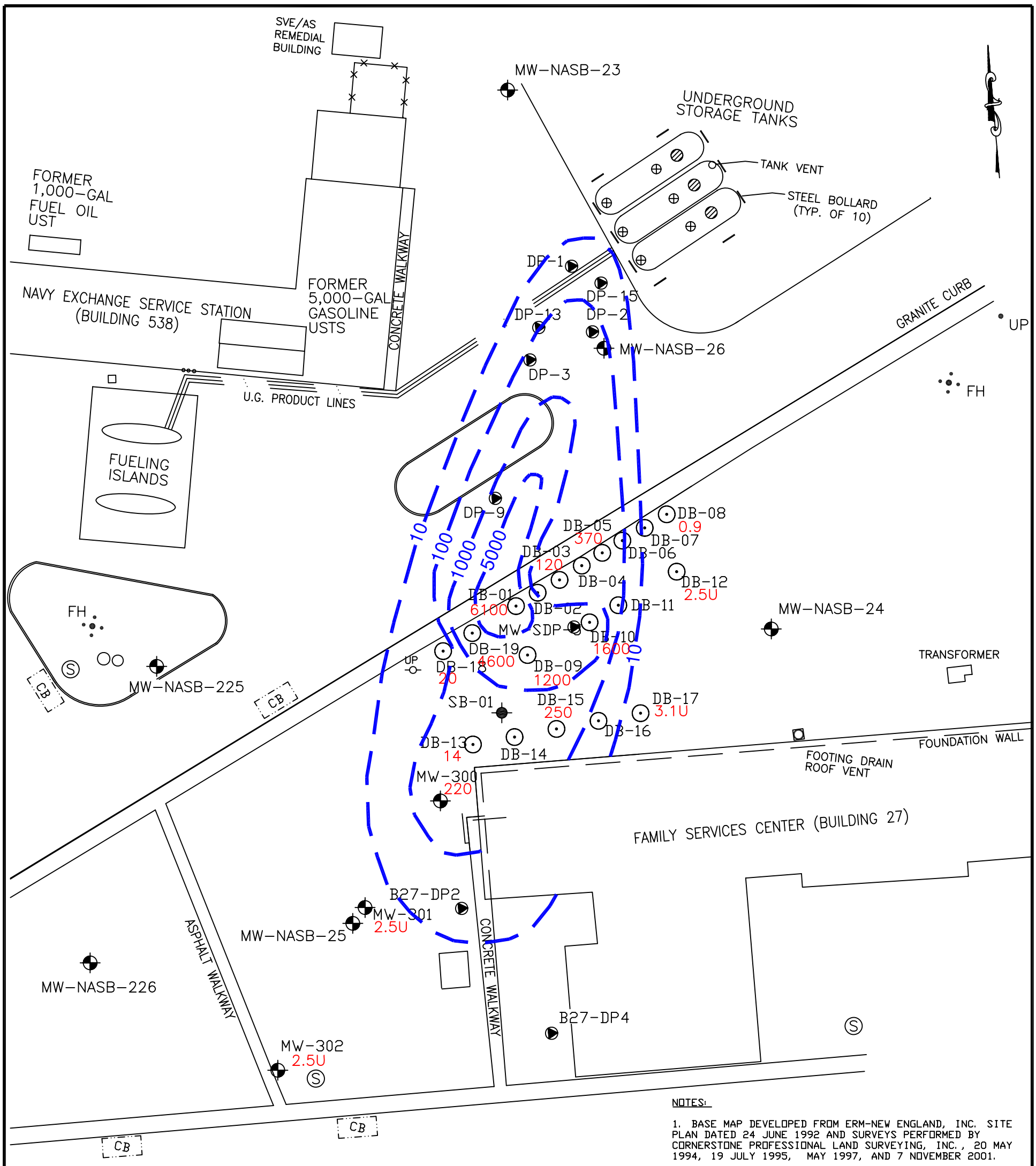
0′ 30′ 60′

TETRA TECH NUS, INC.

ROUND 2 (OCTOBER 2005)
GROUNDWATER GRO CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-13.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
1-13	0	02/11/08



NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

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4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-0	DIRECT-PUSH N-BLEND ADDITION WELL (2004)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
—— ——	UNDERGROUND STRUCTURE
—— ——	LINE OF EQUAL GRO CONCENTRATION IN SOIL (mg/kg) – DASHED WHERE APPROXIMATE

GRAPHIC SCALE

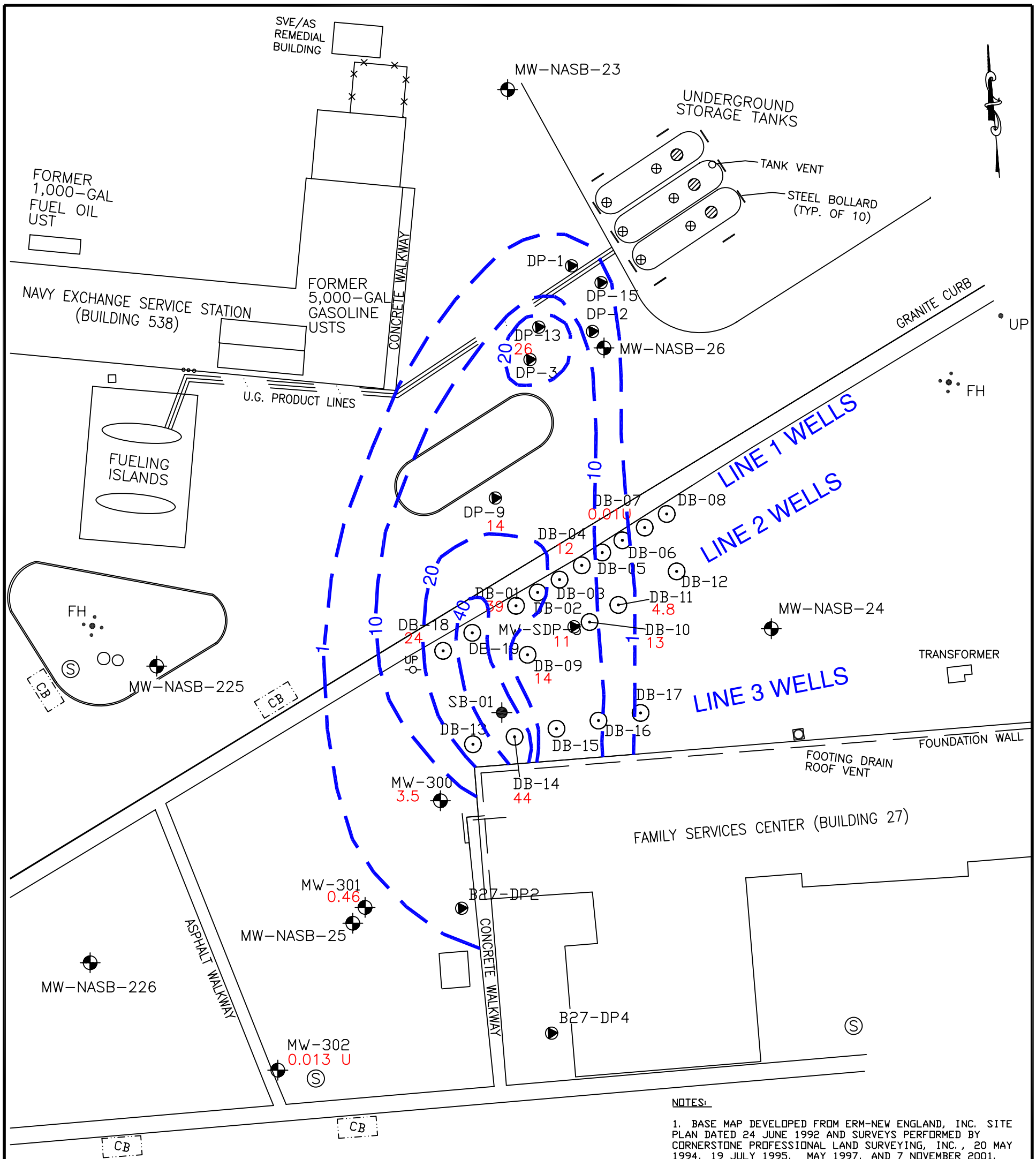
0′ 30′ 60′

TETRA TECH NUS, INC.

ROUND 2 (OCTOBER 2005)
SOIL GRO CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-14.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
1-14	0	02/11/08



NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 11 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

3. LOCATIONS NAD ELEVATIONS FOR ADDITION WELLS (DB-01 TO DB-17) AND NEW MONITORING WELLS (MW-300,-301,-302) SURVEYED BY DEST ASSOCIATES, INC. ON NOVEMBER 2, 2004.

4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-0	DIRECT-PUSH N-BLEND ADDITION WELL (2004)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
—— ——	UNDERGROUND STRUCTURE
1	LINE OF EQUAL GRO CONCENTRATION IN GROUNDWATER (mg/L) – DASHED WHERE ESTIMATED

GRAPHIC SCALE

0′ 30′ 60′

TETRA TECH NUS, INC.

ROUND 3 (JULY 2006)
GROUNDWATER GRO CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-15.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
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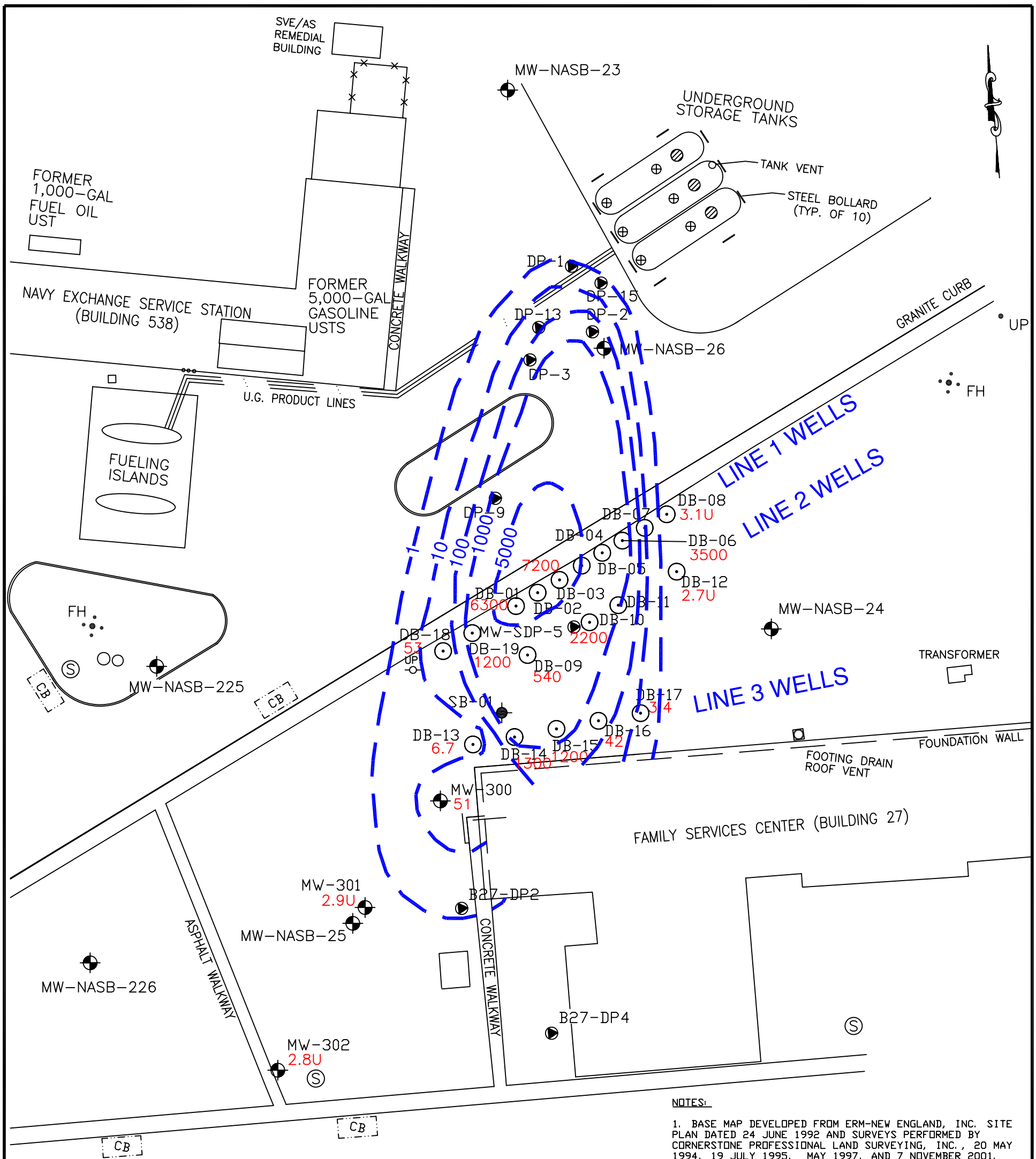


NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 11 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

3. LOCATIONS NAD ELEVATIONS FOR ADDITION WELLS (DB-01 TO DB-17) AND NEW MONITORING WELLS (MW-300,-301,-302) SURVEYED BY DEST ASSOCIATES, INC. ON NOVEMBER 2, 2004.

4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-0	DIRECT-PUSH N-BLEND ADDITION WELL (2004)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
—— ——	UNDERGROUND STRUCTURE
—— 1 ——	LINE OF EQUAL SOIL GRO CONCENTRATION (mg/kg) – DASHED WHERE ESTIMATED

GRAPHIC SCALE

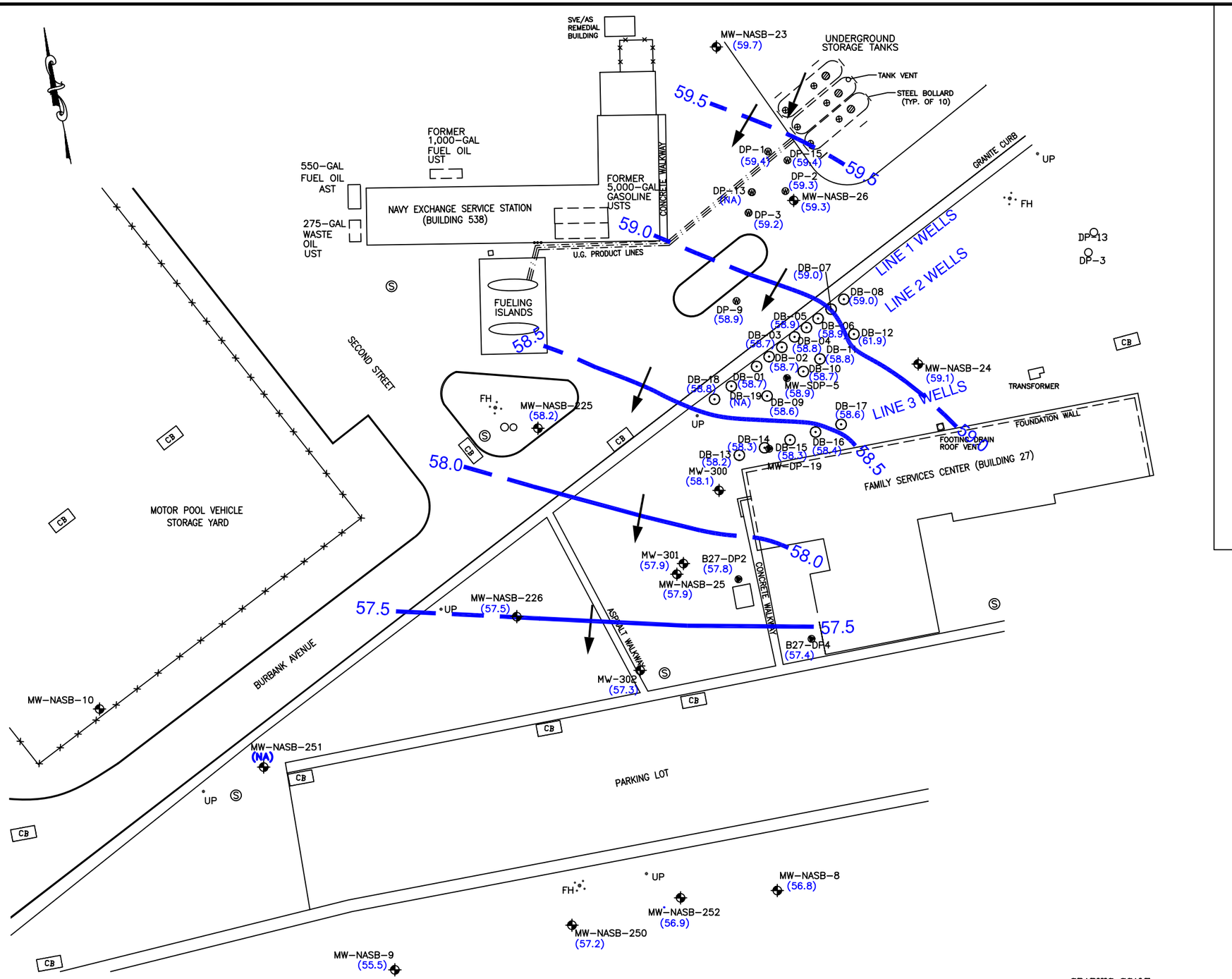
0′ 30′ 60′

TETRA TECH NUS, INC.

ROUND 3 (JULY 2006)
SOIL GRO CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_1-16.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
1-16	0	02/11/08



LEGEND

MW-NASB-24 (58.86)	MONITORING WELL (WATER-TABLE SURFACE ELEVATION, FT MSL) (ND = NOT DATA) (NS = NOT SURVEYED)
B27-DP2 (57.61)	DIRECT-PUSH SOIL BORING (LOCATION CONFIRMED BY SURVEY) (WATER-TABLE SURFACE ELEVATION, FT MSL)
DP-15 (59.49)	DIRECT-PUSH SOIL BORING COMPLETED AS 1.5-IN FLUSH MOUNT MONITORING WELL (WATER-TABLE SURFACE ELEVATION, FT MSL)
DB-01	DIRECT-PUSH N-BLEND ADDITION WELL (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
	EXISTING CHAIN LINK FENCE
	UNDERGROUND STRUCTURE
59.0	LINE OF EQUAL WATER TABLE ELEVATION IN FEET, OCTOBER 29-31, 2007 DASHED WHERE INFERRED
	ARROW POINTS IN DIRECTION OF GROUNDWATER FLOW

NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 11 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVIE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

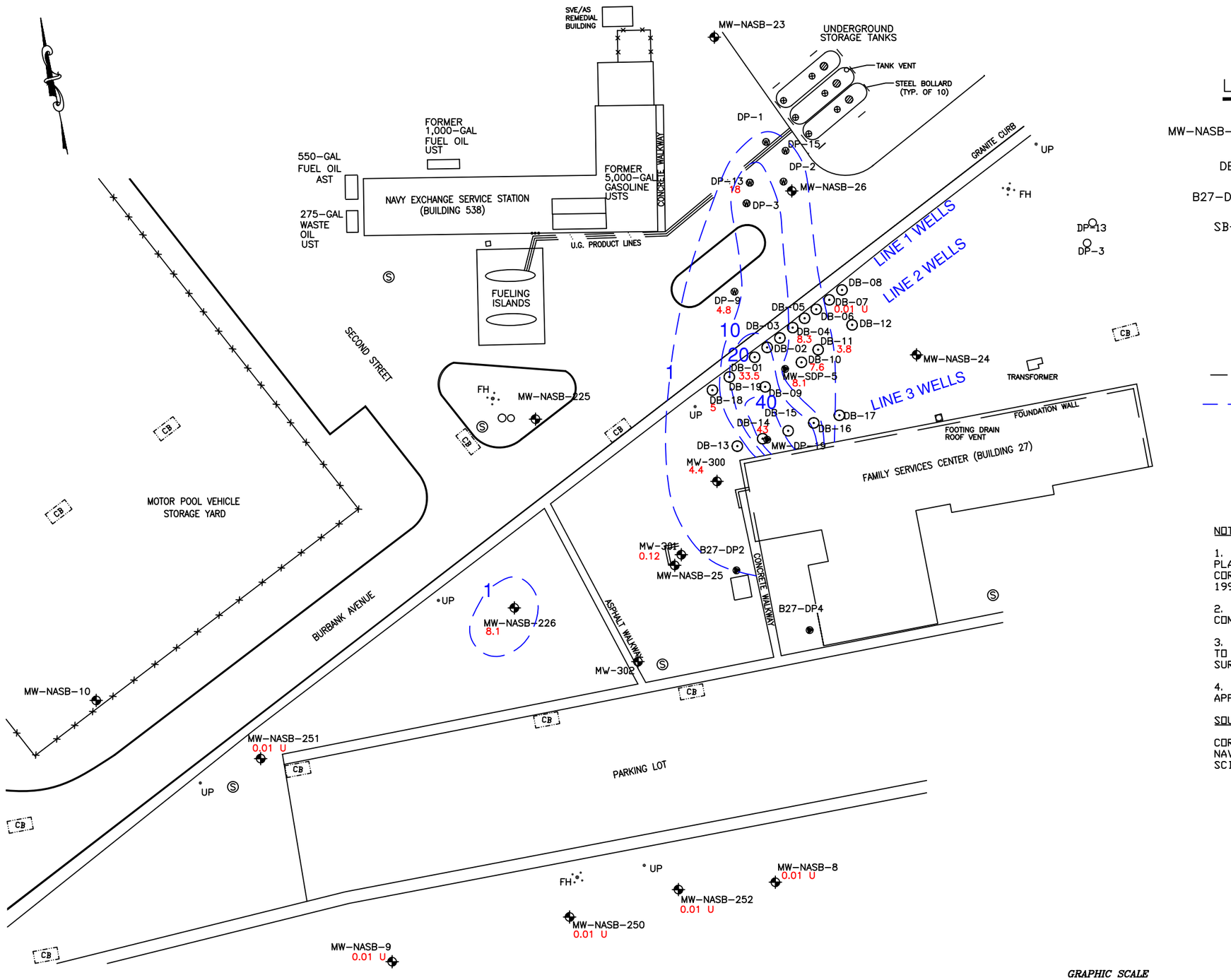
GRAPHIC SCALE

0′ 50′ 100′

TETRA TECH NUS, INC.

WATER TABLE SURFACE – OCTOBER 2007
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_2-1.DWG	AS NOTED
FIGURE NUMBER 2-1	REV 0 / DATE 02/11/08



LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-01	DIRECT-PUSH N-BLEND ADDITION WELL (2004)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
— — —	UNDERGROUND STRUCTURE
— —1— —	LINE OF EQUAL GRO CONCENTRATION IN GROUNDWATER (mg/L) – DASHED WHERE ESTIMATED
4.8	GRO CONCENTRATION IN GROUNDWATER (mg/L)

NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

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3. LOCATIONS NAD ELEVATIONS FOR ADDITION WELLS (DB-01 TO DB-17) AND NEW MONITORING WELLS (MW-300, -301, -302) SURVEYED BY OEST ASSOCIATES, INC. ON NOVEMBER 2, 2004.

4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

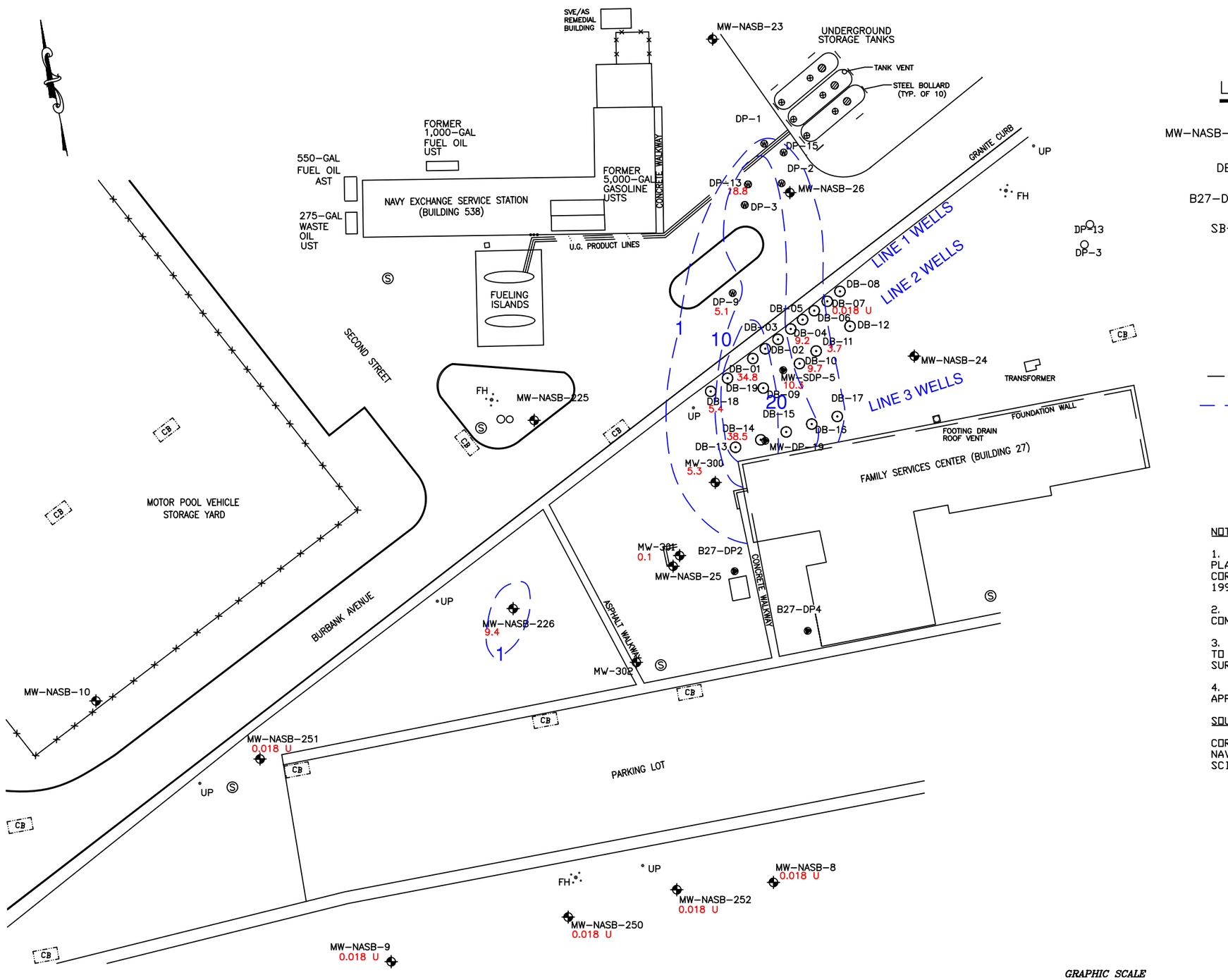
GRAPHIC SCALE

0′ 50′ 100′

TETRA TECH NUS, INC.

ROUND 4 (OCTOBER 2007)
GROUNDWATER GRO CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_3-1.DWG	AS NOTED
FIGURE NUMBER 3-1	REV 0 / DATE 02/11/08



LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-01	DIRECT-PUSH N-BLEND ADDITION WELL (2004)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
— — —	UNDERGROUND STRUCTURE
— —1— —	LINE OF EQUAL VPH AROMATICS CONCENTRATION IN GROUNDWATER (mg/L) – DASHED WHERE ESTIMATED
4.8	VPH AROMATICS CONCENTRATION IN GROUNDWATER (mg/L)

LINE OF EQUAL VPH AROMATICS CONCENTRATION IN GROUNDWATER (mg/L) – DASHED WHERE ESTIMATED

NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

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4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

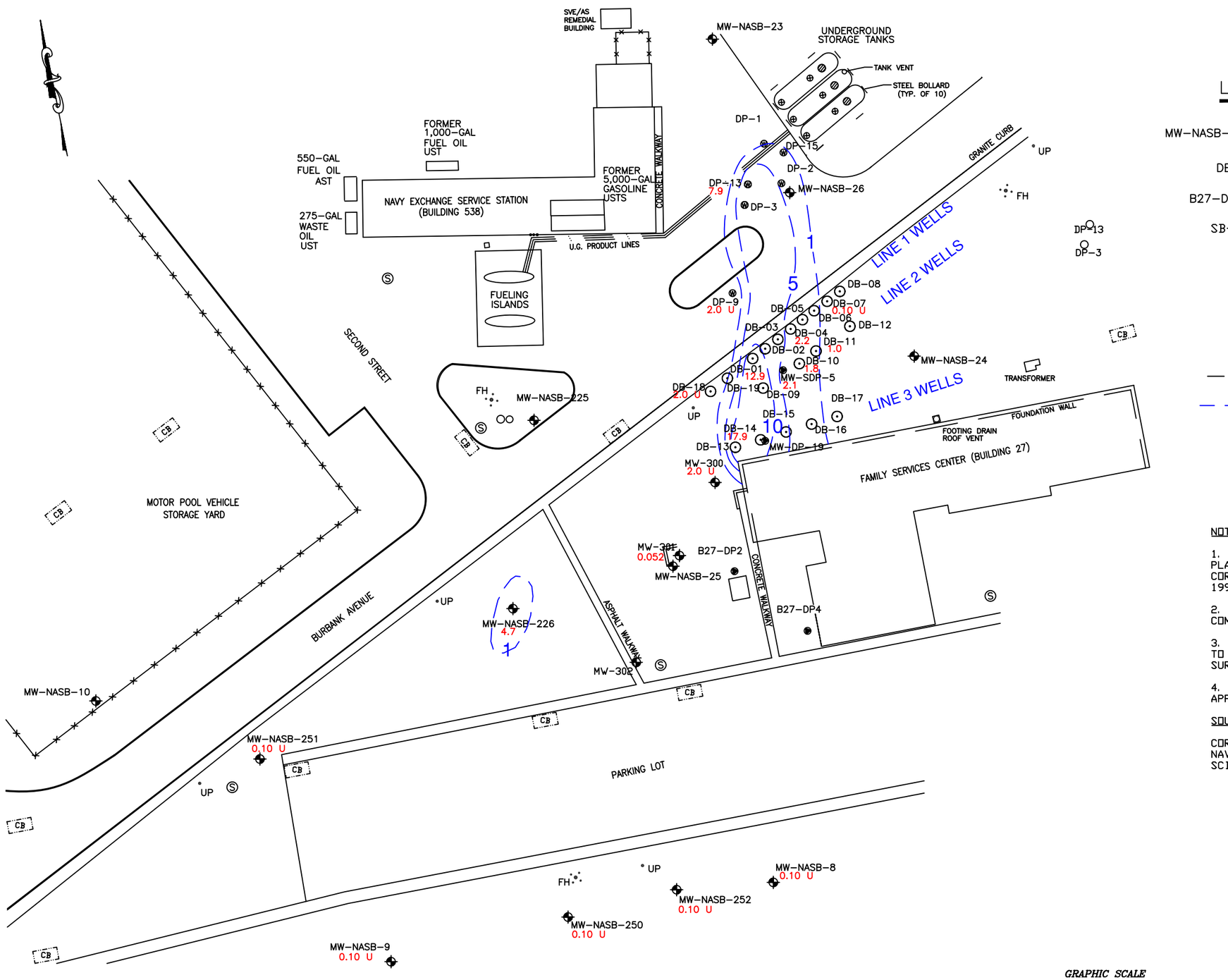
GRAPHIC SCALE

0′ 50′ 100′

TETRA TECH NUS, INC.

ROUND 4 (OCTOBER 2007) GROUNDWATER
VPH AROMATIC HYDROCARBON CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_3-2.DWG	AS NOTED
FIGURE NUMBER 3-2	REV 0 / DATE 02/11/08



LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-01	DIRECT-PUSH N-BLEND ADDITION WELL (2004)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
— — —	UNDERGROUND STRUCTURE
— —1— —	LINE OF EQUAL VPH ALIPHATICS CONCENTRATION IN GROUNDWATER (mg/L) – DASHED WHERE ESTIMATED
4.8	VPH ALIPHATICS CONCENTRATION IN GROUNDWATER (mg/L)

LINE OF EQUAL VPH AROMATICS CONCENTRATION IN GROUNDWATER (mg/L) – DASHED WHERE ESTIMATED

NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

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4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

GRAPHIC SCALE

0′ 50′ 100′

TETRA TECH NUS, INC.

ROUND 4 (OCTOBER 2007) GROUNDWATER
VPH ALIPHATIC HYDROCARBON CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_3-3.DWG	AS NOTED
FIGURE NUMBER 3-3	REV 0 / DATE 02/11/08

FIGURE 3-4

GRO TREND IN GROUNDWATER - THROUGH NOVEMBER 2007
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

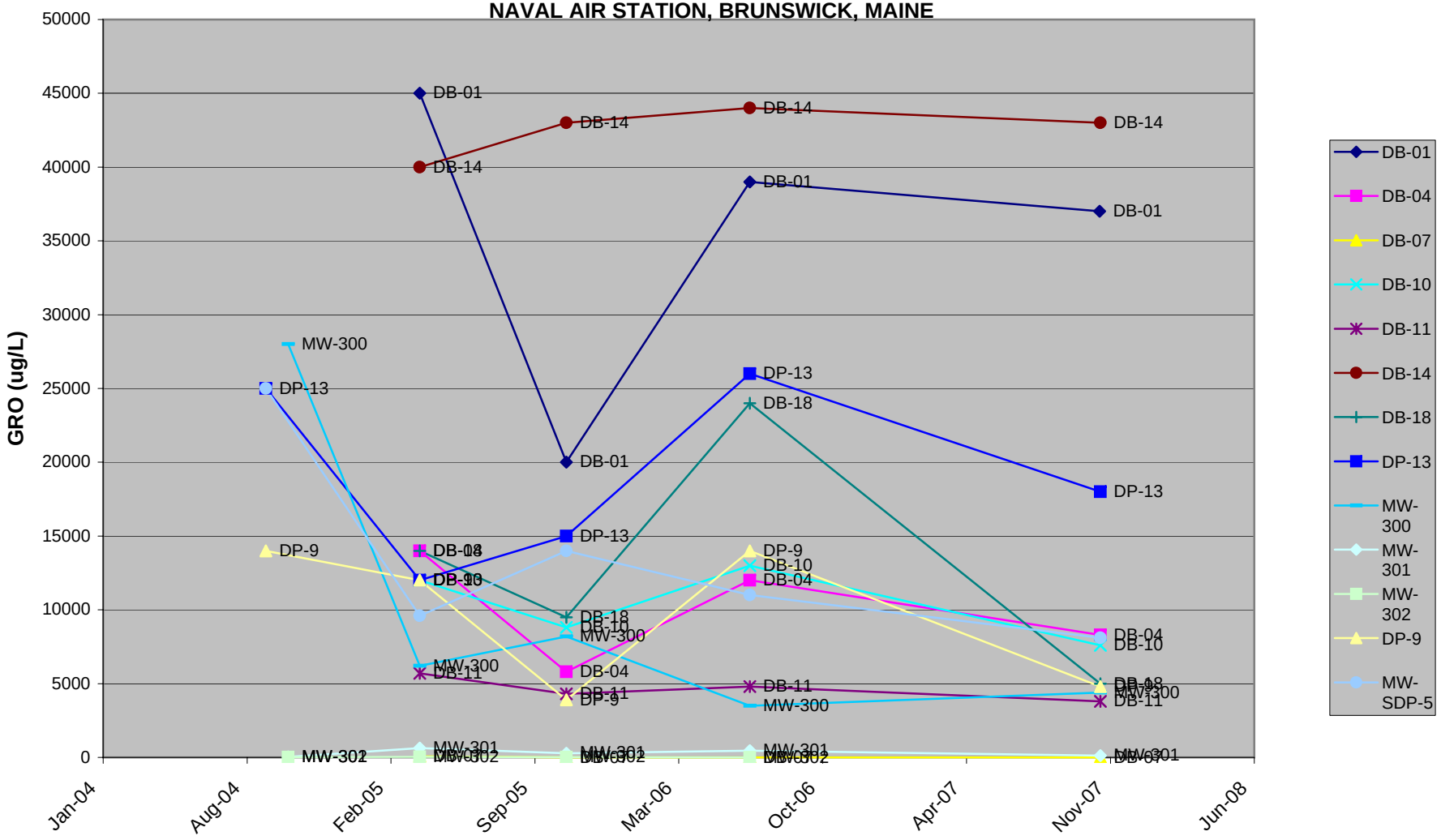


FIGURE 3-5

VPH AROMATICS TREND IN GROUNDWATER - THROUGH NOVEMBER 2007
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

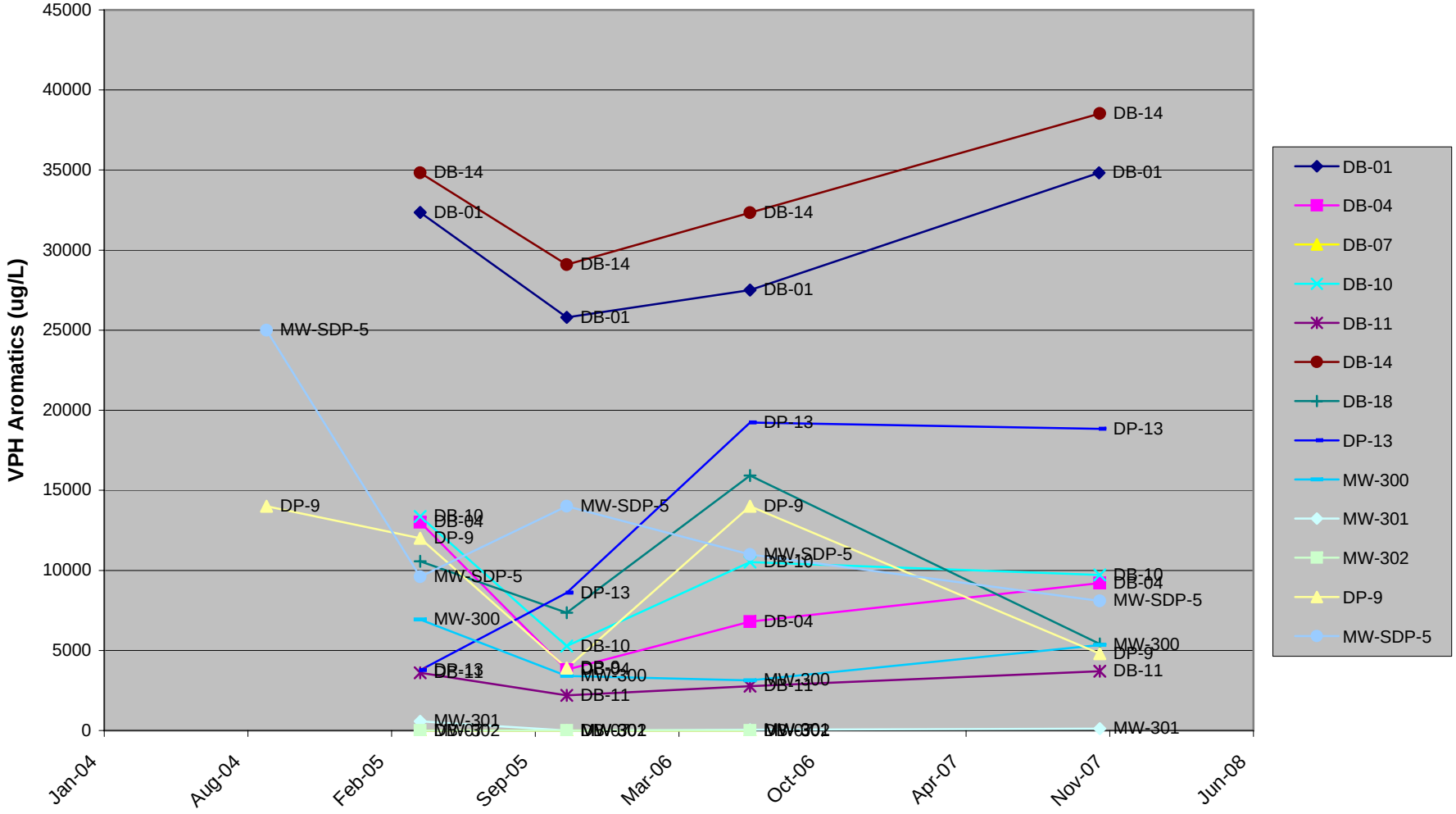


FIGURE 3-6

VPH ALIPHATICS TREND IN GROUNDWATER - THROUGH NOVEMBER 2007
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

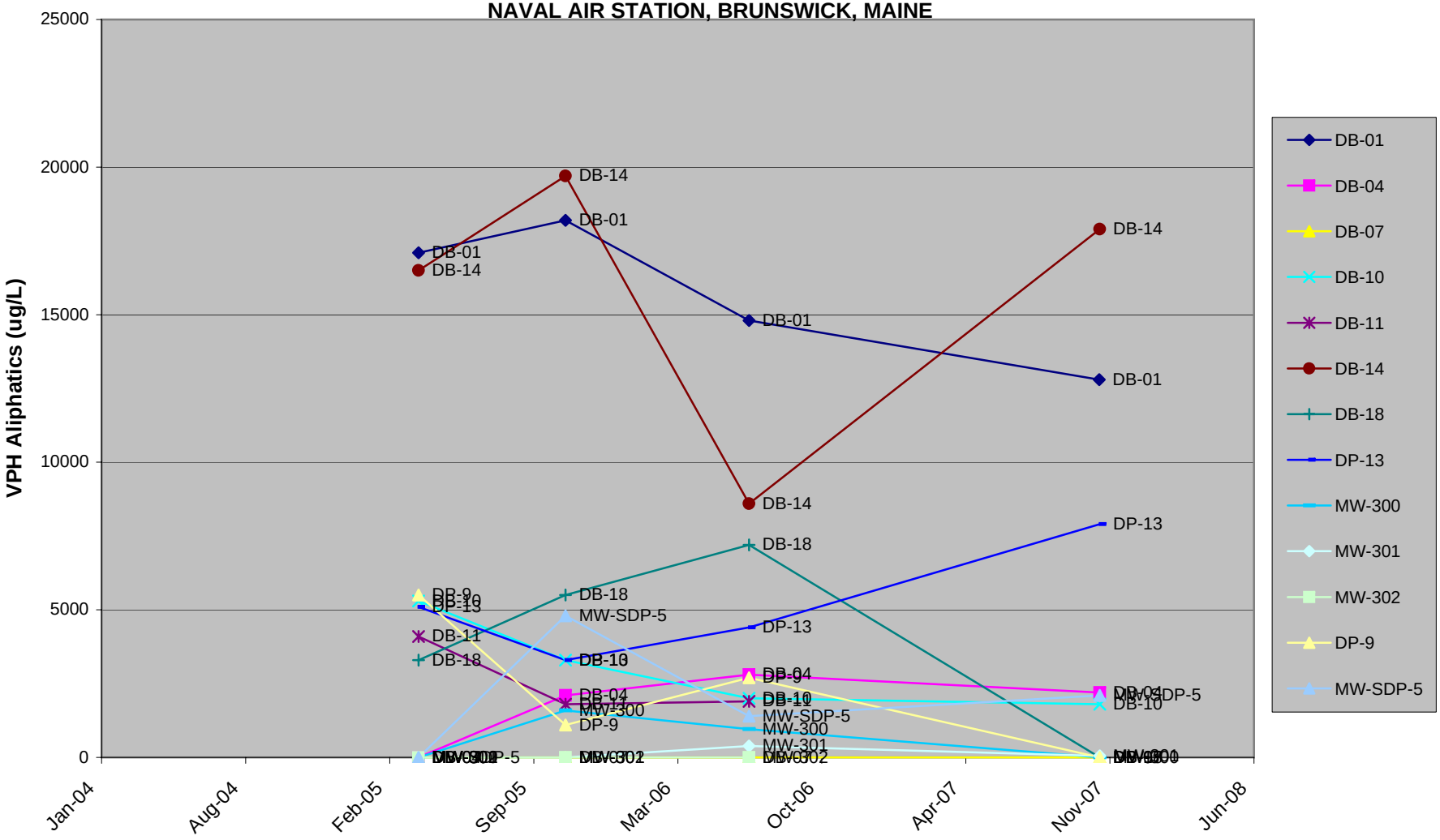
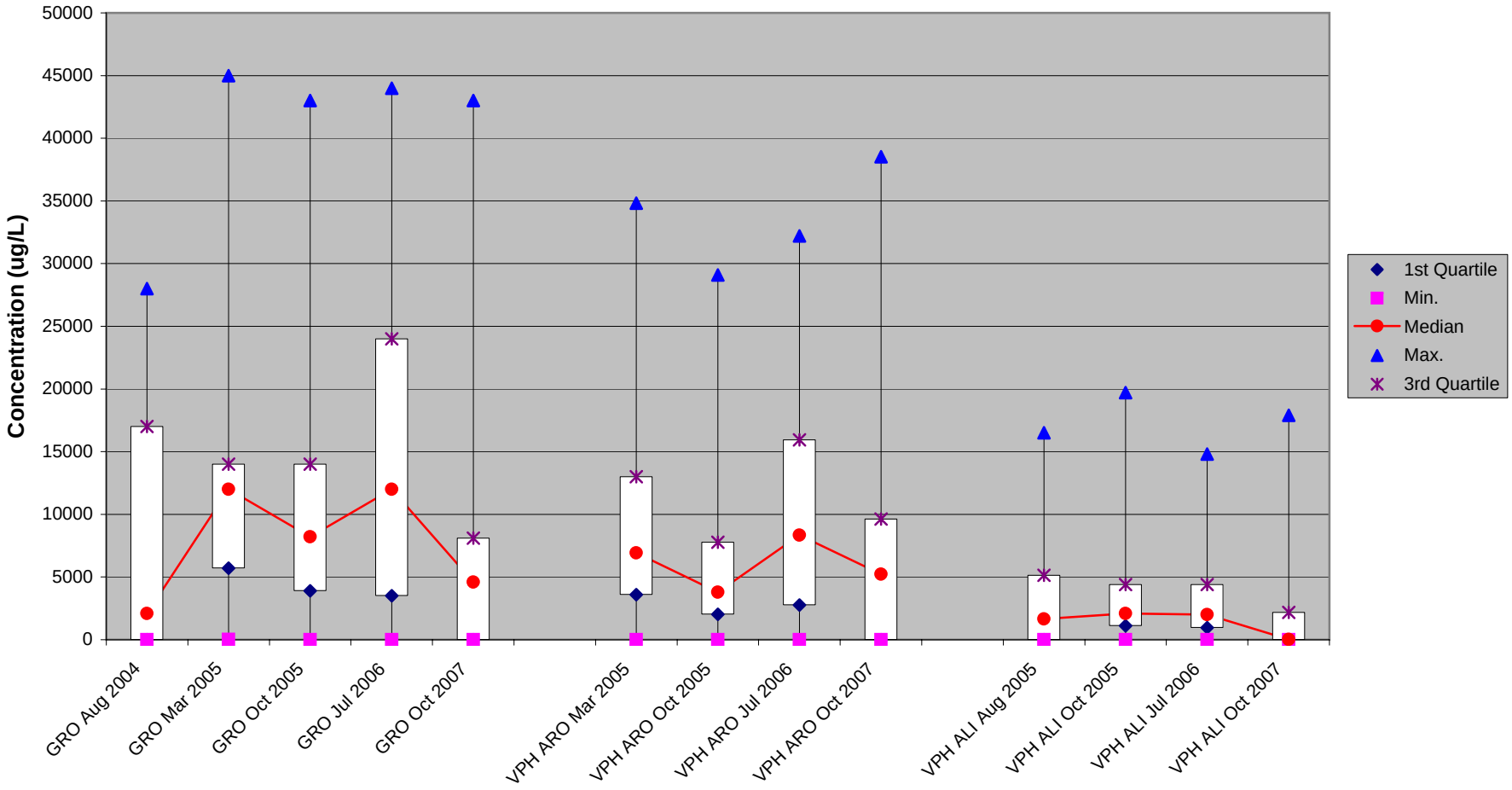
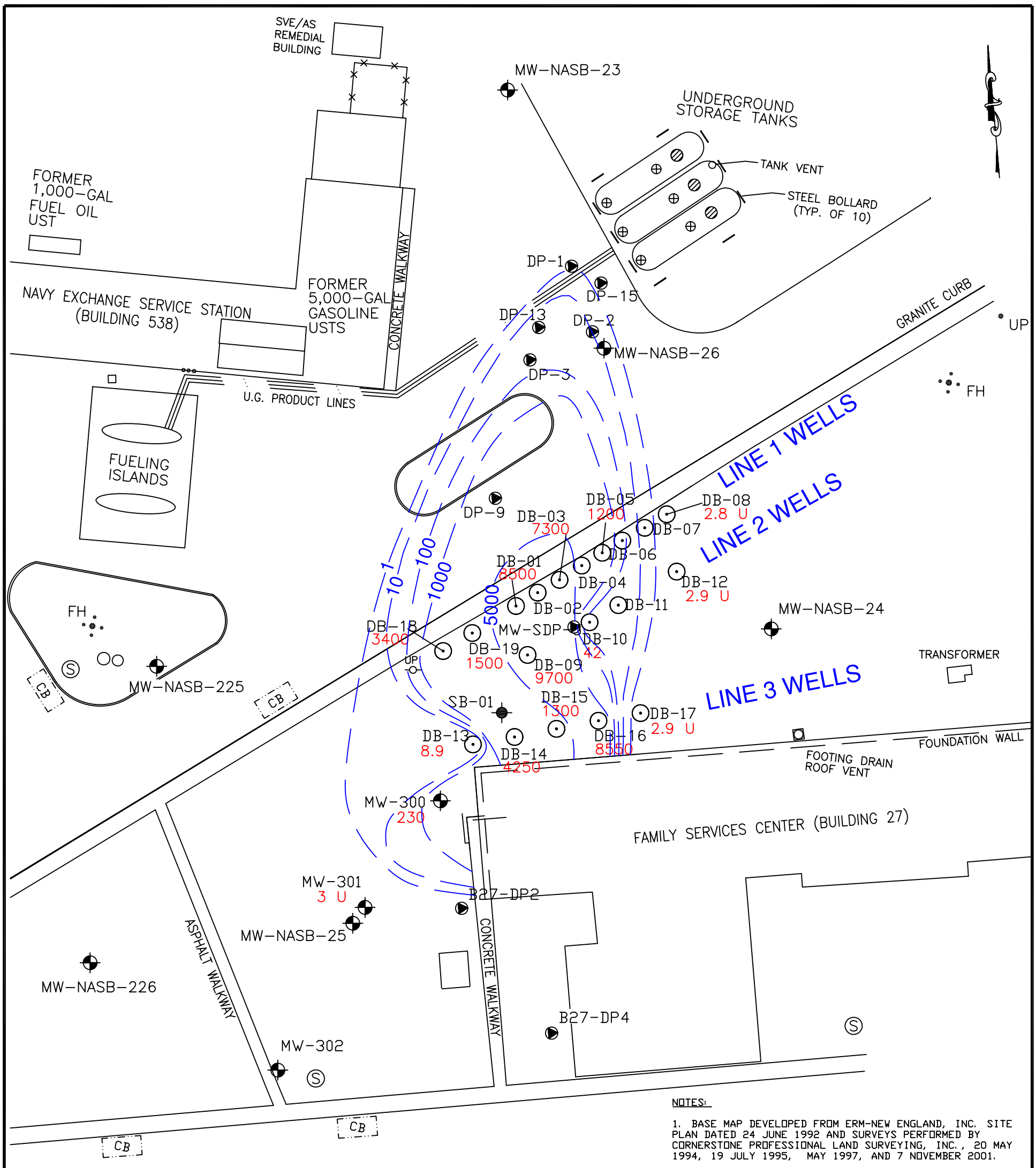


FIGURE 3 - 7

GROUNDWATER BOX PLOTS
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE





LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-01	DIRECT-PUSH N-BLEND ADDITION WELL (2004)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
—— ——	UNDERGROUND STRUCTURE
—— 1 ——	LINE OF EQUAL SOIL GRO CONCENTRATION (mg/kg) – DASHED WHERE ESTIMATED
120	SOIL GRO CONCENTRATION (mg/kg)

GRAPHIC SCALE
0′ 30′ 60′

NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 11 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

3. LOCATIONS NAD ELEVATIONS FOR ADDITION WELLS (DB-01 TO DB-17) AND NEW MONITORING WELLS (MW-300, -301, -302) SURVEYED BY OEST ASSOCIATES, INC. ON NOVEMBER 2, 2004.

4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

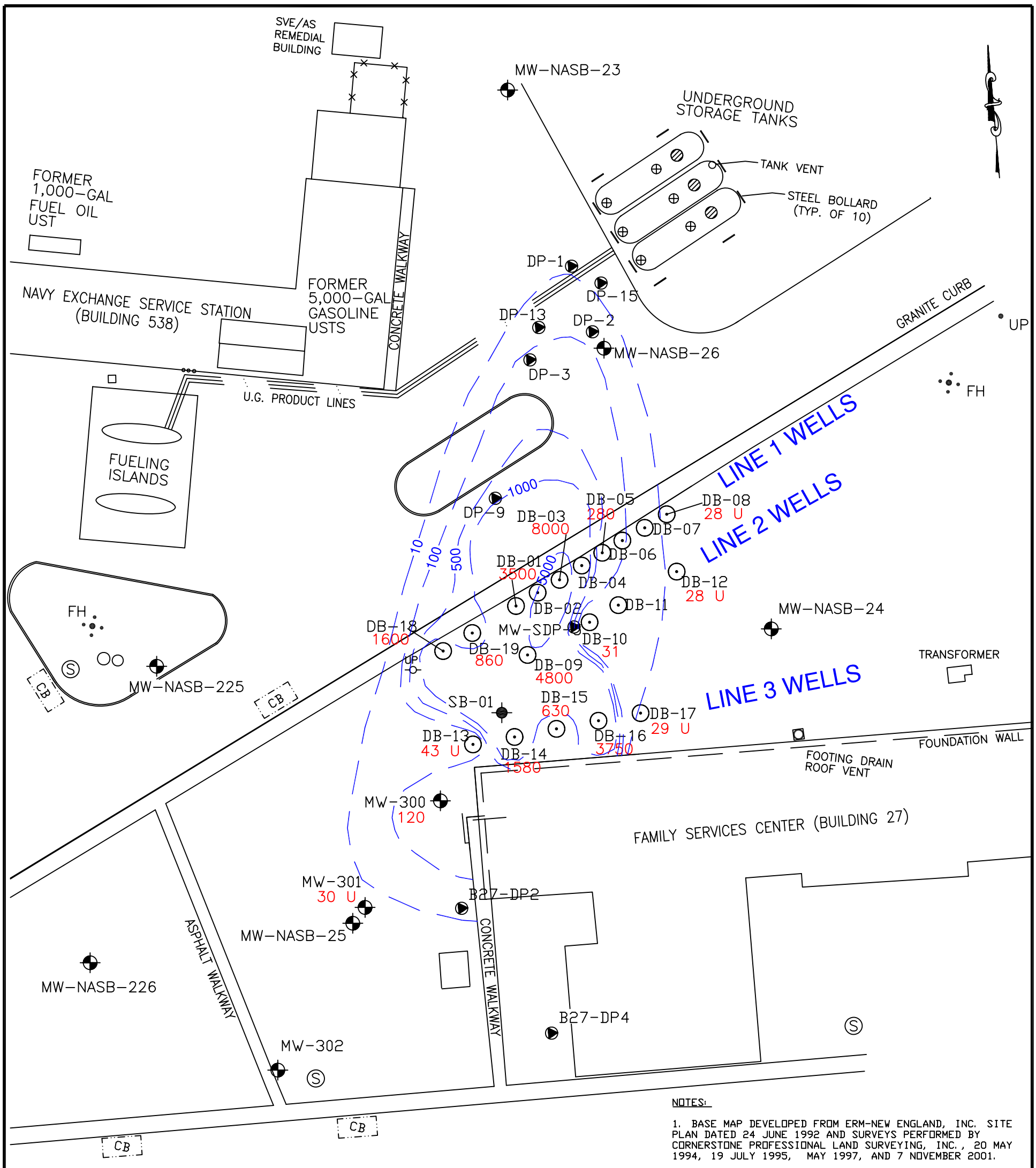
SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

TETRA TECH NUS, INC.

ROUND 4 (OCTOBER 2007)
SOIL GRO CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_3-8.DWG	AS NOTED
FIGURE NUMBER 3-8	REV 0 / DATE 02/11/08



LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-01	DIRECT-PUSH N-BLEND ADDITION WELL (2004)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
	UNDERGROUND STRUCTURE
1	LINE OF EQUAL SOIL VPH AROMATICS CONCENTRATION (mg/kg) – DASHED WHERE ESTIMATED
120	SOIL VPH AROMATICS CONCENTRATION (mg/kg)

GRAPHIC SCALE

0′ 30′ 60′

NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

2. BASE MAP UPDATED AND VERIFIED BASED ON SURVEY COMPLETED 11 JUNE 2003 BY BRIAN SMITH SURVEYORS, INC.

3. LOCATIONS NAD ELEVATIONS FOR ADDITION WELLS (DB-01 TO DB-17) AND NEW MONITORING WELLS (MW-300, -301, -302) SURVEYED BY OEST ASSOCIATES, INC. ON NOVEMBER 2, 2004.

4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

SOURCE:

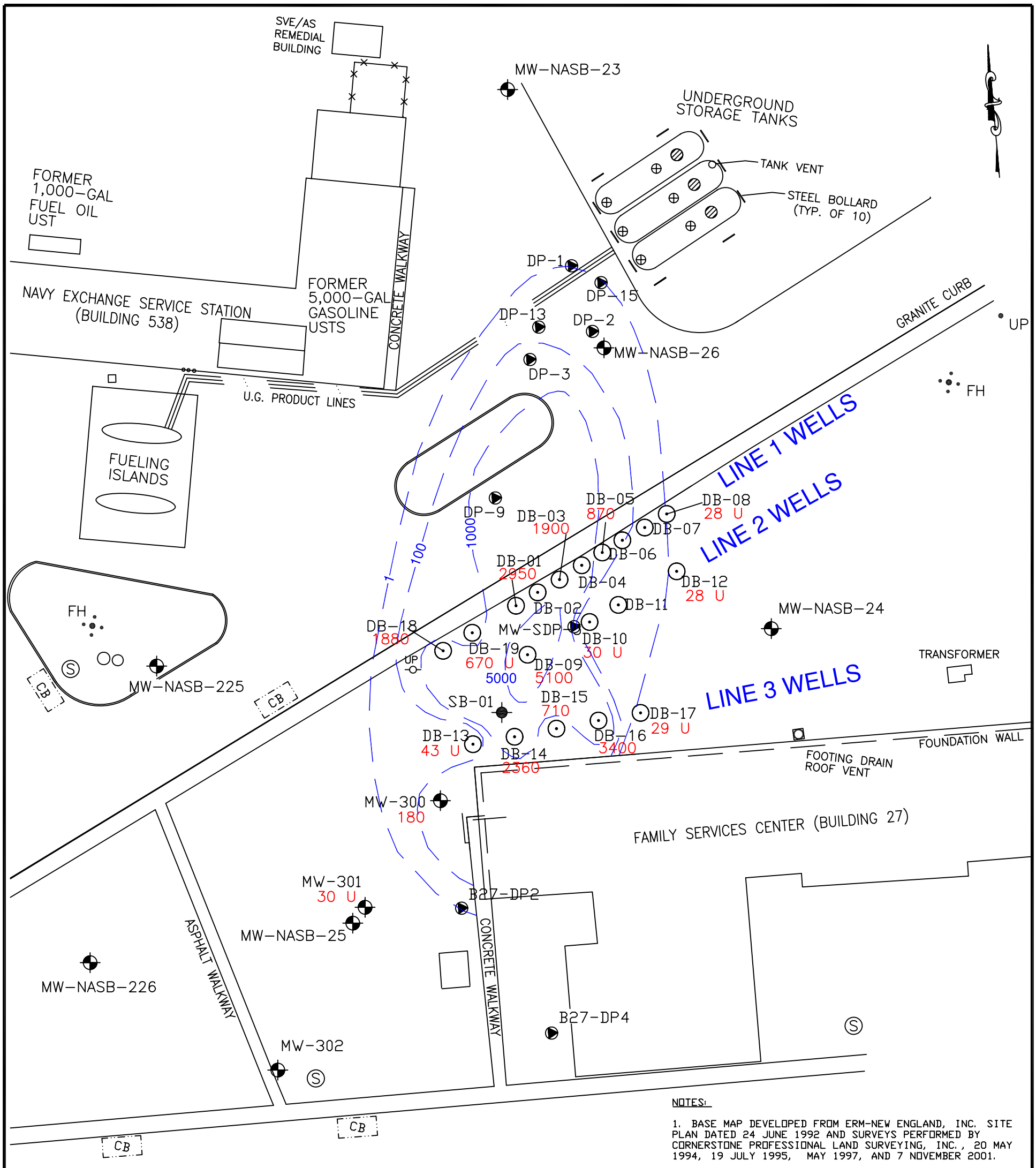
CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

TETRA TECH NUS, INC.

ROUND 4 (OCTOBER 2007) SOIL
VPH AROMATIC HYDROCARBON CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_3-9.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
3-9	0	02/11/08



LEGEND

MW-NASB-24	MONITORING WELL (2-INCH OR 4-INCH INSIDE DIAMETER)
DB-01	DIRECT-PUSH N-BLEND ADDITION WELL (2004)
B27-DP2	DIRECT-PUSH MONITORING WELL
SB-01	DIRECT-PUSH SOIL BORING (2004)
FH	FIRE HYDRANT WITH BOLLARDS
UP	UTILITY POLE
CB	STORM WATER CATCH BASIN
S	SEWER MANHOLE
	UNDERGROUND STRUCTURE
1	LINE OF EQUAL SOIL VPH ALIPHATICS CONCENTRATION (mg/kg) – DASHED WHERE ESTIMATED
120	SOIL VPH ALIPHATICS CONCENTRATION (mg/kg)

GRAPHIC SCALE

0′ 30′ 60′

NOTES:

1. BASE MAP DEVELOPED FROM ERM-NEW ENGLAND, INC. SITE PLAN DATED 24 JUNE 1992 AND SURVEYS PERFORMED BY CORNERSTONE PROFESSIONAL LAND SURVEYING, INC., 20 MAY 1994, 19 JULY 1995, MAY 1997, AND 7 NOVEMBER 2001.

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4. ADDITIONAL WELLS DB-18 AND DB-19 LOCATIONS APPROXIMATE.

SOURCE:

CORRECTIVE ACTION PLAN, NAVY EXCHANGE SERVICE STATION, NAVAL AIR STATION, BRUNSWICK, MAINE; EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC. MARCH 2004.

TETRA TECH NUS, INC.

ROUND 4 (OCTOBER 2007) SOIL
VPH ALIPHATIC HYDROCARBON CONCENTRATIONS
NAVAL EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

FILE	SCALE
\4590\3515\FIG_3-10.DWG	AS NOTED

FIGURE NUMBER	REV	DATE
3-10	0	02/11/08

FIGURE 3-11

SOIL GRO IN LINE 1 - THROUGH NOVEMBER 2007
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

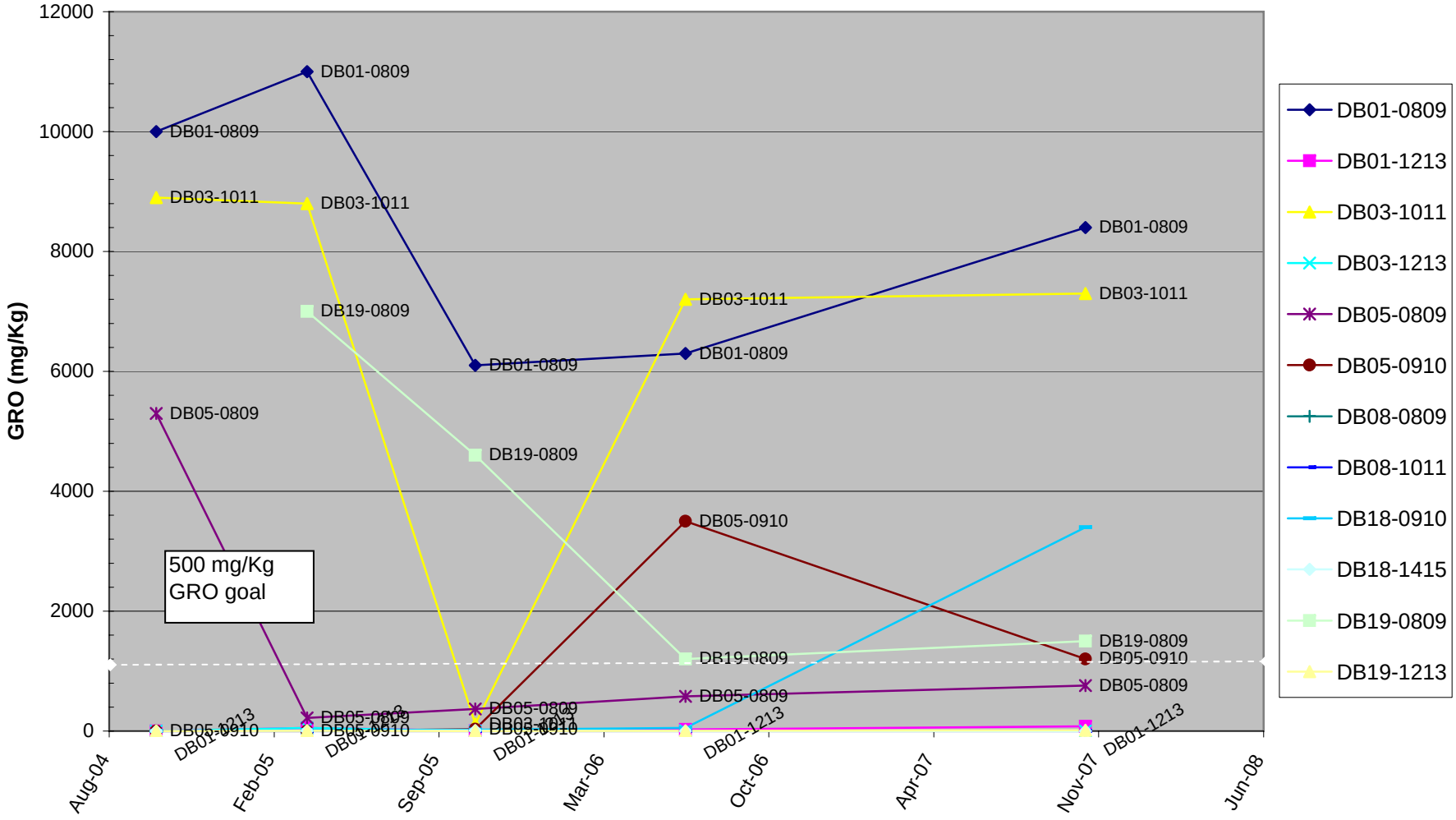


FIGURE 3-12

SOIL GRO IN LINE 2 - THROUGH NOVEMBER 2007
NAVY EXCHANGE SERVICE STATION
NAS BRUNSWICK, MAINE

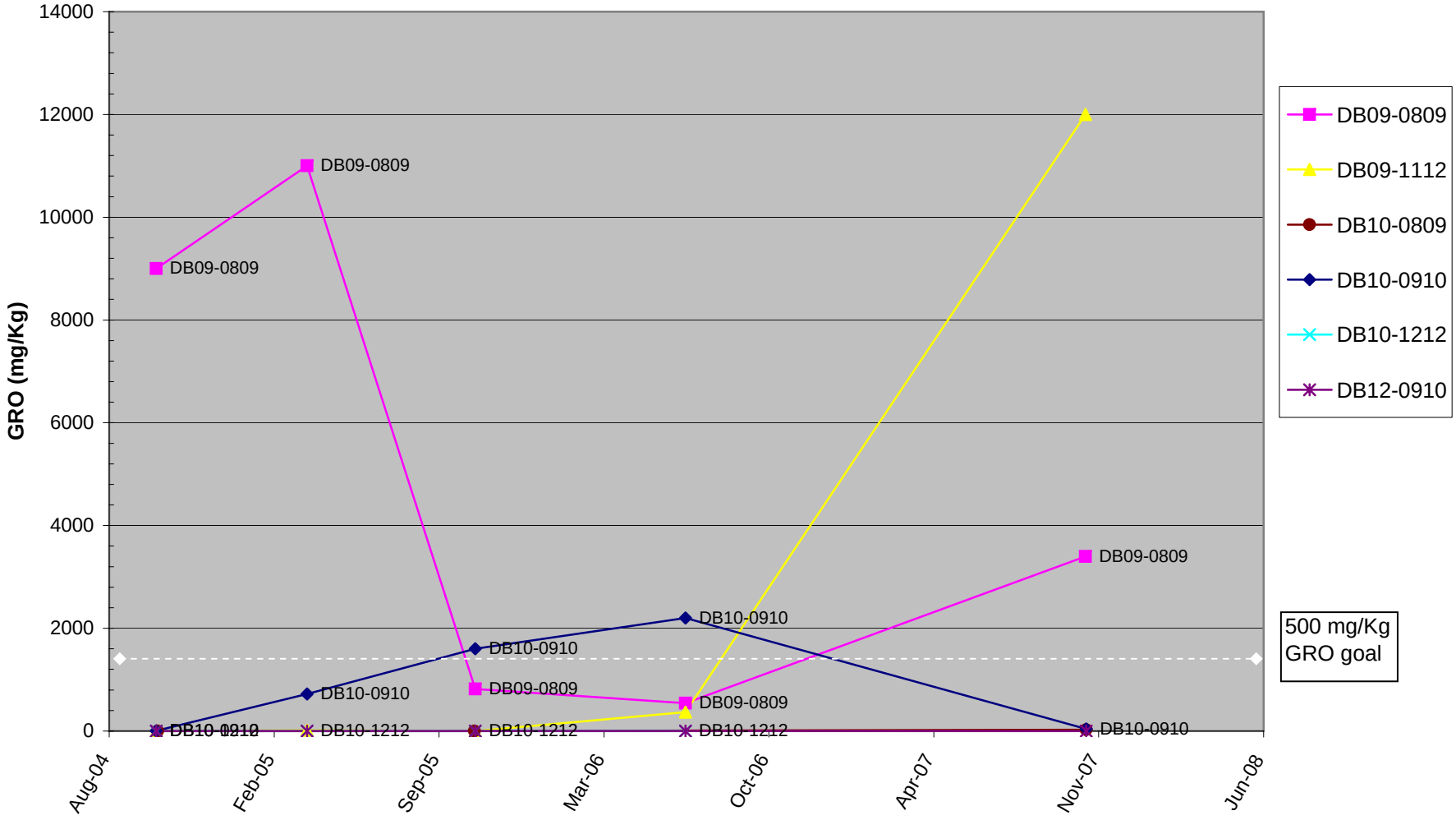


FIGURE 3-13

SOIL GRO IN LINE 3 - THROUGH NOVEMBER 2007
NAVY EXCHANGE SERVICE STATION
NAS BRUNSWICK, MAINE

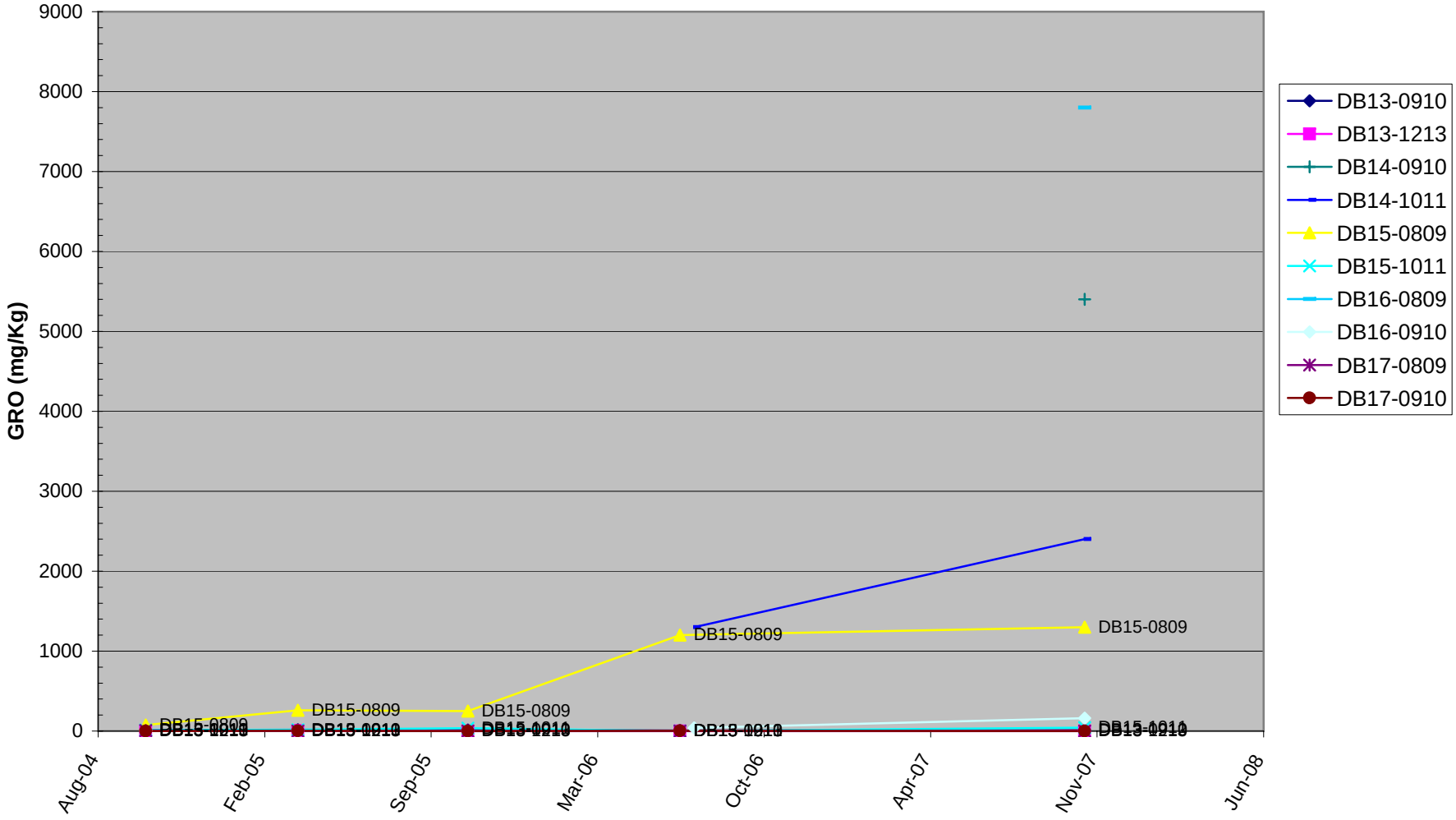


FIGURE 3-14

SOIL BOX PLOTS - THROUGH NOVEMBER 2007
NAVY EXCHANGE SERVICE STATION
NAVAL AIR STATION, BRUNSWICK, MAINE

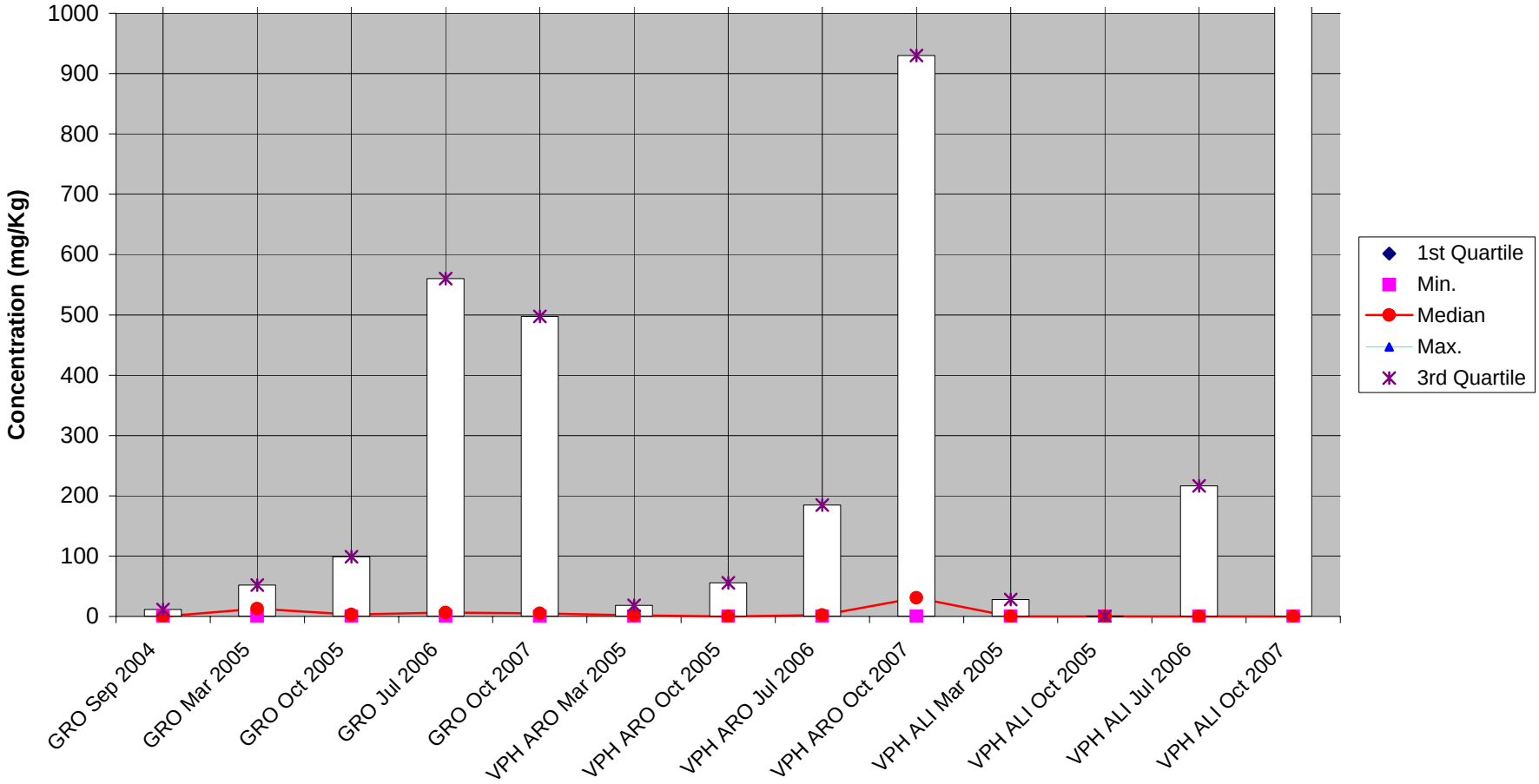
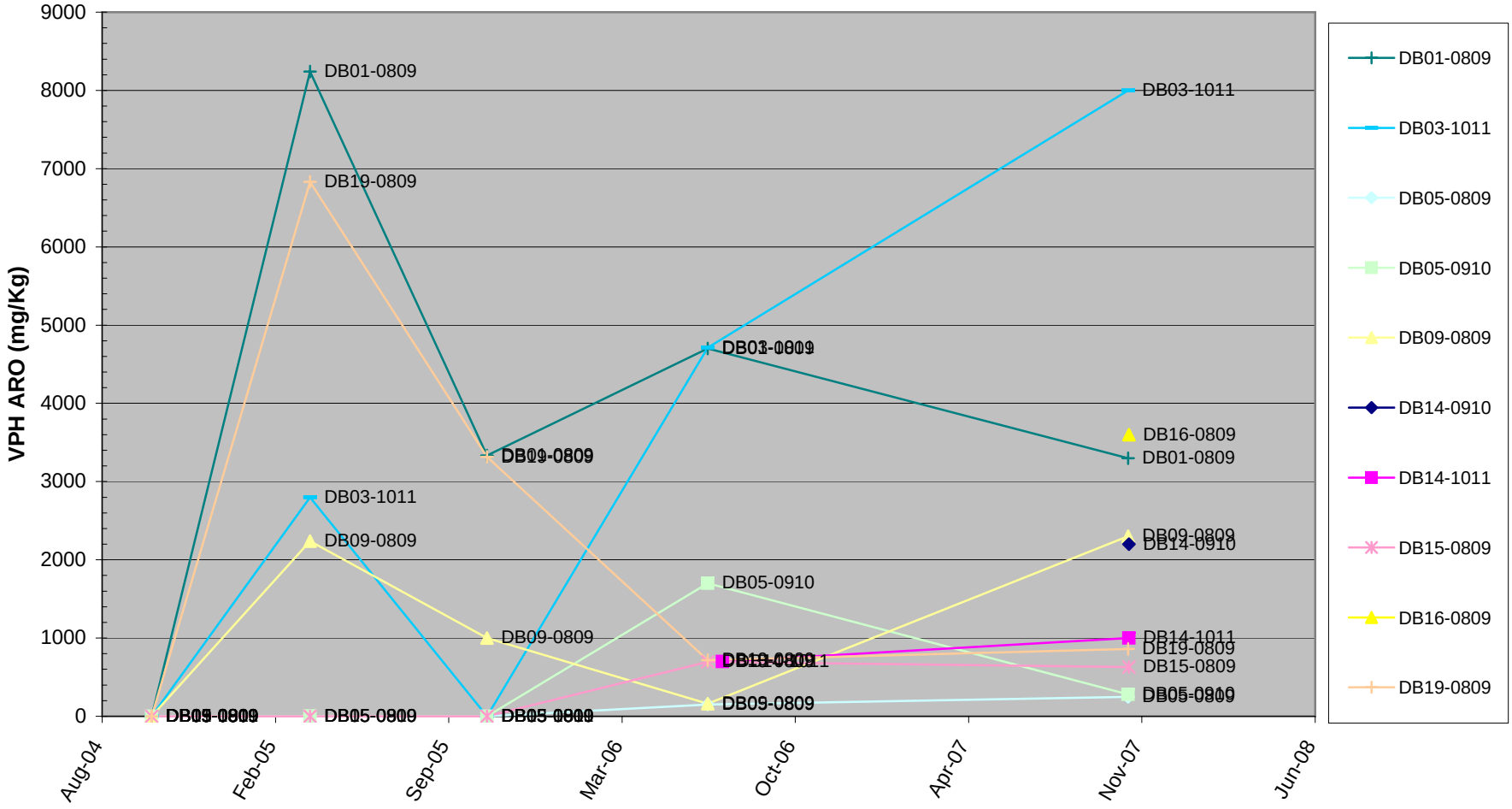


FIGURE 3-15

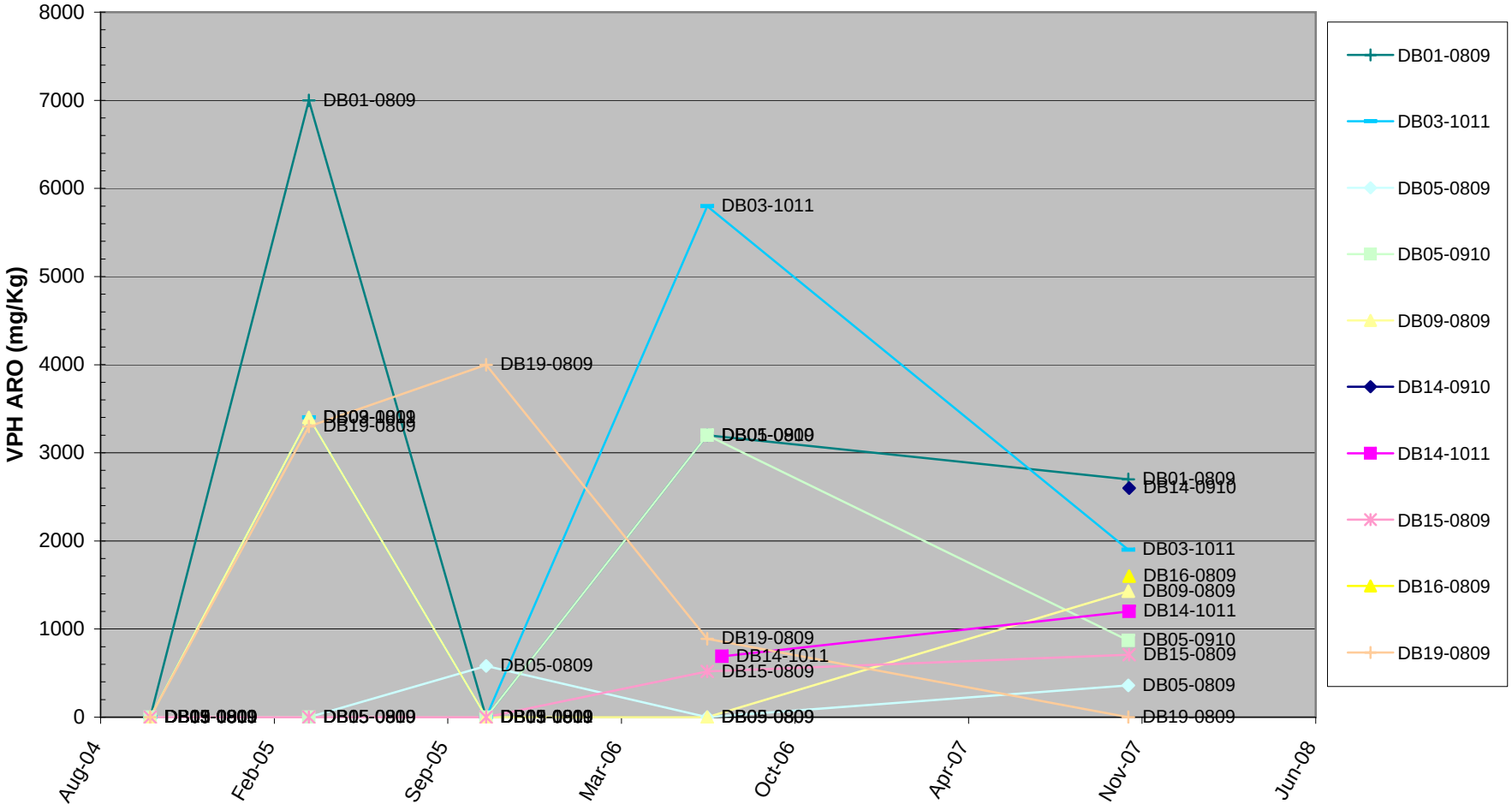
SOIL VPH AROMATICS TREND - THROUGH NOVEMBER 2007
NAVY EXCHANGE SERVICE STATION
NAS BRUNSWICK, MAINE



[Only samples with GRO/VPH > 500 mg/Kg depicted]

FIGURE 3-16

SOIL VPH ALIPHATICS TREND - THROUGH NOVEMBER 2007
NAVY EXCHANGE SERVICE STATION
NAS BRUNSWICK, MAINE



[Only samples with GRO/VPH > 500 mg/Kg depicted]

REFERENCES

REFERENCES

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APPENDIX A

GROUNDWATER SAMPLE COLLECTION LOGS

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - DB01

Tetra Tech NUS Charge No. 112GN4590-
QC: NEX-GW4-DUP01 (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: ~ 9.5 Feet Screened Interval Depth 5-13.8 feet
Sample Date & Time: 10/30/07 1615 hours, 1625 /Dup
Sampler(s): Glennon / Seward / Fullerton / Sivenson
Data Recorded By: P. Seward Signature: Peter Seward
Notes: MP = top of PVC
HS = well head space
PW = purge water

H&S Survey Meter HS 0.0 PW 0.0 PPM
Field Instrument Group A/B/C/D (Horiba - B, Turbidity - B)
Pre-pump insertion WL NA ft Post - pump insertion WL NA ft

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					

Nitrate/Nitrite DRO? Y/(N) (circle one)

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged ~~liters~~ gal	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1510	7.39	Begin purge									
1515	7.44		240		15.40	0.714	7.31	6	19.90*	15	clear/colorless
1525	7.45		240		15.9	0.97	6.59	115	0.75	11	
1530	7.46		240		15.9	0.795	6.83	5	0.15	7.8	
1535	7.46		240		15.9	0.794	6.86	-7	0.15	7.5	
1540	7.46		240	~1.5	15.9	0.787	6.87	-21	0.11	7.0	
1545	7.46		240		15.9	0.774	6.89	-29	0.10	6.6	
1550	7.46		240		15.9	0.787	6.90	-36	0.08	6.3	
1555	7.46		240		15.9	0.785	6.90	-40	~~0.07~~ 0.09	~~6.5~~ 4.3	
1600	7.46		240	~2.5	15.9	0.784	6.90	-42	0.08	4.5	
	purge completed										

TtNUS Form 0009

A Typical bottle set is 7 VOC vials w/ HCl, ~~[illegible]~~, and 1 125-ml poly.
Extended bottle set: add 2 1-ltr ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

* tightened flow-through cell fittings

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - ~~DO4~~ DB04

Tetra Tech NUS Charge No. 112GN4590-
QC: _____ (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: 11.0' Feet Screened Interval Depth 5-11.5 feet
Sample Date & Time: 10/31/07 1200 hours NA /Dup
Sampler(s): Glennon / Seward / Fullerton-Simpson
Data Recorded By: P. Seward Signature: Peter Seward
Notes: MP = top of PVC; no sheen observed on purge water
HS = well headspace; PW = purge water; BZ = breathing zone
No sheen observed on purge water

H&S Survey Meter HS 0.0 PW 0.0 BZ 0.0 PPM Field Instrument Group A/B/C/D PID A
Pre-pump insertion WL NA ft Post - pump insertion WL NA ft

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					
Nitrate/Nitrite		DRO? Y/N (circle one)			

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged ~~liters~~ gal	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1020 ~~0920~~	7.78	Begin purge									
1025 ~~0925~~	7.79		260		15.4	99.9*	6.31	-65	1.73	19	clear/colorless
1030 ~~0930~~	7.99		260		15.4	3.48	6.29	-63	5.46	14	
1035 ~~0935~~	8.00		260		15.5	3.37	6.31	-86	1.97	10	
1040 ~~0940~~	8.02		260		15.6	63.0	6.25	-94	2.24	7.3	
1045 ~~0945~~	8.03		260		15.6	58.6	6.25	-95	2.26	7.3	
1100 ~~1000~~	7.90		160	~2.5	15.6	72.3	6.28	-102	2.03	45	light brown/cloudy
1105 ~~1005~~	7.87		160		15.7	80.3	6.30	-100	2.04	70	
1114	7.88		160		15.8	99.9*	6.30	-87	1.22	17	clear/colorless
		stopped collecting reading called US EPA.									
1135	7.90		150	~300	15.9	99.9*	6.11	-42	0.39	5.0	clear colorless
1140	7.89		150		16.1	99.9*	6.25	-63	0.36	14.0	
1145	7.89		150		16.2	99.9*	6.29	-69	0.37	4.2	
1150	7.89		150	3.5 gal	16.3	99.9*	6.35	-79	0.38 ~~0.39~~	4.0	

TtNUS Form 0009

Purge complete
A Typical bottle set is 7 VOC vials w/ HCl, ~~2 1-liter ambers~~, and 1 125-ml poly.
Extended bottle set: add 2 1-liter ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

* reading was flashing. Removed the horiba from the groundwater setup and conducted a manual calibration — instrument OK.

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - DB07

Tetra Tech NUS Charge No. 112GN4590-
QC: _____ (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: _____ Feet Screened Interval Depth _____ feet
Sample Date & Time: 10/31/07 1230 hours _____ /Dup
Sampler(s): Glennon / Seward / Fullerton-Sivenson
Data Recorded By: Cathy Glennon Signature: [signature]
Notes:

H&S Survey Meter _____ PPM Field Instrument Group A/B/C/D
Pre-pump insertion WL 9.2 ft Post - pump insertion WL 9.2 ft
Top of screen = 5' BGS Bottom of screen = 12' BGS

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					
Nitrate/Nitrite		DRO? Y/N (circle one)			

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged liters	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1026	9.2		200	Start pump							
1032											
1058	9.45		80	pump at lowest possible setting							
1108					14.62	4.87	7.30	292	19.99 ERR 2		
1146	11.00		90	6	14.53	5.14	7.44	208	19.86	30	
1151	11.01				14.51	5.11	7.45	169	18.49		
1156					14.52	5.12	7.45	160	18.27	31	
1201					14.52	5.69	7.47	147	18.10		
1204					14.53	5.70	7.47	139	18.05	70	
1212	11.23				14.60	5.32	7.46	113	16.63	31	
1217	11.23				14.62	5.25	7.46	105	16.52	31	
1222	11.23			8	14.61	5.26	7.46	101	16.55	40	Stable

TtNUS Form 0009

A Typical bottle set is 7 VOC vials w/ HCl, ~~2 1-liter ambers~~, and 1 125-ml poly.
Extended bottle set: add 2 1-liter ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - DB10

Tetra Tech NUS Charge No. 112GN4590-
QC: _____ (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: 8.5 Feet Screened Interval Depth 5-12 feet
Sample Date & Time: 10/31/07 1340 hours NA /Dup
Sampler(s): Glennon / Seward / Fullerton / Swenson
Data Recorded By: D. Seward Signature: [signature]
Notes: MP = top of PVC
HS = well head space ; pw = purge water ; BZ = breathing zone

H&S Survey Meter: HS 0.0 PW 0.0 BZ 0.0 PPM
Field Instrument Group A/B/C/D
Pre-pump insertion WL NA ft
Post - pump insertion WL NA ft

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					
Nitrate/Nitrite		DRO? Y/N (circle one)			

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged ~~liters~~ gal or cc	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1245	7.21	Begin	purge								
1250	7.50		120		15.5	7.69	6.46	30	4.48	130	light tan - cloudy
1255	7.50		120		15.3	99.9*	6.38	6	0.96	85	↓
1300	7.50		120		15.0	99.9*	6.34	-25	0.95	50	clear/colorless
1305	7.52		120		14.9	99.9*	6.26	-41	0.70	22	
1310	7.52		120		14.8	99.9*	6.25	-62	0.83	8.5	
1315	7.56		120		14.8	99.9*	6.24	-61	0.73	12	
1320	7.55		120		14.8	99.9*	6.23	-77	0.77	14	
1325	7.55		120		14.8	99.9*	6.24	-77	1.10	9.1	
1330	7.55		120		14.8	99.9*	6.25	-81	1.01	8.1	
1335	7.56		120	N2	14.8	99.9*	6.25	-84	0.94	4.7	
				purge complete							

TtNUS Form 0009

A Typical bottle set is 7 VOC vials w/ HCl, 2 1-liter ambers, and 1 125-ml poly.
Extended bottle set: add 2 1-liter ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

* reading climbed to 99.9 then started flashing. Per Chuck Page - we will continue sampling waiting sure the other parameters have stabilized.

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - DB11

Tetra Tech NUS Charge No. 112GN4590-
QC: _____ (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: _____ Feet Screened Interval Depth _____ feet
Sample Date & Time: 10/31/07 1345 hours _____ /Dup
Sampler(s): Glennon / Seward / Fellows-Stevenson
Data Recorded By: Glennon Signature: [signature]
Notes:

H&S Survey Meter _____ PPM Field Instrument Group A/B/C/D
Pre-pump insertion WL 7.24 ft Post - pump insertion WL NA ft
Screened at 5-11.5' BGS

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					
Nitrate/Nitrite		DRO? Y/N (circle one)			

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged liters	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1304	7.24			Start pump							
1316	7.82		200								
1319	7.84				14.76	0.932	6.57	262	19.99	16	
1333	7.87			4	14.45	2.27	6.11	211	19.74	17	
1336	7.87				14.45	2.23	6.12	208	19.61	18	
1339	7.87			5	14.39	2.25	6.11	207	19.99	16	Stable

TtNUS Form 0009 A Typical bottle set is 7 VOC vials w/ HCl, ~~2 1-liter amberes~~, and 1 125-ml poly.
Extended bottle set: add 2 1-liter ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - DB14

Tetra Tech NUS Charge No. 112GN4590-
QC: _____ (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: 12.5 Feet Screened Interval Depth 5-12.5 feet
Sample Date & Time: 10/31/07 1450 hours /Dup
Sampler(s): Glennon / Seward / Fellows-Swenson
Data Recorded By: C. Fellows Signature: [illegible]
Notes: Weather: 65°F Sunny

H&S Survey Meter 132 W RW PPM Field Instrument Group A/B/C/D
Pre-pump insertion WL 7.85 ft Post - pump insertion WL 7.87 ft

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					

Nitrate/Nitrite DRO? Y/(N) (circle one)

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged ~~liters~~ gal	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1330	7.87	Turn pump on, filling flow through cell, measuring, slow start									
1350	7.95	2 o'clock	240		14.8	1.34	6.38	49	0.17	3.0	
1400	7.95	2	260		14.8	1.30	6.33	41	0.05	1.8	
1410	7.96	2	260		14.8	1.29	6.31	36	0.0	1.4	
1420	7.96	2	270		14.8	1.29	6.33	31	0.09	1.1	
1430	7.97	2	270		14.8	1.28	6.35	27	0.11	1.2	
1435	7.97	2	275	2.5	14.8	1.27	6.36	23	0.11	1.1	
1440	7.97	2	275		14.8	1.27	6.36	22	0.11	0.95	
1445	7.97	2	275	3.0	14.8	1.27	6.36	22	0.11	0.95	
	* END PURGE										
1450	[illegible]										

TtNUS Form 0009

A Typical bottle set is 7 VOC vials w/ HCl, 2 1-liter ambers, and 1 125-ml poly.
Extended bottle set: add 2 1-liter ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - DB18

Tetra Tech NUS Charge No. 112GN4590-
QC: matrix spike (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: 14.5 Feet Screened Interval Depth 5-15.7 feet
Sample Date & Time: 10/31/07 ~~1705~~ 1205 hours 002 /Dup
Sampler(s): Glennon / Seward / Fellows-Swenson
Data Recorded By: C. Fellows Signature: [signature]
Notes: Weather - 65° sunny

H&S Survey Meter BZ 0 | W 0 | PW 0 PPM Field Instrument Group A/B/C/D
Pre-pump insertion WL 7.25 ft Post - pump insertion WL 7.28 ft
TD = 15.25

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					
Nitrate/Nitrite		DRO? Y/N (circle one)			

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged ~~liters~~ gal	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L 3%	Turbidity NTU	Comments
1055	7.31	* Filling flow through cell, observing drawdown, etc.									
1100	7.31	3 o'clock	290		16.0	2.69	7.30	129	1.37	25	
1110	7.31	3 o'clock	300		15.9	2.13	7.45	50	0.41	2.0	
1120	7.31	3 o'clock	300	2.5	15.9	2.08	7.46	10	0.25	1.3	
1130	7.31	3 o'clock	300		15.9	2.06	7.48	-9	0.20	0.75	
1140	7.31	3 o'clock	325	4.0	15.9	2.02	7.51	-21	0.17	0.75	
1150	7.31	3	325		15.9	2.01	7.51	-26	0.16	0.75	
1155	7.31	3	350		15.9	2.00	7.51	-30	0.16	0.75	
1200	7.31	3	350	5.0	15.9	1.99	7.51	-31	0.16	0.75	
1200	End Purge.										
1205	Begin Sampling										

TtNUS Form 0009 A Typical bottle set is 7 VOC vials w/ HCl, ~~2 liter ambers~~, and 1 125-ml poly.
Extended bottle set: add 2 1-liter ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - DP09

Tetra Tech NUS Charge No. 112GN4590-
QC: _____ (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: _____ Feet Screened Interval Depth _____ feet
Sample Date & Time: 10/31/07 1740 hours _____ /Dup
Sampler(s): Glennon / Seward / Fullerton-Swenson
Data Recorded By: Glennon Signature: [signature]
Notes:

H&S Survey Meter _____ PPM Field Instrument Group A/B/C/D
Pre-pump insertion WL 7.13 ft Post - pump insertion WL 7.13
Horiba C has had conductivity problems

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					
Nitrate/Nitrite		DRO? Y/N (circle one)			

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged liters	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1657	7.13			Start pump							
1721	7.22			4	15.1	4.22	7.16	-31	3.19	7.9	
1724					15.3	5.09	7.14	-39	2.84	5.5	
1732	7.22				15.6	71.9	7.15	-53	1.93	3.6	
1735	7.22		220		15.6	61.7	7.15	-59	2.02	3.3	
1738				5 qt	15.6	55.3	7.15	-61	2.05	4.7	stable

TtNUS Form 0009

A Typical bottle set is 7 VOC vials w/ HCl, 2 1-liter ambers, and 1 125-ml poly.
Extended bottle set: add 2 1-liter ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - DP13

Tetra Tech NUS Charge No. 112GN4590-
QC: _____ (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: _____ Feet Screened Interval Depth _____ feet
Sample Date & Time: 10/5/07 1735 hours _____ /Dup
Sampler(s): Glennon / Seward / Fellows-Sivenson
Data Recorded By: _____ Signature: _____
Notes: _____

H&S Survey Meter _____ PPM Field Instrument Group A/B/C/D
Pre-pump insertion WL 7.62 ft Post - pump insertion WL 7.62 ft

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					
Nitrate/Nitrite		DRO? Y/N (circle one)			

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged ~~liters~~ gal	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1618	7.62			Start pump							
1700	7.70	12	210		16.3	0.544	1.57	26	2.62	17	
1705	7.76	12	230		16.3	0.544	7.59	22	2.20	15	
1715	7.70	12	230		16.4	0.535	7.76	-31	0.74	12	
1720	7.70	12	230		16.4	0.531	7.81	-47	0.40	10	
1725	7.76	12	230		[illegible]	0.530	7.84	-54	0.40	10	
1730	7.70	12	230		16.4	0.528	7.84	-57	0.40	11	
[illegible]	[illegible]	[illegible]	[illegible]								
				≅48 gal based on purge rate + time							

TtNUS Form 0009

A Typical bottle set is 7 VOC vials w/HCl, 2 1-liter ambers, and 1 125-ml poly.
Extended bottle set: add 2 1-liter ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - MW300

Tetra Tech NUS Charge No. 112GN4590-
QC: _____ (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: _____ Feet Screened Interval Depth _____ feet
Sample Date & Time: 10/31/07 1545 hours _____ /Dup
Sampler(s): Clinton / Seward / Fellows-Swenson
Data Recorded By: _____ Signature: _____
Notes: _____

H&S Survey Meter _____ PPM Field Instrument Group A/B/C/D
Pre-pump insertion WL _____ ft Post - pump insertion WL _____ ft

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					
Nitrate/Nitrite		DRO? Y/N (circle one)			

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged liters	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1420	7.90	Begin purge									clear/colorless
1425	7.90		220		15.5	2.15	6.30	-97	4.31	18	
1430	7.91		220		15.6	99.9*	7.26	-128	2.02	3.0	
1435	7.91		220		15.6	54.4	7.34	-143	2.74	3.1	
1530	7.91				15.4	2.47	7.39	-177	2.76	0.85	
1533	7.91				15.4	2.44	7.40	-177	2.75	0.15	
1536	7.91				15.5	2.49	7.39	-176	2.75	0.20	Stable
				~4 gal based on purge rate + time							

TtNUS Form 0009

A Typical bottle set is 7 VOC vials w/ HCl, 2 1-liter ambers, and 1 125-ml poly.
Extended bottle set: add 2 1-liter ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - [illegible]

Tetra Tech NUS Charge No. 112GN4590-
QC: _____ (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: [illegible] Feet Screened Interval Depth [illegible] feet
Sample Date & Time: / / 1620 hours /Dup
Sampler(s): Glennon / Seward / Fellows-Swenson
Data Recorded By: [illegible] Signature: [illegible]
Notes: [illegible]

H&S Survey Meter 0 0 0 PPM (BZ 4PW) Field Instrument Group A/B/C/D
Pre-pump insertion WL 6.63 ft Post - pump insertion WL 6.65 ft

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					

Nitrate/Nitrite DRO? Y/N (circle one)

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged ~~liters~~ gallons	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1530	Filling flow through cell, [illegible] dam, etc.										
1545	6.72	2	260		15.2	0.7553	6.62	62	0.32	2.6	
1550	6.72	2	270	1	15.0	0.689	6.58	67	0.21	1.3	
1600	6.72	2	300		15.0	0.654	6.59	69	0.17	0.75	
1610	6.72	2	300		14.9	0.655	6.59	71	0.15	0.75	
1615	6.72	2	[illegible]	2	14.9	0.644	6.59	71	0.15	0.90	
1620	6.72	2	[illegible]		14.8	0.639	6.59	71	[illegible]	[illegible]	
	Hold Purge, Begin Sampling										

TtNUS Form 0009

A Typical bottle set is 7 VOC vials (w/ HCl), 2 1-liter ambers, and 1 125-ml poly.
Extended bottle set: add 2 1-ltr ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - SDP5

Tetra Tech NUS Charge No. 112GN4590-
QC: _____ (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: _____ Feet Screened Interval Depth _____ feet
Sample Date & Time: 01/31/07 1645 hours _____ /Dup
Sampler(s): Glennon / Seward / Fellows-Swenson
Data Recorded By: Glennon Signature: [signature]
Notes:

H&S Survey Meter _____ PPM Field Instrument Group A B/C/D
Pre-pump insertion WL 7.02 ft Post - pump insertion WL 7.02 ft

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					
Nitrate/Nitrite		DRO? Y/N (circle one)			

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged (liters)	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1502	7.02		180	Start pump							
1512	7.20										
1517	7.20				14.71	0.648	6.29	231	19.99	12	
1630	7.20				14.33	0.592	6.14	56	19.99	7.0	
1633	7.20				14.31	0.592	6.14	56	18.09	4.9	
1636	7.20			16	14.29	0.591	6.14	55	16.13	1.9	

TtNUS Form 0009

A Typical bottle set is 7 VOC vials w/HCl, 2 1-liter ambers, and 1 125-ml poly.
Extended bottle set: add 2 1-ltr ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

Well is 4' WNW from DB-10 (walk towards near utility pole)
Its hard to see - rusty cap most

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - NASB - 8

Tetra Tech NUS Charge No. 112GN4590-
QC: None (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: _____ Feet Screened Interval Depth _____ feet
Sample Date & Time: 11/1/07 1410 hours /Dup
Sampler(s): Glennon / Seward / Fellows-Swenson
Data Recorded By: Glennon Signature: [signature]
Notes:

H&S Survey Meter _____ PPM Field Instrument Group A B/C/D / E - Lamotte - Horiba
Pre-pump insertion WL 2.55 ft Post - pump insertion WL 2.55 ft

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					
Nitrate/Nitrite		DRO? (Y)/N (circle one)			

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged (liters)	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1327	2.55				start pump						
1333	2.72		200								
1347	2.85		180		13.5	0.512	5.86	252	3.19		
1402	2.83		240	6	13.5	0.513	5.75	272	3.38	1.8	
1405	2.84				13.5	0.513	5.75	273	3.43	1.4	
1408	2.83				13.5	0.511	5.78	273	3.49	1.00	Stable

TtNUS Form 0009

A Typical bottle set is 7 VOC vials w/HCl, 2 1-liter ambers, and 1 125-ml poly.
Extended bottle set: add 2 1-liter ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - NASB - [redacted] 9

Tetra Tech NUS Charge No. 112GN4590-
QC: Matrix Spike (DRO only) (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: _____ Feet Screened Interval Depth _____ feet
Sample Date & Time: 11/1/07 1230 hours /Dup
Sampler(s): Glennon / Seward / Fullerton / Swenson
Data Recorded By: Glennon/Seward Signature: [signature]
Notes: WL = top of PVC

H&S Survey Meter _____ PPM Field Instrument Group A/B/C/D (Horiba - Lamotte)
Pre-pump insertion WL 3.61 ft Post - pump insertion WL 3.61 ft

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					
Nitrate/Nitrite					

DRO? (Y)/N (circle one)

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged (liters)	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1043	3.61		240	Start pump							
1048	3.71										
1128	3.72			13							
1150	3.72		240		14.25	0.152	5.64	215	0.0*	1.7	clear/colorless
1205	3.72		240		14.23	0.162	5.14	227	0.0*	1.0	
1210	3.72		240		14.25	0.152	5.56	207	0.0*	0.0	
1215	3.72		240		14.29	0.152	5.66	199	0.0*	0.0	
1220	3.72		240	15	14.24	0.152	5.74	190	0.0*	0.0	
		purge complete									

TtNUS Form 0009

A Typical bottle set is 7 VOC vials w/ HCl, 2 1-liter ambers, and 1 125-ml poly.
Extended bottle set: add 2 1-liter ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

* problem w/ instrument DO reading will continue purge

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW 4 ~~NNASB~~ 2226

Tetra Tech NUS Charge No. 112GN4590-
QC: _____ (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: 12 Feet Screened Interval Depth 5-13 feet
Sample Date & Time: 11/1/07 1045 hours ~~GMT~~ /Dup
Sampler(s): Glennon / ~~Seward~~ / Fellows-Swenson
Data Recorded By: C. Pellas Signature: [signature]
Notes: Weather - 65°F cloudy

H&S Survey Meter 0/0/0 PPM (B2/W/EW)
Field Instrument Group A/B/C/D (Horiba C - Lamott)
Pre-pump insertion WL ~~3.78~~ 4.78 ft
Post - pump insertion WL ~~3.74~~ 4.79 ft

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					
Nitrate/Nitrite		DRO? (Y)/N (circle one)			

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged ~~liters~~ gal	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L *	Turbidity NTU	Comments
0910	* Start Pump, measuring drawdown, filling flow through cell										
	4.82										
1010	~~3.82~~	12	270		15.6	0.204	6.29	71	0.36	1.6	
~~1020~~	~~4.06~~	~~12~~				~~0.102~~	~~6.34~~		~~9.95~~		
1030	4.82	12	290		15.6	0.200	6.32	55	0.18	1.3	
1035	4.82	12	290		15.6	0.199	6.32	55	0.19	1.2	
1040	4.82	12	300	5	15.6	0.198	6.32	53	0.17	1.2	
1045	* ~~Begin~~ End Purge, Begin Sampling										

TtNUS Form 0009

A Typical bottle set is 7 VOC vials w/ HCl, 2 1-liter ambers, and 1 125-ml poly.
Extended bottle set: add 2 1-ltr ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

* Problem with DO - no better instruments available

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - ~~[illegible]~~ NASB-250

Tetra Tech NUS Charge No. 112GN4590-
QC: None (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: _____ Feet Screened Interval Depth _____ feet
Sample Date & Time: 11 / 1 / 07 1255 hours _____ /Dup
Sampler(s): Glennon / Seward / Fellows-Swenson
Data Recorded By: Glennon Signature: [illegible]
Notes:

H&S Survey Meter _____ PPM Field Instrument Group (A)/B/C/D/(E) Lamotte - Horiba
Pre-pump insertion WL 3.60 ft Post - pump insertion WL 3.60 ft

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOC					
Nitrate/Nitrite		DRO? (Y)/N (circle one)			

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged liters	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1109	3.60			start pump							
1130	9.00			~~decrease pump rate~~ turn pump off 4 liters purged so far							
1149	3.72			pump on - lowest rate possible							
1152	4.02		100								
1155	4.46										
1242	7.85			10	13.4	0.185	6.02	138	5.48	2.7	
1247	8.05				13.4	0.185	6.05	135	5.63	2.8	
1252	8.31				13.4		6.07	134	5.63	2.1	stable

TtNUS Form 0009

A Typical bottle set is 7 VOC vials w/ HCl, ~~2 1-liter ambers~~, and 1 125-ml poly.
Extended bottle set: add 2 1-liter ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - MWNASB-251

Tetra Tech NUS Charge No. 112GN4590-
QC: _____ (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: _____ Feet Screened Interval Depth _____ feet
Sample Date & Time: 11/1/07 1135 hours / /Dup
Sampler(s): Glennon / Seward / Fellows-Swenson
Data Recorded By: C. Fellows Signature: [signature]
Notes: Weather - 65° Cloudy

H&S Survey Meter 0 0 0 PPM (52 M PW)
Field Instrument Group A/B/C/D (Hanlon / Lamotte)
Pre-pump insertion WL 4.20 ft Post - pump insertion WL 3.95 ft

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					

Nitrate/Nitrite DRO? (Y)/N (circle one)

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged ~~liters~~ gal	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
0930	* Start Pump, reverse draw down, fill flow through cell.										
	* Water has orange tint and clumps of iron/organic material in it, gets stuck in flow through cell.										
1015	3.97	12	200		14.2	0.102	6.35	248	11.02	11	
1025	4.00	12	200		14.2	0.101	6.40	197	9.78	18	
1055	4.00	12	200		14.3	0.099	6.44	82	8.50	11	
1105	4.00	12	200		14.3	0.099	6.46	76	7.50	90	
1115	4.00	12	235		14.3	0.098	6.45	71	7.31	27.4	
1120	4.00	12	235		14.35	0.098	6.46	68	7.22	28.8	
1125	4.00	12	230		14.34	0.098	6.46	67	7.06	20.8	
1130	4.00	12	230	7	14.4	0.098	6.46	66	7.02		
	* End Purge										
1135	* Begin Sampling										

TtNUS Form 0009

A Typical bottle set is 7 VOC vials (w/ HCl), ~~2 1-liter ambers~~, and 1 125-ml poly.
Extended bottle set: add 2 1-ltr ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

TETRA TECH NUS, INC.

SAMPLE LOG SHEET - "LOW FLOW" GROUNDWATER

Site Name: NAS Brunswick - NEX Service Station
Sample ID: NEX - GW4 - MW - NASB - 252

Tetra Tech NUS Charge No. 112GN4590-
QC: NEX - GW4 - DUP02 (If applicable)

Sample Method: Low Flow Using Peristaltic Pump
Depth Sampled: 10.5 Feet Screened Interval Depth 5-11.7 feet
Sample Date & Time: 11/1/07 1400 hours 1410/Dup
Sampler(s): Glennon / Seward / Fellows-Sivensen
Data Recorded By: CFellows Signature: [signature]
Notes: Weather 65° - Cloudy

H&S Survey Meter 1 PPM Field Instrument Group A/B/C/D
Pre-pump insertion WL 3.24 ft Post - pump insertion WL 3.21 ft
TD = 11.7

Analysis	Bottle Lot #	Analysis	Bottle Lot #	Analysis	Bottle Lot #
VPH					
GRO					
VOCs					
Nitrate/Nitrite		DRO? (Y)/N (circle one)			

Clock Time 24hr	Water Depth below MP ft	Pump Dial 1	Purge Rate ml/min	Cumm. Volume Purged liters	Temp °C	Spec. Cond. 2 uS/cm	pH	ORP/Eh3 mv	DO mg/L	Turbidity NTU	Comments
1250	* Turn pump on, filling flow through cell, monitoring drawdown.										
1320	3.32	11	190		14.1	0.366	6.72	36	0.18	1.85	
1330	3.35	12	225		14.0	0.355	6.70	33	0.07	2.77	
1340	3.35	12	220		13.9	0.352	6.68	30	0.04	5.25	
1345	3.35	12	220		13.9	0.352	6.68	30	0.04	6.37	
1350	3.35	12	220		13.9	0.351	6.68	29	0.04	6.42	
1400	End Purge @ 1350, Begin Sampling @ 1400										
				≈ 4 gal based on purge rate + time on							

TtNUS Form 0009 A Typical bottle set is 7 VOC vials w/ HCl, ~~2 1-liter ambers~~, and 1 125-ml poly.
Extended bottle set: add 2 1-ltr ambers

1. Pump dial setting (for example: hertz, cycle/min, etc.)
2. Siemens per cm (same as umhos/cm) at 25 °C.
3. Oxidation reduction potential (stand in for Eh).

APPENDIX B

SOIL BORING LOGS

BORING LOG FOR: NEX – NASB ROUND 4 (NE OF WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Fellows
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION: —

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: DB-01
START DATE: 10/29/07
COMPLETION: DATE: 10/29/07
MON. WELL NO.: —
CHECKED BY: C. Race

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~FID~~, (PPM)]
										PID
2										
4										
6										
8			1405		Sl. loose	tan	8.0-9.0- f-m sand			
8.0-9.0		8.0-12.0	DB01-0809		Sl. loose	tan	9.0-10.0- f-m sand, bands of gray sand between 9.0-9.5, may be due to staining	SP	Strong odor, moist	565
10		4.0/4.0			Sl. loose	tan	10.0-11.0- f-m sand	SP		749
					Sl. loose	tan	11.0-12.0- m sand	SP		658
12			1420							27
12.0-13.0		1.0/1.0	DB01-1213		Sl. loose	gray	12.0-13.0- f sand, gray sand may be due to petro. staining.	SP	Strong odor, moist	20
14				EOB @ 13'						

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS:
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: DB-01 PAGE: 1 OF 1

Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (NE OF WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: G. Fellows
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION:

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: DB-03
START DATE: 10/29/07
COMPLETION: DATE: 10/29/07
MON. WELL NO.: —
CHECKED BY: C Rose

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~FID~~ (PPM)]
			NOT sampled							P.10
2										
4										
6										
8										
		8.0-11.0 3.0/3.0			Sl. loose	tan	8.0-10.0 - f-m sand	SP		
10									Strong odor 9'-11', moist	
10.0-11.0			1240 DB03-1011		Sl. loose	tan	10.0-11.0 - f-m sand	SP		522
12		11.0-13.0 2.0/2.0	1300 DB03-1213							911
12.0-13.0					Dense	tan	12.0-12.8 - silt w/ fine sand		moist, sl. odor but windy	
14				EOB @ 13.0'	Dense	gray	12.8-13.0 - clay	SM		

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS:
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: DB-03

Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (N ~~W~~ E OF WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Fellows
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION: —

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: DB 05
START DATE: 10/29/07
COMPLETION: DATE: 10/29/07
MON. WELL NO.:
CHECKED BY: C. Rau

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~FID~~ (PPM)]
			Not sampled							0.0
2										
4										
6										
8										
8.0-9.0		2.0/2.0	1220 DB05-0809		Sl. loose	tan	8.0-9.5 - fine to med sand	SP	moist, sl. wet	0.0
9.0-10.0 10			DB05-0910		Dense	tan	9.5-10.0 - silt w/ some fine sand	SM		
12				EOB @ 10'						

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS:
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: DB-05

PAGE: 1 OF 1

Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (N ~~W~~ E OF WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Fellows
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION:

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: DB08
START DATE: 10/29/07
COMPLETION: DATE: 10/29/07
MON. WELL NO.:
CHECKED BY: C. Race

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~FID~~ (PPM)]
							NO soil collected 0'-8'			PID
2										
4										
6										
8										
		2.5/2.5 (8-10.5)	1050 DB08-0809	8	loose	tan	8.0-9.0- fine sand (upper sand)	SP	Dry	
10			DB08-0910	9	sl. dense	tan	9.0-9.5 - silt w/ fine sand	SM		0.0
10.5				10	Dense	gray	9.5-10.0 - clay w/ some silt (transitional zone)	SC	Moist	
12				EOB @ 10.5'	sl. Dense	tan	10.0-10.5 - silt w/ fine sand	SM		

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS:
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: DB-08

PAGE: 1 OF 1

Sample 8.5-9.5
10.5 10

Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (NW OF WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Fellows
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION:

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: DB-09
START DATE: 10/29/07
COMPLETION: DATE: 10/29/07
MON. WELL NO.:
CHECKED BY: C. Rose

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~PID~~ (PPM)]
										PID
2										
4										
6										
8			1640							
			DB 09-0809							
10		4.0/4.0	1650		sl. loose	tan	8.0-9.0 - f. sand	SP	Strong odor, sl. moist	634
			DB09-1011							1830
12					sl. loose	tan	11.0-12.0 - f. sand 11.3-11.6 - f-m sand	SP		918
				EOB @ 12'			11.6-12.0 - tan silt w/ f. sand			127

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS:
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: DB-09

PAGE: 1 OF 1

Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (N/~~W~~ E OF WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Fellows
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION: —

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: DB 10
START DATE: 10/30/07
COMPLETION: DATE: 10/30/07
MON. WELL NO.: —
CHECKED BY: C. Race

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~FID~~ (PPM)] P.D
2										
4										
6										
8			0910							
			DB10-0909		Sl. loose	tan	8.0-9.0- f. sand	SP	strong odor, moist	927
10		4.0/4.0	DB10-0910		Dense	gray	9.0-10.0- silt w/ some vf-f sands	SM	strong odor,	1761
					Dense	gray	10.0-11.0- clay, some silt	SC	strong odor	405
12					Dense	gray	11.0-12.0- silt w/ some vf-f sands	SM	Sl. odor	16.9
				EOB @ 12'						

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS: —
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: DB 10

PAGE: 1 OF 1

Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (NW ~~W~~ E OF WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Fellows
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION:

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: DB12
START DATE: 10/30/07
COMPLETION: DATE: 10/30/07
MON. WELL NO.:
CHECKED BY: C. Rose

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~FID~~, (PPM)]
										PID
2										
4										
6										
8			0930							
10		4.0/4.0	DB12-0910		Dense	tan	8.0-9.0 - silt w/ some vf sands		No odor moist	0.0
					Dense	gray	9.0-10.0 - silt w/ clay			
12					Dense	gray	10.0-11.0 - clay w/ some silt		NO odor, moist	0.0
					Dense	gray	11.0-12.0 - clay w/ some silt			
				EOB @ 12'						

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS:
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: DB 12

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Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (N of WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Fellas
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION: —

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: DB13
START DATE: 10/30/07
COMPLETION: DATE: 10/30/07
MON. WELL NO.: —
CHECKED BY: C. Race

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~PID~~, (PPM)]
										P.O
2										
4										
6										
8										
10		4.0/4.0	NEX-SOIL-DB13-1011		sl. loose	tan	8.0-9.0 - f. sand	SP	V. Sl. odor, moist	34
							9.0-11.0 - f. sand w/ gray staining/banding	SP		5
12							11.2 - Dark gray/black stain/band 11.6 - Orange stain/band	SP		54
13		1.0/1.0	NEX-SOIL-DB13-1213		sl. loose	gray	12.0-12.5 - f. sand	SP	No odor, v. moist	10
14				EOB @ 13'	Dense		12.5-D.O. - S/H w/ vf. sand	SM		0.0

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS: —
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: DB13

PAGE: 1 OF 1

Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (N ~~W~~ E OF WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Felkins
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION:

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: DB14
START DATE: 10/30/07
COMPLETION: DATE: 10/30/07
MON. WELL NO.: —
CHECKED BY: C. Race

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~FID~~ PID (PPM)]
										PID
2										
4										
6										
						*	6.5 - Refusal (hit old trench that has been filled in w/ gravel) deposition SE of Monitoring well			
8			1730							
		4.0/	NEX-S04-DBH-0010		sl. loose	tan	8.0-11.0 - f. sand, bands of gray staining w/ visible sheen	SP	V. strong odor, moist	1190
10					sl. loose	tan				1780
		/4.0	NEX-S04-DBH-1011		sl. loose	tan				1350
12					sl. loose/ Dense	tan/ gray	11.0-11.2 - f-m sand (tan) 11.2-12.0 - Silt w/ vf-f sand (gray)	SP SM		205
				ECB @ 12'						

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS:
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: DB14

PAGE: 1 OF 1

Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (N & E OF WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Fellows
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION: —

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: DB15
START DATE: 10/30/07
COMPLETION: DATE: 10/30/07
MON. WELL NO.: —
CHECKED BY: C. Rose

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~FID~~ PID (PPM)]
2										
4										
6										
8			1204							
			NEX-SO4-DB15-0809		sl. loose	tan	8.0-10.0 - f. sand	SP	Strong odor, moist	1191
10		4.0/4.0	NEX-SO4-DB15-0910		sl. loose	tan	↓			230
					Dense	tan	10.0-12.0 - s. lt w/ some vf sand	SM	V. sl. odor, moist	20.2
12					Dense	tan	↓			0.0
				ECAB 12'						

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS:
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: DB15

PAGE: 1 OF 1

Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (N ~~W~~ E OF WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Fellows
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION: —

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: DB17
START DATE: 10/30/07
COMPLETION: DATE: 10/30/07
MON. WELL NO.: —
CHECKED BY: G. Rocco

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~FID~~; (PPM)]
										PID
2										
4										
6										
8										
		2.0/2.0	NEX-SO4-DB17-0809		Sl. Dense-Dense	tan	8.0-8.5- vf-f sand w/ silt	SP	No odor, sl. moist	ND
10			NEX-SO4-DB17-0910				8.5-9.0- silt w/ some sand	SM		
					Dense	gray	9.0-10.0- clay w/ some silt	SC		ND
				EOB @ 10'						

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' x 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS: —
OTHER OBSERVATIONS:

ND. No data.

Tetra Tech NUS, Inc.

BORING NO.: DB17

PAGE: 1 OF 1

Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (N ~~W~~ E OF WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Fellows
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION: —

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: DB16
START DATE: 10/30/07
COMPLETION: DATE: 10/30/07
MON. WELL NO.: —
CHECKED BY: L Rose

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~FID~~ (PPM)]
										0.0
2										
4										
6										
8			1100							
		2.0/2.0	NEX-S04-DB16-0809		Sl. loose	tan	8.0-9.0 - f. sand, 9.0-9.1 - orange / dark brown band	SP	Strong odor, moist	1197
10			NEX-S04-DB16-0910		Dense	tan	9.0-10.0 - silt w/ some sand	SM		100
				EOB 10'						

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS: —
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: DB16

PAGE: 1 OF 1

Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (NW ~~S~~ E OF WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Fellows
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION:

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: DB-18
START DATE: 10/29/07
COMPLETION: DATE: 10/29/07
MON. WELL NO.:
CHECKED BY: C. Race

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~FID~~, (PPM)]
										P.D
2										
4										
6										
8			1540 DB18-0809							
		4.0/4.0			sl. loose	gray	8.0-11.0- fine sand, stained	SP	Strong odor, moist	821
10					↓	↓	↓			222
										40
12					sl. loose	tan	11.0-12.0- fine sand	SP	sl. odor, moist	10
		3.0/3.0			sl loose	tan	12.0-14.0 - f-m sand	SP		6.9
14			1600 DB18-1415				↓			3.0
					sl. loose	tan	14.0-15.0 - f-m sand, 14.0-14.3 orange stain, micaceous	SP	V. sl. odor moist	1.1
16				EOB 16						

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS:
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: DB-18

Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (NW of WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Fellows
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION: —

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: DB-19
START DATE: 10/29/07
COMPLETION: DATE: 10/29/07
MON. WELL NO.:
CHECKED BY: G. Race

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~FID~~ (PPM)]
										PID
2										
4										
6										
8			1500							
8.0-9.0			DB19 - 0809		Sl. loose	tan	8.0-12.0 - f. sand, Dark gray staining throughout 8-12'	SP	Strong odor, moist	465
10		4.0/4.0								235
										32
12		1.0/1.0	1520							
12.0-13.0			DB19 - 1213		Sl. loose	tan	12.0-13.0 f-m sand 12.8-13.0 - orange stain	SP	Sl. odor, wet	18
14				~~GPB~~ 13'						0.0

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS: —
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: DB-19

PAGE: 1 OF 1

Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (N ~~W~~ E OF WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Fellows
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION:

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: MW300
START DATE: 10/30/07
COMPLETION: DATE: 10/30/07
MON. WELL NO.:
CHECKED BY: C. Rae

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~FID;~~ (PPM)] PID
2										
4										
6										
8										
10		4.0/4.0	1510 NEX-SCH-MW300-0910		sl. loose	Brown	- 8.0-9.0 - f. sand 9.0-9.2 - f. sand w/ c. sand	SP	V. strong odor, must	83
					sl. loose	gray	9.2-10.5 - f. sand	SP		388
					sl. loose	gray / tan	10.5-11.0 - f. sand w/ gray/black staining		sl. odor, moist	10
12		1.0/1.0	1520 NEX-SCH-MW300-1213		sl. loose	tan / orange	11.0-11.6 - f-m sand 11.6-12.0 - f-m sand, orange staining	SP		5
14				E (12.9) 13'	sl. loose / Dense	tan	12.0-12.9 - f-m sand 12.9-13.0 - silt w/ vf. sand	SP / SM	No odor, moist	0.0

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS:
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: MW300

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Ttnus Form 0018

BORING LOG FOR: NEX – NASB ROUND 4 (N of WELL)
PROJECT NO.: 112GN4590 –
LOGGED BY: C. Fellows
DRILLED BY (Company/Driller): YARMOUTH ENV. SERV. / E. THOMAS
GRD. SURFACE ELEVATION: —

TRANSCRIBED BY:
ELEVATION FROM:

BORING NO.: MW301
START DATE: 10/30/07
COMPLETION: DATE: 10/30/07
MON. WELL NO.: —
CHECKED BY: C. Rocco

DEPTH (FEET)	BLOWS PER 6" NA	SAMP REC. / SAMP LENG.	SAMPLING TIME & SAMPLE NO. (QA/QC STATUS)	DEPTH MAT'L CHG./ WELL PROF'L	SOIL DENSITY/ CONSIS. or ROCK HARD.	CLR	MATERIAL CLASSIFICATION	USCS or ROCK BRKN	REMARKS (moisture condition; odors; geological classification; rock weathering; etc.)	FIELD SCREENING DATA METHOD = [~~FID~~ (PPM)]
										PID
2										
4										
6										
		1515								
8			NEX-SCH-MW301-0708		sl. loose	tan	7.0-8.0 - f. sand, top 5" light tan, bottom 5" darker tan	SP	no odor, moist	0.0
		1000								
10			NEX-SCH-MW301-0910		sl. loose	tan/orange	8.0-10.0 - f-m sand, heavily oxidized and orange/brown in color 9.0-9.5	SP	no odor, moist	0.0
				EOB @ 10'						

TYPE OF DRILLING RIG: GEOPROBE
METHOD OF ADVANCING BORING: DPT
METHOD OF SOIL SAMPLING: 4' X 1.5" LINER
METHOD OF ROCK CORING: NA
GROUNDWATER LEVELS: —
OTHER OBSERVATIONS:

Tetra Tech NUS, Inc.

BORING NO.: MW301

PAGE: 1 OF 1

Ttnus Form 0018