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SITE INSPECTION REPORT FOR NINE BASE REALIGNMENT AND CLOSURE PARCELS
NAS KEY WEST FL
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TETRA TECH NUS

SITE INSPECTION REPORT
for
NINE BRAC PARCELS

Naval Air Station
Key West, Florida

Southern Division
Naval Facilities Engineering Command

Contract Number N62467-94-D-0888

Contract Task Order 0032

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SITE INSPECTION REPORT
FOR
NINE BRAC PARCELS

FOR

NAVAL AIR STATION
KEY WEST, FLORIDA

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
North Charleston, South Carolina 29406

Submitted by:
Tetra Tech NUS
661 Andersen Drive
Foster Plaza 7
Pittsburgh, Pennsylvania 15220

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PREPARED BY:

CHUCK BRYAN
TASK ORDER MANAGER
TETRA TECH NUS
AIKEN, SOUTH CAROLINA

APPROVED BY:

DEBBIE WROBLEWSKI
PROGRAM MANAGER
TETRA TECH NUS
PITTSBURGH, PENNSYLVANIA

EXECUTIVE SUMMARY

This report presents the results of a Site Inspection (SI) at Naval Air Station (NAS) Key West on behalf of the U.S. Navy, Naval Facilities Engineering Command, Southern Division (NAVFACENGCOM-Southern Division). The report covers the inspection of nine sites (Base Realignment and Closure [BRAC] Parcels A, B, C, D, E, F, H, I, and K). The results associated with a tenth parcel (Poinciana Housing) are contained in a separate report (B&R Environmental, 1998b). Tetra Tech NUS (TtNUS) performed this SI in accordance with the SI Workplan for 10 BRAC Properties (Brown and Root Environmental [B&RE], 1998), which was reviewed by the United States Environmental Protection Agency (EPA) and the Florida Department of Environmental Protection (FDEP). These 10 BRAC Parcels were all categorized as "grey" during Environmental Baseline Studies (EBSs). "Grey" Parcel categorization means areas that have not been evaluated or that require additional evaluation before being reclassified into a category eligible for deed transfer.

The goal of this report is to evaluate the data gathered during the SI Field effort and determine the need for any additional investigative or remedial activities prior to reclassification into a category eligible for deed transfer. This report contains a description of each subzone, contaminants detected, a comparison of the detected concentrations with selected screening values, and conclusions and recommendations for each subzone. The subzone conclusions are then summarized to provide overall conclusions and recommendations for the Parcel.

Five soil, one sediment, one surface water, and one groundwater subzone were included in the Hamaca Hawk Missile Site (Parcel A) SI field investigation. Contaminants that may have come from various site and adjacent property uses and activities were considered, including polynuclear aromatic hydrocarbons (PAHs), solvents, battery acid, oils, dielectric fluid from vandalized Army transformers, and metals. Four of the five soil subzones (1, 5, 6, and 7) addressed received a no further action recommendation. Subzone 4, the Sewage Lift Station, is recommended for further action based on multiple detections and one exceedance of arsenic. In addition, further action is recommended for the sediment in the ponds at Parcel A, subzone 9 due to detections of barium, lead, zinc, bis(2-ethylhexyl)phthalate, butyl benzyl phthalate, and 4,4-DDE above screening criteria. Subzones 10 (surface water) and 11 (groundwater) do not require further action.

Parcel B, East Martello Battery contains two subzones that were investigated during the SI. Petroleum, solvents, fuels, and lead from past uses as a defense battery were considered to be potential surface soil contaminants. However, no chemicals were detected in excess of action levels. Subzone 1 (soil) and 3 (groundwater) both received a recommendation of no further action.

Truman Annex DRMO Waste Storage Area (Parcel C) had three soil subzones investigated during the BRAC SI: subzones 1, 3, and 4. All three subzones are recommended for further action. Subzone 1, Building 261 Hazardous Material Storage, indicated exceedances of lead and Aroclor-1260. Subzones 3 and 4, the Former Scrap Metal Storage Areas, were both recommended for further action based on concentrations of benzo(a)pyrene and lead detected above action levels.

Further action is recommended for soil subzone 1 at Truman Annex Seminole Battery (Parcel D). Arsenic, benzo(a)pyrene, and benzo(b)fluoranthene were detected in excess of action levels at the Seminole Battery (subzone 1). All exceedances were detected at the same sample location (SS-03). No chemicals were detected in excess of action levels at the Former Grease Racks (subzone 2). Therefore, no further action is recommended at the Former Grease Racks.

Truman Annex Buildings 102, 103, and 104 (Parcel E) contains six soil subzones, three of which are recommended for further action [Subzones 2 (Former Building 136 soil), 3 (Building 102 and 104 soil), and 9 (Building 103 soil)]. Former Building 136 had arsenic and several semivolatile organic compounds (SVOCs) detected in excess of action levels, and the detected arsenic concentration was indicative of potential carcinogenic human health risks. Subzone 3 exceedances included benzo(a)pyrene and indeno(1,2,3-cd)pyrene. Both SVOC concentrations were indicative of potential carcinogenic risks. Several SVOCs, as well as a polychlorinated biphenyl (PCB), were detected in excess of screening criteria at subzone 9, Building 103 soil. Further action was recommended based on the potential carcinogenic risk associated with these chemicals.

Parcel F, Truman Annex Building 223, contains two soil subzones of interest. Subzone 1 is the Former Lube Area. Due to a single exceedance of arsenic that was indicative of potential carcinogenic human health risks, further action is recommended. Subzone 3 is the Building 223 Equipment Repair Shop. Again, arsenic exceeded its action level. The arsenic concentration at subzone 3 was indicative of both potential carcinogenic and noncarcinogenic human health risks. For this reason, further action is recommended.

Parcel H is Trumbo Point Piers D-1 and D-3. Parcel H groundwater (subzone 6) was the medium of concern. No chemicals were detected in excess of screening criteria. Monitoring well DO6-MW-42 was not sampled at the time the other samples were taken because of the presence of free product in the well. An Interim Remedial Action (IRA) was performed at MW-42 to remove the free product. Samples taken before and after the IRA contain no chemicals in excess of action levels. No further action is recommended at Parcel H, subzone 6.

Parcel K contains three subzones of concern. Soil subzones 1, 2, and 3 were investigated in this SI. Subzone 1, Building 149 Port Operations and Hazardous Waste Storage Area, surface soil was sampled and analyzed for VOCs, SVOCs, and inorganics. No chemicals were detected in excess of their action levels. In addition, no chemicals were detected in excess of action levels in subzone 2 (Remainder Public Works Maintenance Facilities) or 3 (Building 84). All subzones of concern at Parcel K were recommended for no further action.

Truman Annex groundwater was considered as one subzone in the SI. Fuels, oils, metals, and solvents were considered as potential groundwater contaminants at Truman Annex. Nine groundwater screening samples were collected in Parcels D, E, F, and K. These groundwater screening samples were used in determining the location of five permanent wells installed during the SI field effort. One SVOC (phenanthrene) and one VOC (benzene) exceeded their action levels at a single well in Parcel K. Ecological risks from the chemicals were determined to be negligible. There were no other exceedances in groundwater samples at Truman Annex. No further action or investigation is recommended for Truman Annex groundwater except in the vicinity of Buildings 102, 103, and 104 at Parcel E, which is scheduled for additional investigation during the Supplemental SI at Truman Annex.

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LIST OF ACRONYMS AND ABBREVIATIONS

ACBM	asbestos-containing building material
ARAR	Applicable or Relevant and Appropriate Requirement
AST	above ground storage tank
bls	below land surface
B&R Environmental	Brown and Root Environmental
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CAR	Contamination Assessment Report
cm	centimeter
CLEAN	Comprehensive Long-Term Environmental Action - Navy
COA	Certificates of Analysis
COC	Chain of Custody
DOD	Department of Defense
DQO	Data Quality Objective
DRMO	Defense Reutilization and Marketing Office
EBS	Environmental Baseline Study
EPA	United States Environmental Protection Agency
ER-L	effects range-low
ER-M	effects range-median
FDEP	Florida Department of Environmental Protection
FKAA	Florida Keys Aqueduct Authority
FNAI	Florida Natural Areas Inventory
ft	feet
IDW	Investigation derived waste
IR	Installation Restoration
LBP	lead based paint
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mgd	million gallons per day
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mm	millimeters
msl	mean sea level
NAS	Naval Air Station
NAVFACENGCOM-Southern Division	Naval Facilities Engineering Command, Southern Division
NPWC	Naval Public Works Center
PAHs	polynuclear aromatic hydrocarbons
PC	Patrol Craft
PCB	polychlorinated biphenyl
PEL	probable effects level
Port Ops	Port Operations
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	Resource Conservation & Recovery Act Facility Investigation
RGO	remedial goal option
RI	remedial investigation
SAL	Screening Action Level
SAR	Supplemental Assessment Report

SI	Site Inspection
SSC	Species of Special Concern
SVOC	semivolatile organic compound
TEL	threshold effects level
TtNUS	Tetra Tech NUS
USCG	United States Coast Guard
USN-NPWC	United States Navy-Naval Public Works Center
USN-SUPSHIP	United States Navy-Supervisor of Shipbuilding Conversion and Repair, Environmental Detachment
UST	underground storage tank
VOC	volatile organic compound

1.0 INTRODUCTION

Tetra Tech NUS (TtNUS) has performed a Site Inspection (SI) of Base Realignment and Closure (BRAC) Properties at the Naval Air Station (NAS) Key West, Florida on behalf of the U.S. Navy, Naval Facilities Engineering Command, Southern Division (NAVFACENGCOM-Southern Division). This SI Report was completed under Comprehensive Long-Term Environmental Action - Navy (CLEAN) Contract Number N62467-94-D-0888, Contract Task Order 0032.

1.1 PURPOSE AND SCOPE OF REPORT

This SI was conducted under the authority of the BRAC Act of 1992 and was designed to gather information to support a reclassification of Parcels designated as "grey" during the development of the parcels' draft Environmental Baseline Studies (EBSs). These BRAC Parcels were previously referred to as "Zones" in the BRAC SI Workplan (B&R Environmental, 1998a). The grey Parcel categorization is for areas that have not been evaluated or that require additional evaluation. A Parcel cannot be considered for deed transfer until all investigative and, if necessary, remedial actions have been determined. The Parcel can then be reclassified into a category eligible for deed transfer. The goal of this report is to evaluate the data gathered during the SI field effort and determine the need for any additional remedial activities prior to reclassification of the nine BRAC Parcels.

The nine BRAC Parcels addressed in this report are located at:

- Harnaca Hawk Missile Site (Parcel A)
- East Martello Battery (Parcel B)
- Truman Annex (Parcels C, D, E, F, and K)
- Trumbo Point (Parcels H and I)

A tenth Parcel, Poinciana Housing, was addressed in a separate SI report (B&R Environmental, 1998b).

1.2 REPORT ORGANIZATION

This SI report consists of nine major sections and four appendices. Section 1 provides an introduction, the purpose and scope of the report, a facility description, an overview of the base environmental setting, an explanation of the Data Quality Objective (DQO) Process, a synopsis of field procedures, an overview of the data quality assessment process, and a discussion of the data interpretation and presentation

methods employed in this report. Sections 2 through 9 each characterize one of the grey BRAC Parcels mentioned above. The sections provide additional description of individual subzones within each Parcel and present the results of the SI for each subzone. The subsections that discuss the SI findings for each subzone present the contaminants detected and compare the detected concentrations with selected screening values. These subsections are accompanied by maps that place results in a geographic frame of reference. Conclusions are presented for each subzone based on the SI findings in that particular area. The subzone conclusions are then summarized in the last subsection of each Section to provide overall Conclusions and Recommendations for the Parcel.

This report includes four appendices. Appendix A presents the responses to comments on the SI Report submitted by the Florida Department of Environmental Protection (FDEP) and the United States Environmental Protection Agency (EPA). Appendix B provides field documentation including a summary of all amendments to and deviations from the SI Workplan for Ten BRAC Properties, NAS Key West, Florida (B&R Environmental, 1998a); copies of all field data sheets including boring logs, sample collection forms, well development logs, and well completion logs; and survey data. Appendix C provides documentation in support of the estimated risk process as described in Section 1.8.2.2. Appendix D consists of a compact disk, which contains the complete SI data set used in the decision-making process. The data is included in standard database format (BRACSI.dbf) and portable document format (BRACSI.pdf).

1.3 NAS KEY WEST DESCRIPTION

Several installations in various parts of the lower Florida Keys compose NAS Key West. The U.S. Navy manages 6,323 acres of land divided into 20 separate tracts in the lower Florida Keys, concentrated around Key West and Boca Chica Key (Figure 1-1) in southern Monroe County (B&R Environmental, 1998c). Key West, one of the two most western major islands of the Florida Keys, is approximately 150 miles southwest of Miami and 90 miles north of Havana, Cuba. Key West connects to the mainland by the Overseas Highway (U.S. Highway no. 1).

The missions for NAS Key West changed dramatically in 1974, resulting in the relocation of several units. At present, NAS Key West is proceeding with realignment of aviation operations, a research laboratory, communications intelligence, counternarcotics operations, a weather service, and several other activities. In addition to the Naval activities and units, other Department of Defense (DOD) and Federal agencies at NAS Key West include the U.S. Air Force, U.S. Army, and U.S. Coast Guard (USCG).

The nine BRAC Parcels addressed by this report are all located on the island of Key West (Figure 1-2). These Parcels are located in three geographically distinct areas (Truman Annex, Trumbo Point, and Key

West Interior), as discussed below. As part of the DQO Process (see Section 1.6), each BRAC Parcel was broken into a number of subzones based on the physical geographic boundaries and previous uses. The nomenclature used for the subzone indicates the identity of both the Parcel and the subzone (e.g., GRYZNA-SZN1 is the designation for grey Parcel A, subzone 1).

1.3.1 Truman Annex

The Truman Annex BRAC Parcels (Figure 1-2) include:

- Parcel C – Defense Reutilization and Marketing Office (DRMO) Waste Storage Area
- Parcel D – Seminole Battery
- Parcel E – Buildings 102, 103, and 104
- Parcel F – Building 223
- Parcel K – The Waterfront Maintenance Facilities

These five Parcels make up a contiguous piece of land that is part of the Navy's Truman Annex Facility located on the southwest end of Key West. The area is flat terrain that slopes gently to the southwest. Information pertaining to the current and past operations on these Parcels is limited since the EBSs for the Truman Annex Parcels are in draft form.

Truman Annex has a long history as a defense facility. In 1823, after Key West was purchased by an American citizen, the Navy was dispatched to the island to remove pirates inhabiting most of it. The Navy then occupied the northernmost portion of the west end of Key West. The Army acquired land on the western end of Key West in 1845 to build Fort Zachary Taylor, which provided support during the Mexican-American War. Seminole Battery was constructed to carry out defenses during the Civil War. Much of the land consisted of salt ponds, which limited further construction. From 1909 to 1919, the United States conducted landfill operations on the northern portion of the island in the area from the Army pier to the Naval Station.

Gradually, the Navy assumed control of the entire western tip of Key West. As early as 1918, and particularly during the 1940s through the early 1970s, submarines were berthed at eight finger piers in the turning basin. Most of the buildings along the quay were used for support of schools, units, and activities relating to submarines. The majority of the support buildings were demolished after 1982.

1.3.2 Trumbo Point

Two BRAC Parcels are located on Trumbo Point on the northwest end of Key West (Figure 1-2). Only one of these Parcels (Parcel H – Piers D-1 and D-3) is addressed in this report. The need for taking environmental samples at Parcel I (Building B-48), which includes the building and surrounding parking areas, was eliminated from the SI during the DQO Process phase of the workplan development, as discussed in Section 1.6.

The area around Trumbo Point is composed of flat terrain that slopes gently to the southeast. Piers D1 and D3 extend out into the Gulf of Mexico. Two of the buildings currently present on the BRAC SI Parcel at Trumbo Point (B-27 and B-28) were originally constructed as ordnance facilities. Buildings B-27 and B-28 were used as shop and maintenance facilities for ordnance.

The City of Key West, the Monroe County School District, and the USCG own tracts of land adjacent to the BRAC Parcels located on Trumbo Point. The tract owned by the City of Key West had a coal-fueled power plant on it that generated power for the surrounding Keys. The tar pits on the property were subsequently remediated by the City of Key West. The City of Key West also was granted an easement for sewer lines through Naval property on Trumbo Point to discharge to the Key West Bight. The lines are no longer used. They are capped and are severely rusted and pitted on the visible portions of discharge piping. The Monroe County School District has a garage, maintenance facility, and administrative complex on its tract of land. Three aboveground storage tanks (ASTs) used for gasoline, diesel fuel, and oil are located on the school district's property. In 1976, ownership of Pier D-2, located on Trumbo Point, was transferred from the Navy to the USCG. The USCG currently holds approximately 13 acres on Trumbo Point. Ship refueling and hazardous waste storage are among the activities at these USCG facilities.

1.3.3 Key West Interior

The two Key West Interior BRAC Parcels addressed by this report are made up of two separate land parcels on the eastern end of Key West (Figure 1-2). Both Hamaca Hawk Missile Site (Parcel A) and East Martello Battery (Parcel B) are located off Government Road to the northwest of the Key West International Airport. The two Parcels are separated by a quarter mile and are adjacent to salt ponds with mangrove swamps. Both Parcels are characterized as having flat terrain with a surface-water body located nearby. A portion of each Parcel drains to its respective surface-water body.

A third Key West Interior BRAC Parcel, Poinciana Housing (Parcel G), is not discussed in this report. The Parcel, located on the east end of Key West near the Naval Regional Medical Clinic, was specifically addressed in a separate SI Report (B&R Environmental, 1998b) issued during 1998.

1.4 KEY WEST ENVIRONMENTAL SETTING

The island of Key West is approximately 4 miles long and 1.5 miles wide. The City of Key West is the county seat for Monroe County. The principal industry in Key West is tourism, which draws 1.5 million tourists annually (Roberts, 1998). Tourism, fishing, wholesale and retail trade, services, construction, finance, insurance, real estate, Federal, state and local government, and transportation industries make up the major sources of employment in Key West.

The following subsections present a summary of existing conditions common to all Parcels located at Key West.

1.4.1 Climate and Meteorology

Of the Florida Keys, the Lower Keys have the least rainfall with an average annual rainfall of 39.4 inches. Temperature is fairly uniform across the Florida Keys with a July average temperature of 84 degrees Fahrenheit (°F), a January temperature of 64 to 70°F, and an average annual temperature of 76.3°F. Freezing temperatures are rare in the Florida Keys due to their proximity to the Gulf Stream and the Gulf of Mexico, both of which modify advancing cold fronts. Freezes, when they occur, have the long-lasting effect of killing cold-sensitive species that might otherwise become established. Easterly tradewinds and sea breezes suppress summer heat from June to September (B&R Environmental, 1998a).

Hurricanes normally form in the warm, moist air over the tropical seas around the Lesser Antilles and occasionally in the Caribbean. They tend to move in a westerly to northwesterly direction, gradually turning northward and eastward. Most hurricanes that approach Key West do so from the south and east. Severe hurricanes have struck Key West from each direction. Tidal flooding causes an estimated 75 percent of all damage that occurs during a hurricane (B&R Environmental, 1998a).

Dry and wet seasons characterize the climate of Key West. From December through May, the Keys receive approximately 20 to 25 percent of their total annual precipitation. Approximately 75 to 80 percent of the annual rainfall occurs from June through November. Rainfall usually occurs in advance of a cold front in the form of a few heavy showers, with generally five to eight light showers per month. Overland flow or storm drains that drain approximately 50 percent of the island's surface area carry rainfall runoff

from Key West to the tidal waters; however, much of the rainfall percolates directly into the subsurface (B&R Environmental, 1998a).

1.4.2 Topography

Key West lies in the southeastern Coastal Plain physiographic province. A series of ancient marine reefs, formed during the Pleistocene period when the sea level was higher than it is at present, control the topography of the Coastal Plain in southern Florida (B&R Environmental, 1998a).

Ground elevations on Key West average between 4 and 5 feet (ft) above mean sea level (msl), and the highest point on Key West is approximately 14 ft above msl. Key West is characterized by a sparse veneer of residual soil and surface vegetation overlying eroded limestone. The topography of the lower Keys, generally smooth and flat in the center of the key, slopes gently toward the shoreline. Except in the filled areas that underlie the Overseas Highway, Key West is generally flat. With the exception of central Key West, most areas are within the 100-year floodplain (B&R Environmental, 1998a).

1.4.3 Surface-water Hydrology

The surrounding saltwater bodies, the Atlantic Ocean and the Gulf of Mexico, dominate the surface-water regime in the Florida Keys. FDEP classifies surface water in the Florida Keys as Class G-III Waters - Recreational, Propagation, and Management of Fish and Wildlife. In the immediate area of Key West are the Great White Heron National Wildlife Refuge and the Key West National Wildlife Refuge, which FDEP classifies as Outstanding Florida Waters to receive the highest degree of protection by the State. The residents of Florida consider these waters of exceptional recreational and ecological significance (B&R Environmental, 1998a).

Freshwater recharge in the lower Keys occurs directly through rainfall. The nearly flat topography and porous nature of exposed limestone allows much of the rainfall to infiltrate to shallow groundwater tables, forming freshwater lenses. Overland flow or storm drains in most of the more developed areas carry remaining rainfall to tidal waters. Accelerated runoff and increased saltwater intrusion from canals, housing, dewatering (as a mosquito control measure), and marinas decrease the freshwater lens on the Florida Keys and affect water quality. During the dry season, freshwater tends to disappear quickly by seepage to the sea and evaporation. Evaporation exerts an important effect on the Florida Keys' hydrologic budget, with transpiration affecting a more localized and confined area on individual islands (B&R Environmental, 1998a).

1.4.4 Geology and Soil

The lower Keys, which are within the southern or distal geomorphic division of Florida, were formed during the Pleistocene era. Commonly referred to as the "Oolite Keys," they are underlain by the Oolitic Member (Miami Oolite) of the Miami Limestone. The Oolitic Member consists of variably sandy, fossiliferous limestone composed primarily of ooids (spherical calcareous grains 0.25 to 2.0 millimeters [mm] in diameter) that were created through eustatic elevation of the limestone. In the lower Keys, the Oolitic Member consists of the Ooid Calcarenite and the Oomoldic-recrystalline lithofacies. The Ooid Calcarenite lithofacies consist of very fine to coarse sand-size, spherical carbonate grains concentrically laminated around a silt-size to fine-sand-size nucleus. The Oomoldic-recrystalline lithofacies consist of slightly sandy to very sandy well- to moderately well-consolidated micritic calcite. The Miami Oolite overlies the Key Largo Limestone, a geologic unit consisting of light grey to light yellow coralline limestone comprised of coral heads encased in a matrix of calcarenite.

The Miami Oolite is reported to be 27 ft thick. The Key Largo limestone is greater than 270 ft thick in the western portion of Key West. The Key Largo Limestone is generally more porous than the Miami Oolite, but it contains only saltwater. Figure 1-3 shows a geologic cross-section of the Florida Keys.

Many areas of the Florida Keys have been filled and graded. Undisturbed soil in the Keys consists of shallow marl over limestone with the substrate rock outcropping at the surface.

1.4.5 Hydrogeology

The surficial aquifer system in the lower Keys consists of the Oolitic Member, which is very porous and highly permeable due to the dissolution of carbonate by groundwater as it recharges the aquifer system. The aquifer is tidally controlled and fluctuates constantly. Solution holes and caverns are ubiquitous. The Tamiami Formation lies below the Key Largo Limestone unit, between 300 and 900 ft below land surface (bls). The formation contains mineralized water that does not meet Florida drinking water standards. Underlying the Tamiami Formation are the Hawthorn and Tampa Formations, which together act as an aquiclude confining the underlying limestone units. Below the confining units of the Hawthorn and Tampa Formations is the Suwannee Limestone, fossiliferous limestone representing the top of the water-producing zone in the Florida Keys. The Avon Park Limestone is 1,300 ft bls and, although it has a higher transmissivity than the Suwannee Limestone and supplies large quantities of drinking water in central Florida, is of poor quality in the Florida Keys (B&R Environmental, 1998a).

The surficial aquifer is the principal aquifer of concern in Key West because of its reported use as a potable water resource to a limited extent (although not at NAS Key West) and because of its

groundwater-to-surface-water contaminant migration route (ABB, 1995). The water table ranges in depths from 0.8 to 2.4 ft above msl at the center of Key West and from 0.4 to 2.2 ft above msl near the coast. The water table fluctuates diurnally because of tidal effects. Head differentials associated with tidal variations near the shore can further accelerate groundwater movement in the area. A reconnaissance water-quality sampling study completed in 1990 by the U.S. Geological Survey in cooperation with the South Florida Water Management District indicates that the freshwater lens contains nonpotable water (B&R Environmental, 1998a). The State of Florida classifies groundwater in unconfined aquifers that have a total dissolved solids content of 10,000 milligrams per liter (mg/L) or greater as Class G-III (nonpotable water). The City Engineer of Key West reports that water from some wells in the surficial aquifer might be used for drinking after treatment such as reverse osmosis. The freshwater lens averages 5 ft in thickness below the center of the western half of Key West. The lens contains between 20 and 30 million gallons of fresh water, depending on the season. Underlying the freshwater lens is a 40-foot transition zone of brackish water (B&R Environmental, 1998a).

1.4.6 Potable Water Supply

Potable water is supplied to all the Florida Keys. The Florida Keys Aqueduct Authority (FKAA) operates and maintains the Florida Keys Aqueduct that supplies potable water throughout the Florida Keys. The water is drawn from wells near Florida City in southeastern Dade County and pumped 130 miles through a water main that parallels U.S. Highway 1 and terminates in Key West. Water is distributed along the length of the main. In 1984, the FKAA supplied the City of Key West with an average flow of 11.7 million gallons per day (mgd). The Navy at NAS Key West received 14.35 percent of the average flow (B&R Environmental, 1998a). In some instances, potable water also is obtained by rainwater catchment (the only source prior to the construction of the pipeline in the 1940s).

Alternative sources of potable and nonpotable water in the Florida Keys include private cisterns, private wells, home desalination systems, and bottled water. The Monroe County Health Department recognizes the public water supply as the only potable water source available on Key West. In addition to managing the centralized public water supply system, the FKAA has the authority to regulate all potable water supplies in the Keys, including alternative sources of water such as those mentioned above. Those residences using a dual system of private and public water are required to use a reduced-pressure valve to prevent back-flow of water into the water supply system. The FKAA does, however, report that private wells in the freshwater lens in the surficial aquifer may be used for both potable and nonpotable purposes (B&R Environmental, 1998a). The number of people who use water from private wells in Key West for drinking or nonpotable domestic purposes is unknown. The best estimate of the number of people using local groundwater for nonpotable domestic purposes is less than 500 people (B&R Environmental, 1998a).

1.4.7 Key West Population and Land Use

The City of Key West has a residential population of approximately 24,800 (USCBS, 1990). The principal industry is tourism with approximately 1.5 million tourists visiting the city annually (Roberts, 1998). The Monroe County population is approximately 78,000, and the average age is approximately 39 years (USCBS, 1990). The average household size is 2.3 persons. The median cost of housing is $164,000. Key West has five elementary schools, three parochial elementary schools, one public high school, the Florida Keys Community College, and May Sands Exceptional Center. Monroe County has 33 churches, one synagogue, and two Florida Health System Hospitals (east and west). Land use in the City of Key West consists primarily of commercial and residential areas.

1.4.8 Key West General Area Ecology

Key West includes areas that have been developed by the Navy and retain little natural resource value. Of the BRAC Parcels addressed in this report, the five Truman Annex Parcels, and the Trumbo Point Parcel are considered fill areas with no natural communities. However, some abandoned areas still support high-quality natural communities and provide important habitats. Five non-marine natural community types have been identified within the NAS Key West study area (FNAI, 1994). The only known elements of the mangrove swamp and coastal rock barren communities on Key West occur on the BRAC Parcels Hamaca Hawk Missile Site and East Martello Battery. These two natural community types are described below.

1.4.8.1 Mangrove Swamp

Four plant species dominate these areas: red mangrove (*Rhizophora mangle*), black mangrove (*Avidennia germinans*), white mangrove (*Laguncularia racemosa*), and buttonwood (*Conocarpus erecta*). The relative abundance of each species varies greatly from area to area as do the density, average height, degree of canopy closure, and diversity of associated herbaceous species. Mixed mosaics of mangrove species make up the majority of mangrove swamps at NAS Key West, which vary continuously over a given area with regard to species dominance. A mangrove swamp exists on the eastern half of the Hamaca Hawk Missile Site Parcel. A narrow fringe of mangrove swamp habitat occurs along the water's edge on the southern and eastern portion of the East Martello Battery Parcel (FNAI, 1994).

1.4.8.2 Coastal Rock Barren

Coastal rock barrens are generally characterized as flat rocklands with much exposed and eroded limestone, sparsely vegetated with stunted, xeric, and halophytic (salt-adapted) shrubs, cacti, algae, and

herbs. Buttonwood in some form often dominates this community. It can vary from bonsai-like sprawling shrubs less than 30 centimeters (cm) in height growing with two or three other stunted halophytes on essentially bare rock pavement to erect, multi-trunked 10-m-tall trees growing on deeper marls and associated with a rich variety of xerophytic shrubs, trees, cacti, graminoids, and forbs. Typical species include saffron plum (*Bumelia celastrina*), Christmas berry (*Lycium carolinana*), cat's claw (*Pithecellobium keyense*), erithalis (*Erithalis fruticosa*), bay cedar (*Suriana maritima*), indigo berry (*Randia aculeata*), wild dilly (*Manilkara bahamensis*), poisonwood (*Metopium toxiferum*), seagrape (*Coccoloba uvifera*), joewood (*Jacquinia keyensis*), rhacoma (*Crossopetalum rhacoma*), Spanish stopper (*Eugenia myrtoides*), saltgrass (*Distichlis spicata*), fimbristylis (*Fimbristylis castanea*), and Porter's broom spurge (*Chamaesyce porteriana var. scoparia*). In these sites, the coastal rock barren becomes a relatively dense thorn scrub thicket of sclerophyllous vegetation that typically includes epiphytic bromeliads and orchids.

At NAS Key West, coastal rock barren occurs in both the open pavement rockland form and in the deeper marl thicket form. Widely disparate forms of this community type at NAS Key West support populations of various vascular plants and vertebrates.

Remnants of this habitat appear to exist on the northwestern portion of the Hamaca Hawk Missile Site property beyond the site fence line and on the northwestern portion of the East Martello Battery property although it has been impacted by the invasion of Australian pine (FNAI, 1994).

1.4.8.3 Wildlife

As expected, wildlife at NAS Key West vary considerably depending on habitat. Developed areas of Key West limit wildlife primarily to birds associated with urbanized areas. A variety of species, however, use the relatively undisturbed habitats (particularly mangrove swamps and lagoons).

An 11-month field study observed 126 species of birds at NAS Key West (FNAI, 1994). As many as 300 species of birds might use habitats on the base either as migrants or residents (Schuetz, 1996). Biologists observed four snake and three lizard species during the Florida Natural Areas Inventory (FNAI) study at NAS Key West: the black racer (*Coluber constrictor*), red rat snake (*Elaphe guttata guttata*), Eastern diamondback rattlesnake (*Crotalus adamanteus*), rough green snake (*Opheodrys aestivus*), Florida Keys mole skink (*Eumeces egregius egregius*), Carolina anole (*Anolis carolinensis*), and brown Cuban anole (*A. sagrei*) (FNAI, 1994). Biologists previously observed the endangered Eastern indigo snake (*Drymarchon corais couperi*) (FNAI, 1994); this and other reptiles and amphibians undoubtedly occur on the base.

Very few mammal species occur on Key West and in the lower Florida Keys. Only three native mammal species were observed during the FNAI study: the Lower Keys marsh rabbit (*Sylvilagus palustiris hefneri*), the raccoon (*Procyon lotor*), and the opossum (*Didelphis virginianus*) (FNAI, 1994). Raccoons are abundant and widespread on the base, while opossums are uncommon.

Relatively harsh natural ecological conditions in the Keys (i.e., poor soils, scarcity of fresh water) likely ensure a low species diversity of mammals. In addition, humans have extensively altered or destroyed natural habitats, so remaining natural habitats occur in small isolated patches. Exotic species such as Australian pine have invaded and thus significantly altered many natural areas.

Carnivorous mammals at NAS Key West are limited to raccoons and feral cats. No moles or shrews live on the base, and few rodent species occur there. Neither the eastern harvest mouse (*Reithrodontomys humulis*) nor the cotton mouse (*Peromyscus gossypinus*), both common in most of Florida, occur on the base. Native terrestrial mammals on the base appear to be limited to raccoons, marsh rabbits, opossums, and cotton rats (*Sigmodon hispidus*).

1.4.8.4 Threatened and Endangered Species

Tables 2-1 and 2-2 in the SI Workplan (B&R Environmental, 1998a) present Federal and State-listed threatened and endangered species recorded at NAS Key West (FNAI, 1994). A few listed threatened and endangered species not recorded on these tables undoubtedly occur on the base but have not been reported to FNAI. For example, Truman Beach (part of the Truman Annex Parcel) has been documented as a nesting area for the threatened loggerhead sea turtle (*Caretta caretta*) (BAP, 1997). The mangrove rivulus (*Rivulus marmoratus*), a minnow that is a state-listed Species of Special Concern (SSC), could potentially occur in mangrove swamps at East Martello Battery and Hamaca Hawk Missile Site.

The West Indian manatee is occasionally observed in waters adjacent to the Truman Annex Parcel (BAP, 1997). Other listed species occurring on or near the Truman Annex Parcel include least terns, Roseate terns, and ospreys.

Wooded areas at the East Martello Battery and Hamaca Hawk Missile Site Parcels provide potential nesting and roosting habitat for the white crowned pigeon, a state-listed threatened species.

Wading birds such as little blue herons, snowy egrets, tricolored herons, reddish egrets, and white ibis (all state-listed as SSC) are commonly observed foraging in lagoons, ditches, and other aquatic habitats at East Martello Battery and Hamaca Hawk Missile Site Parcels, as well as along the shoreline at the Truman Annex Parcels.

Bald eagles and ospreys are occasionally observed in the vicinity of the East Martello Battery and Hamaca Hawk Missile Site Parcels.

The East Martello Battery and Hamaca Hawk Missile Site Parcels are believed to be the only locations on NAS Key West where endangered or threatened plant species might occur (BAP, 1997).

1.5 FIELD PROCEDURES

All methods and procedures employed in the course of the field investigation are discussed in the BRAC SI Workplan (B&R Environmental, 1998a). Any change in methodology from that stated in the workplan, usually due to unexpected field conditions, is addressed in Appendix B. Issues and procedures that are addressed by the BRAC SI Workplan include the following:

- Data management
- Decontamination
- Documentation
- Equipment
- Health and safety
- Investigation derived waste (IDW)
- Monitoring well installation
- Project management
- Sample collection, handling, and analysis
- Surveying
- Quality assurance

1.6 DATA MANAGEMENT

In 1997, the DQO Process (EPA, 1994) was used as a tool by the NAS Key West Partnering Team to determine the type, quantity, and quality of data needed to support the development of the BRAC SI Workplan. The DQO Process was performed on the 10 BRAC Parcels categorized as grey. As a systematic planning tool based on the scientific method, the seven-step DQO Process helps establish criteria for defensible decision-making at the onset of a study and develops a data-collection design based on these criteria. The DQO Process also helps develop recommendations based on SI findings for each Parcel. The NAS Key West Partnering Team is made up of the key decision makers for environmental restoration and remediation at NAS Key West. The members include representatives from the FDEP, EPA, NAVFACENGCOM-Southern Division, the U.S. Navy at NAS Key West, and the U.S. Navy's remedial and investigative contractors.

In the initial steps of the DQO Process, all existing site data were reviewed and it was determined that based on site history, a number of subzones could be eliminated from further investigation. It was determined that contamination at several other subzones was already being addressed elsewhere (e.g., primarily by the underground storage tank [UST] program) or was well enough characterized to consider the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) assessment process complete. Table 3-1 of the BRAC SI Workplan provides a summary of all subzones that were eliminated during the DQO Process. These subzones will not be addressed in this report.

The seven steps of the DQO Process identify such information as the goal of the investigation, the inputs needed to reach the goal and make a decision, the temporal and areal boundaries of the investigation, the level of confidence required to support a decision, and finally, a sampling design that is adequate to support the decision-making process. A complete discussion of each step of the DQO Process as it relates to the BRAC SI is provided in Section 3.0 of the BRAC SI Workplan. Important elements of the DQO Process include the following:

- Identification of subzones that do not require additional data (i.e., SI sampling and analysis)
- Identification of the medium (e.g., soil, sediment, surface water, and groundwater) and parameters (volatile organic compounds [VOCs], semivolatile organic compounds [SVOCs], inorganics, pesticides, and polychlorinated biphenyls [PCBs]) of interest in each subzone
- Selection of analytical methods
- Selection of action levels
- Constraints on data collection
- Quantifying the desirable level of confidence in decisions
- Determining sample size for each medium

1.7 DATA QUALITY ASSESSMENT

Maintaining and assuring data quality was a key issue in all stages of the data-handling process. Accordingly, procedures were in place in each step of the process to ensure the integrity of the sample data generated during the SI field investigation. Each portion of the data-handling process, including data generation at the laboratory, data review, and database assembly is discussed below.

1.7.1 Laboratory Quality Assurance

Laboratory quality control (QC) procedures are designed to ensure the consistency and continuity of the data. Standard QC analyses were performed throughout laboratory handling of the BRAC SI samples. This included the routine analysis of matrix spike and matrix duplicate samples, laboratory method blanks, and laboratory control samples. Laboratory instrument calibrations were performed and verified based on the requirements of the individual analytical methods. In order to ensure that data quality standards were met or surpassed, laboratory personnel reviewed all QC procedures and analyses prior to the completion of data packages. Appendix D (Quality Assurance Elements) of the BRAC SI Workplan provides a more detailed discussion of laboratory quality assurance requirements and procedures (B&R Environmental, 1998a).

1.7.2 Data Review

All data packages submitted by the laboratory underwent a formal data review that included the following elements:

- Complete verification of the electronic results against the Chain of Custody (COC) and the result reported on the Certificates of Analysis (COA)
- Review of holding times
- Review of all blank samples submitted as a routine part of the sample collection process (trip blanks, field blanks, and rinsate blanks) in order to eliminate false positives
- Review of laboratory calibration logs for gross non-compliance with QC requirements

1.7.3 Database Assembly

Once the review process of the SI data packages was completed, the electronic data was assembled in a database in order to facilitate the interpretation and analysis of results. A series of electronic checks were performed and documented in order to ensure the integrity of the data set. This included confirming the presence of each sample in the database, demonstrating that the appropriate analytical fractions were present for each sample, verifying consistent sample and parameter nomenclature in the electronic data set, checking units for consistency, and reviewing key fields for blank or other inappropriate entries. The electronic QC process also identified duplicate samples, generated an average result for each duplicate location, and verified that only one set of results for each location was accepted into the final data set.

1.8 SITE INSPECTION METHODOLOGY

An overview of the methods used to interpret and present the analytical data is provided here. Sections 2 through 9 of the BRAC SI Report present the results of the field investigation. These sections include a discussion of each subzone investigated and present the contaminants that were detected during the investigation.

1.8.1 Site Characterization

Each Parcel-specific report section begins with a brief historic account of the Parcel's uses and activities, its geographic and physical features, a description of any previous investigations, and the rationale and scope of the SI. Each section is then further broken down into subzone-specific subsections. Each subsection provides a description of the specific area being addressed and details the findings at that location. Each subsection contains conclusions which evaluate the findings and recommend an appropriate course of action. The subzone-specific conclusions are summarized in an overall Parcel conclusions and recommendations at the end of each section.

1.8.1.1 Determination of Background Levels

In 1996, a comprehensive background data set was assembled for use as a tool in the Supplemental Resource Conservation and Recovery Act Facility Investigation/Remedial Investigation (RFI/RI) Report for Eight Sites (B&R Environmental, 1998d). At that time the background data set was used to characterize the nature and extent of contamination and to assist in the performance of ecological and human health risk assessments at the eight sites that were investigated. A subset of the background data set was used during the DQO Process to statistically determine subzone sample sizes and to screen data from the BRAC SI.

For consistency and comparability, all data included in the BRAC SI background data set were collected over the same time period and analyzed by the same laboratory. Background levels were calculated based on chemical-analytical data from background samples collected in the vicinity of Key West, Florida. The entire BRAC SI background data set can be found in Appendix B of the BRAC SI Workplan (B&R Environmental, 1998a). The Comprehensive Background Report, Appendix F of the Supplemental RFI/RI for Eight Sites (B&R Environmental, 1998d) provides a complete discussion of how calculations were performed and how background data were identified.

1.8.1.2 Modifications to the Parcel Data Sets

In general, the electronic data set developed for site characterization and analysis directly reflects the information presented in the laboratory data packages. A few modifications and exclusions were necessary, as follows:

- Data from field duplicate samples were averaged in order to obtain a single set of results for each sample location within a given investigation. The individual duplicate results were maintained in the electronic database for completeness, but only the calculated averages were used in site characterization and analysis.

- A standardized set of parameter names was used throughout the data set, and the assignment of parameters to analytical fractions was also standardized.

- As described in Section 1.7.2, all analytical results underwent data review, which occasionally resulted in changes to the data set.

1.8.2 Development of Site Investigation Findings

The detected chemicals were considered at the subzone level for each Parcel. All of the analytes were compared to action levels for appropriate media, and the analytes determined to exceed the selected action levels are the primary focus of the discussion. The compounds that exceeded the action levels are shown on maps associated with the subzone-specific discussion of contamination findings. For reference, all detected parameters are presented in the data tables that accompany the discussion.

1.8.2.1 Action Levels

Applicable or Relevant and Appropriate Requirements (ARARs) and Screening Action Levels (SALs) were obtained from various state agencies, Federal agencies, and research institutions. These values were considered as potential screening criteria in evaluating the SI findings at each Parcel. Either a residential or industrial set of action levels was considered for each Parcel based on its future use designation as defined in the Draft Key West Base Reuse Plan (BAP, 1997). Twice the average background concentration (as discussed in Section 1.8.1.1) was used as an additional screen. All potential action levels considered for soil, sediment, surface water, and groundwater are presented in Appendix B of the BRAC SI Workplan (B&R Environmental, 1998a). The last columns of each table identify the value selected for use in screening the parameters detected in each medium.

Legally binding action levels, guidance values, and potentially applicable guidance values from other media were all evaluated as part of action level selection in the DQO Process. For inorganics, commonly found in background samples from the vicinity of NAS Key West, twice the average background concentration was also considered as a potential action level. The decision logic used to compare these various values and select the action levels is shown in Figure 1-4.

Several new soil and groundwater action levels have been developed since the BRAC SI Workplan. Chemicals with new action levels include thallium, phenanthrene, and 2-hexanone. Residential and industrial soil action levels for thallium are 5.5 mg/kg (EPA, 1998) and 140 mg/kg (EPA, 1998), respectively. For 2-hexanone, these soil action levels have been established as 3.4×10^6 µg/kg (EPA, 1997) for residential and 8.2×10^7 µg/kg (EPA, 1998) for industrial. The groundwater action level for 2-hexanone is 4.28×10^5 µg/L (EPA, 1995b) and for phenanthrene is 8.3 µg/L (EPA, 1996b). Risks calculated for naphthalene compounds have been determined negligible. Therefore, FDEP no longer has established action levels for naphthalene, 1-methylnaphthalene, or 2-methylnaphthalene. Detections of these chemicals will not be considered exceedances at NAS Key West.

Thallium results from the SI data set have been reviewed to verify their accuracy. A revalidation was performed for inorganic data and the conclusion was drawn that there is no indication that the results for thallium are incorrect. However, due to the consistency of the detection levels and frequency that thallium was detected (70.4 percent), it appears that a systematic equipment error is responsible for the detections. During supplemental SI field investigations, thallium was not detected in BRAC Parcels where thallium was detected during the SI. The NAS Key West Partnering Team agreed during its October 1998 meeting that thallium detections reported during the SI are suspect and will not be used to drive further action.

1.8.2.2 Estimated Risk Process

As discussed in Section 3.2 of the BRAC SI Workplan (B&R Environmental, 1998a), consistent and appropriate recommendations must be made for subzones where action levels are exceeded. These risk estimates are not considered human health or ecological risk assessments; instead the estimates were used to give the decision-makers an idea of the magnitude of the risks posed by certain chemicals. Estimated risks were calculated for chemicals detected in excess of their action levels. Estimates were based on maximum detected concentrations. Human health risk estimates for soil, sediment, and surface-water subzones were calculated from the Supplemental RFI/RI human health risk assessments (B&R Environmental, 1997a and 1998d) where risk values were available for compounds in question. For each subzone, risk estimates were based on either residential, trespasser, or site/occupational worker scenarios based on subzone future use as described in the Base Reuse Plan (BAP, 1997). When one or

two risk values were available for a given chemical, estimates were based on a ratio of detected concentrations and risk values. When three or more risk values were available for a given compound, estimates were calculated from a trend analysis. In instances where risk values were not available from the RFI/RIs for a given compound, generic remedial goal options (RGOs) were used as benchmarks. Either a residential or industrial risk based concentration was used based on each subzone's future use as described in the Base Reuse Plan (BAP, 1997). Appendix C contains supporting documentation for risk estimation calculations.

Ecological risks were characterized for sediment, surface-water, and groundwater subzones. Groundwater-to-surface-water migration of groundwater contaminants is possible at NAS Key West, especially since groundwater is shallow. However, ecological receptors are not directly exposed to groundwater, and no groundwater thresholds have been developed based on ecological concerns. Therefore, groundwater concentrations of chemicals that exceeded action levels were compared to surface-water screening values (where available) as a conservative scenario (e.g., no attenuation or dilution) in accordance with EPA Region 4 (EPA, 1995a) and FDEP requirements (FDEP, 1996a). Factors such as frequency of detection, frequency of samples that exceeded action levels, comparison to background (for inorganics), and magnitude of exceedances were used in assessing ecological risks.

As in the groundwater analysis, factors such as frequency of detection, frequency of samples that exceeded action levels, comparison to background (for inorganics), and magnitude of exceedances were utilized in assessing ecological risks in sediment and surface water. In addition, concentrations of analytes in surface water and sediment that exceeded action levels were compared to other screening values (where available). For example, sediment chemicals that exceeded action levels were compared to effects range-low (ER-L) and effects range-median (ER-M) values developed by the National Oceanic and Atmospheric Administration, as well as to threshold effects level (TEL) and probable effects level (PEL) values developed by FDEP. Any screening levels used in addition to action levels are provided in the text or in Appendix C.

1.8.2.3 *Data Tables*

Data tables are included within each subzone-specific discussion. Each table lists only the chemicals that were detected in the specific subzone being discussed. These tables provide an inclusive list of the analytes detected at the parcel by subzone. Data validation qualifiers are provided in these tables and are defined at the end of each table. Rejected data are not included.

As stated in the BRAC SI Workplan (B&R Environmental, 1998a), the common essential nutrients calcium, magnesium, potassium, and sodium are not addressed in the SI Report, although some samples were analyzed for these parameters.

1.8.2.4 Contaminant Distribution Maps

Maps were created to present the concentration and distribution of the analytes detected in excess of action levels for each parcel, by subzone. The purpose of these maps is to illustrate the distribution and extent of contaminants, to identify areas of greatest impact, and to link the release and, if applicable, the migration of contaminants to the Parcel's physical features and/or environmental setting. Chemical concentrations are shown at each sampling point where an action level was exceeded. Other considerations made during the preparation of the contaminant distribution maps are:

- Non-detect data and data that fell below the action level for a given chemical are not represented on the maps.

- A data box on each map provides the action levels that were used as a basis of comparison for each chemical shown. Appendix B of the BRAC SI Workplan (B&R Environmental, 1998a) provides an inclusive list of all the ARARs, SALs, and background values that were evaluated as potential screening criteria for the SI findings discussion.

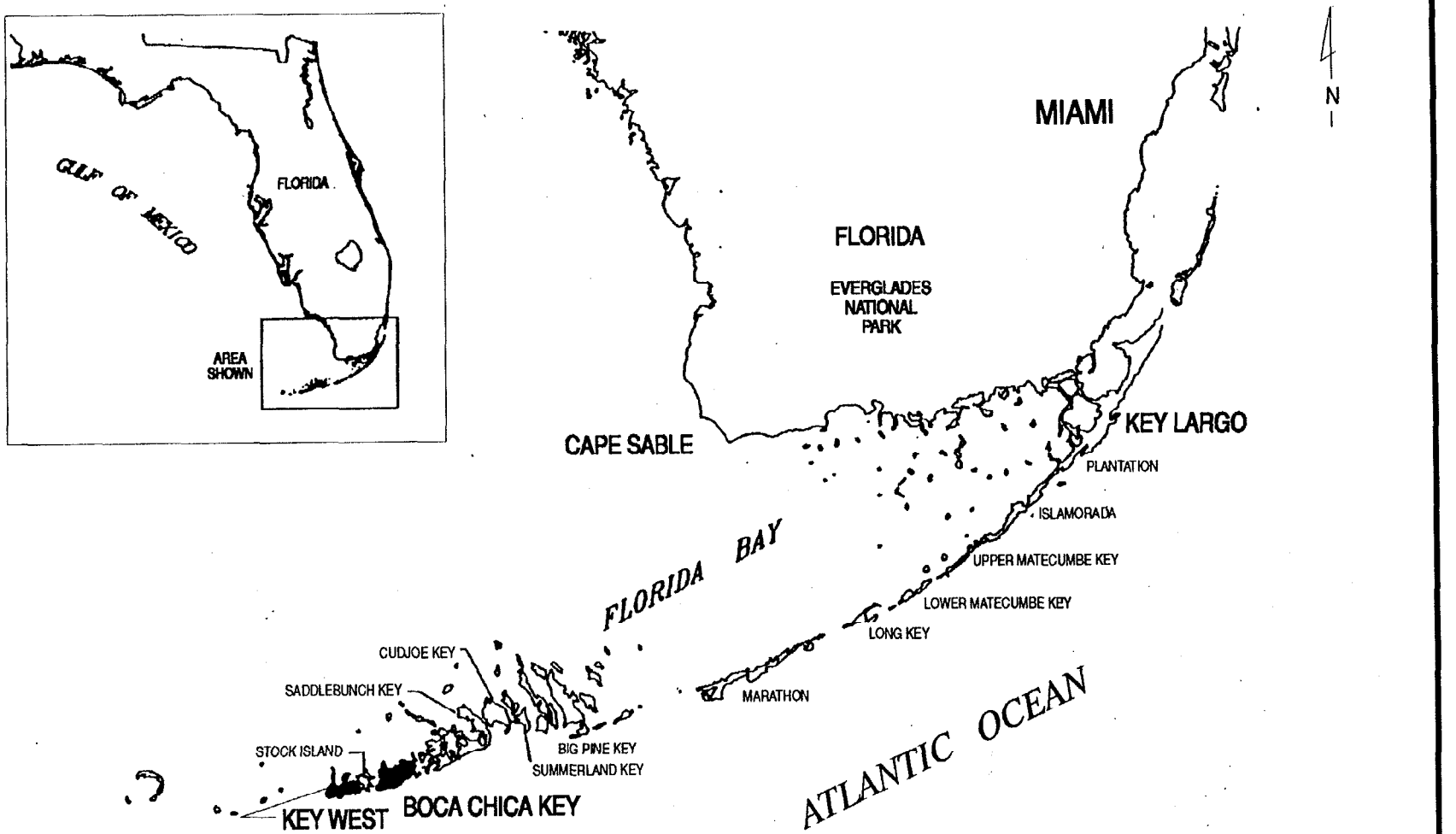
- For sediment and soil, laboratories commonly report organic concentrations in micrograms per kilogram (µg/kg), while inorganic concentrations are reported in milligrams per kilogram (mg/kg). These standardized units are maintained throughout the text, tables, and maps.

- Concentrations of contaminants in groundwater and surface-water contaminants are normally reported in micrograms per liter (µg/L). These standardized units are maintained throughout the text, tables, and maps.

- The maps distinguish between organic and inorganic parameters in order to carry through the standardized units in an easily recognizable, consistent fashion.

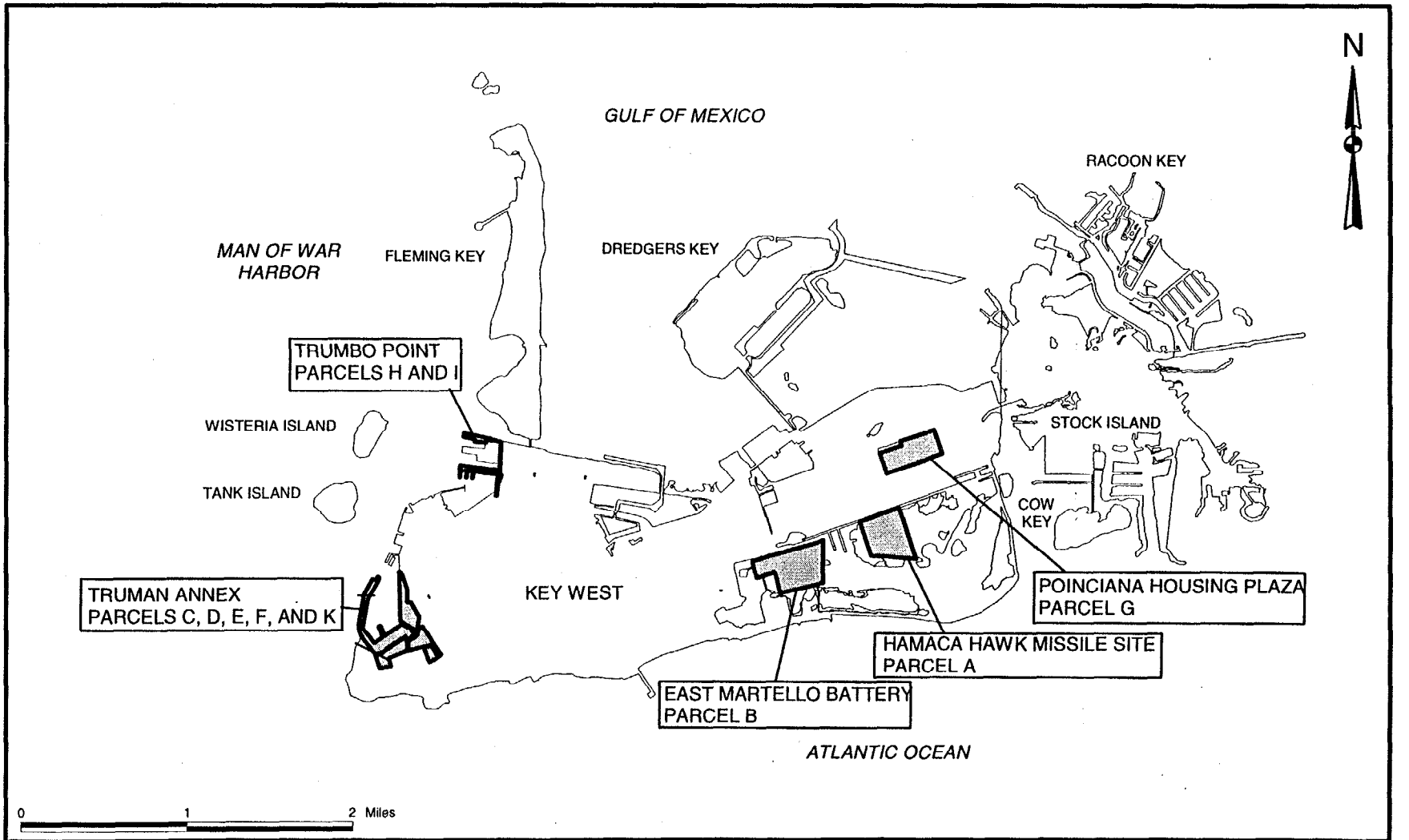
1.8.2.5 Conclusions and Recommendations

Conclusions were prepared for each subzone and for each Parcel to summarize the SI findings. Recommendations based on the findings were developed for each Parcel in cooperation with the NAS Key West Partnering Team and in accordance with the DQO Process (B&R Environmental, 1998a).



DRAWN BY MDB	DATE 11/12/98	SITE INSPECTION REPORT FOR NINE BRAC PARCELS FIGURE 1-1. LOCATION MAP NAVAL AIR STATION KEY WEST NAVY SOUTHERN DIVISION NAS KEY WEST, FLORIDA	CONTRACT NO. 7593
CHECKED BY -	DATE -		APPROVED BY / DATE
COST/SCHED-AREA			APPROVED BY / DATE
SCALE N.T.S.			DRAWING NO. F1-1BRAC.PPT**F1-1LINK.TIF / REV. 1

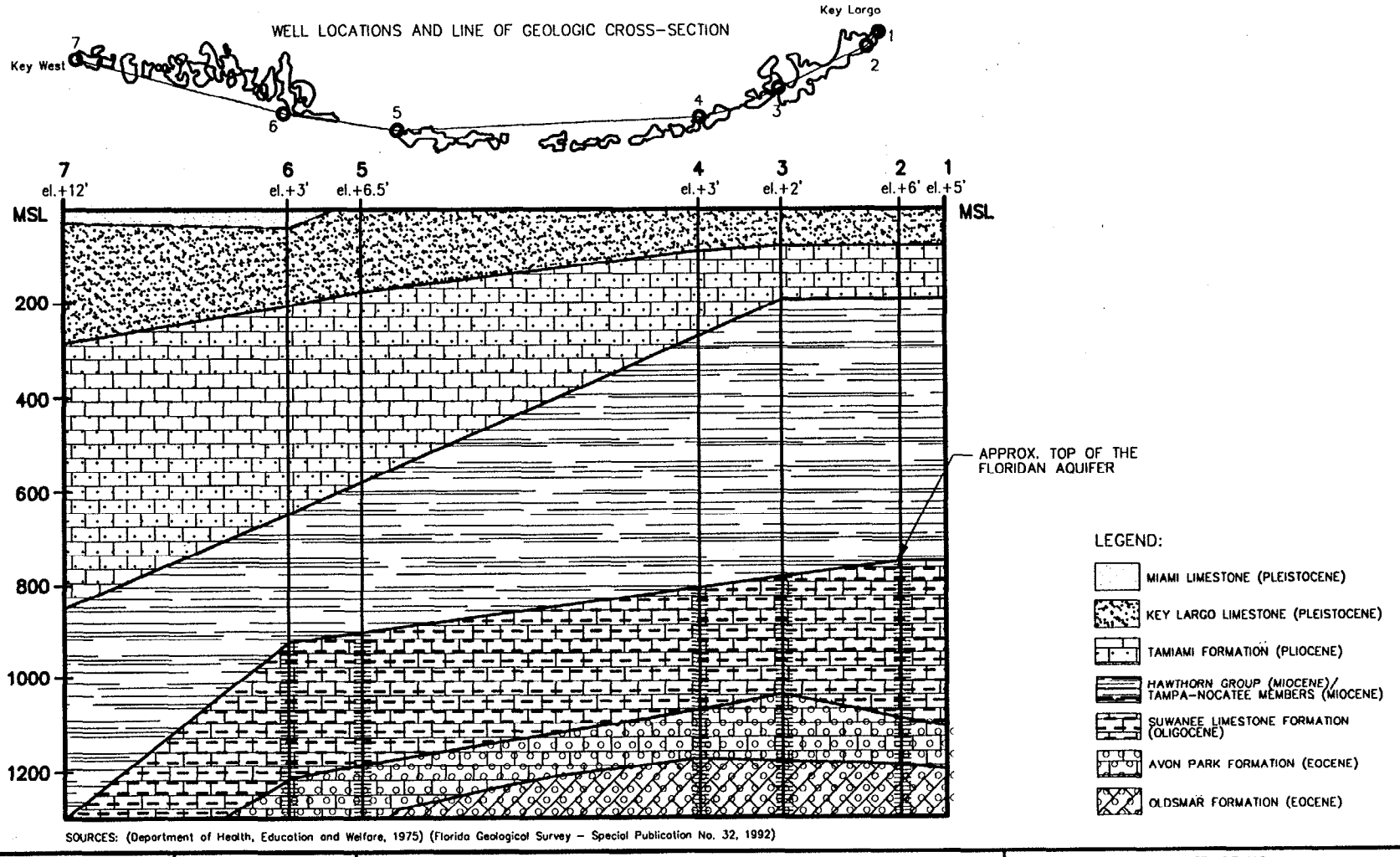
FORM POWERPOINT-SD_AH.PPT-REV 0-3/98



DRAWN BY: 1MH	DATE: 13-OCT-98	SITE INSPECTION REPORT FOR NINE BRAC PARCELS	CONTRACT NUMBER: 7593
CHECKED BY: —	DATE: —	FIGURE 1-2. BRAC PARCEL LOCATION MAP	APPROVED BY: — DATE: —
COST/SCHEDULE-AREA		NAVY SOUTHERN DIVISION	APPROVED BY: — DATE: —
SCALE: APPROXIMATE SCALE AS NOTED		KEY WEST, FLORIDA	DRAWING NO.: — REV: 1

P:\GIS\NAS_KEY_WEST\FIGURES.APR 14-DEC-98 DNP BRAC ZONE LOCATION MAP AH LAYOUT

ACAD: P:\Key West\BRAC (CTO 032)\Mod 04 - BRAC SSI\SSI Report\Pubs Only-Rev 1\Grfx\F1-3 GEO X-SECT.DWG 12/21/98 MDB



SOURCES: (Department of Health, Education and Welfare, 1975) (Florida Geological Survey – Special Publication No. 32, 1992)

DRAWN BY MDB DATE ———	SITE INSPECTION REPORT FOR NINE BRAC PARCELS FIGURE 1-3 GEOLOGIC CROSS-SECTION FLORIDA KEYS NAVY SOUTHERN DIVISION NAS KEY WEST, FLORIDA	CONTRACT NO. 7593
CHECKED BY DATE		APPROVED BY DATE
COST/SCHED-AREA		APPROVED BY DATE
SCALE N.T.S.		DRAWING NO. F1-3 Geo X-Sect REV. 0

FORM CADD NO. SDV_AH12.DWG - REV 0 - 1/20/98

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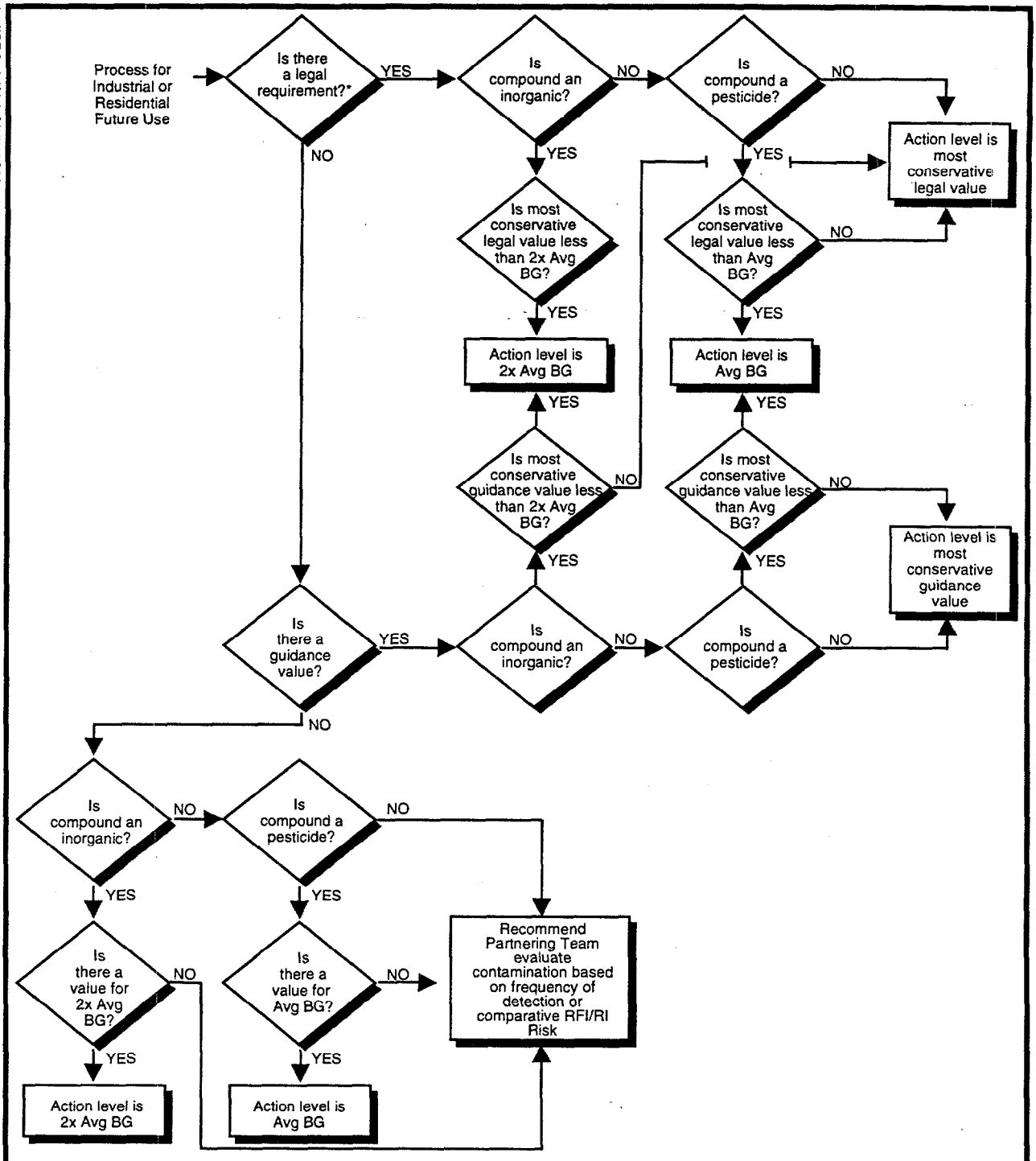

*A residential or industrial set of action levels were considered for the Parcels based on the future use determination made in the Key West Reuse Plan (BAP, 1997).

DRAWN BY: RBP — DATE: ----		SITE INSPECTION REPORT FOR NINE BRAC PARCELS FIGURE 1-4. DECISION LOGIC FOR ACTION LEVEL SELECTION NAVY SOUTHERN DIVISION NAS KEY WEST, FLORIDA	CONTRACT NO. 7593
CHECKED BY — DATE			APPROVED BY — DATE
COST/SCHED-AREA			APPROVED BY — DATE
SCALE: -			DRAWING NO. F1-4DEC.PPT — REV. 1

FORM POWERPOINT-SD_AH.PPT-REV 0-3/98

2.0 HAMACA HAWK MISSILE SITE (PARCEL A)

2.1 PARCEL DESCRIPTION

Based on historical maps and aerial photographs, the land used for the Hamaca Hawk Missile Site was previously salt ponds that were filled by the U.S. Army in order to use the area as a missile site (Figure 2-1). This facility was built in 1964 as a defense site as a result of the Cuban Missile Crisis. It was used for coastal defense until the early 1980s when it was transferred to the Navy. The Navy did not use the property but allowed homeless veterans to stay there in 1994 and 1995. During the 10 months the Vietnam veterans occupied the site, wastewater from showers and washing machines was discharged into the surrounding wetlands.

The Hamaca Hawk Missile Site is bordered to the south by Key West International Airport, where petroleum products are stored and used. The northern border is the Flagler Canal, a man-made canal connected to the Atlantic Ocean. The canal is used by private boats and appears to overflow onto the site at times. Woodlands and wetlands border the property to the east and west.

2.2 INVESTIGATION HISTORY

This section describes previous and current investigations for the Hamaca Hawk Missile Site Parcel.

2.2.1 Previous Investigations

Existing documents include the United States Navy-Naval Public Works Center (USN-NPWC) Lead and Asbestos Survey of Hamaca Hawk Missile Site (USN-NPWC, 1995a), the United States Navy-Supervisor of Shipbuilding Conversion and Repair, Environmental Detachment (USN-SUPSHIP) Predraft EBS Realignment Parcels (USN-SUPSHIP, 1996), the Hamaca Hawk Missile Site Contamination Assessment Report (CAR) (BBL, 1997), and the Supplemental Assessment Report (SAR) (BBL, 1998). No previously existing soil, sediment, surface-water, or groundwater analytical data was included in the analysis of potential contamination at the Hamaca Hawk Missile Site Parcel.

Based on the 1995 inspection performed by the NPWC, both lead based paint (LBP) and asbestos-containing building materials (ACBMs) are present in the Hamaca Hawk Missile Site facilities and infrastructure. The CAR and SAR reported on the investigation of a discharge of diesel fuel in the subzone 2 area at the former 2,000 gallon above ground storage tank (AST). These reports concluded a finding of no further action.

The EBS (USN-SUPSHIP, 1996) documented a number of factors that potentially are helpful in characterizing the current physical condition of the site.

- Although the storage of hazardous or petroleum substances at the site in the past has been documented, no visible sheen or discoloration of surface water has been observed.

- No stains were observed on site soils, although old stains of an indeterminate nature were found on the floors of several site facilities.

- At one time, two ASTs in bermed foundations were used for fuel oil and/or diesel storage. Both of these ASTs have since been removed, although there are currently several other empty ASTs located at site. Two of these tanks, located north of Building I-6504, contained water. Two other empty tanks, sitting on the asphalt drive, were apparently moved from an unknown location by Vietnam veterans.

- Vandalism of three on-site transformers, abandoned by the Army, resulted in a small PCB spill. Initial testing by the Navy showed very low PCB concentrations in soil, and subsequent tests did not indicate any PCB contamination.

- Although pesticides are commonly used for mosquito and pest control throughout NAS Key West, there is no evidence of pesticide misuse at the site.

- A water storage tank and sewage pumping station are located on-site but have not been operable for many years.

2.2.2 Current Investigation

The DQO Process evaluated 13 subzones for the Hamaca Hawk Missile Site Parcel. Subzones 2, 3, 8, 12, and 13 were eliminated from further consideration. Eight subzones within Parcel A required sampling and analysis under the BRAC SI. The environmental medium of each subzone and the parameter groups selected for analysis are presented in Table 2-1. Subzone 1 (Drainage Area), subzone 4 (Sewage Lift Station), subzone 5 (Generator Building I-6536), subzone 6 (Burnt Building I-6530 – Former Missile Maintenance Bay), and subzone 7 (Former Transformer Storage Area) were identified as soil subzones, and the four sample locations within each subzone are shown on Figures 2-2 through 2-6, respectively. Subzone 9 and subzone 10, both ponds, were identified as sediment and surface-water subzones, respectively. Eight sediment and seven surface-water sample locations were identified in these subzones as shown in Figures 2-7 and 2-8. The placement of three permanent monitoring wells in subzone 11

(Parcel A groundwater) is shown in Figure 2-9. Analytical results for samples collected at Parcel A were compared to a residential set of action levels (see Section 1.8.2.1).

2.3 SUBZONE 1 (DRAINAGE AREA)

The subsections below describe subzone 1, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 1 surface soil.

2.3.1 Subzone Description

Polynuclear aromatic hydrocarbons (PAHs), solvents, and metals were considered potential contaminants at subzone 1 from adjacent site property and possibly the former creosote pole storage area just outside the fenced entrance. Four surface soil samples were collected in subzone 1, which is bounded on the southwest and north by Government Road and on the east by the Hamaca Hawk Missile Site fence. The BRAC SI Workplan depicts the fence as dividing this drainage area in two parts, both within subzone 1. However, during initial sampling visits, it was noted that the area within the fence had standing water. It was determined that sediment sampling would be more appropriate for this part of the site. Therefore, the subzone 1 boundary was redrawn to place the entire soil subzone outside the fenced area (with four samples taken from it). The part within the fenced area was appended to the sediment subzone (subzone 9) and two additional sediment samples were collected there. All of the analytical results can be found in Appendix D.

2.3.2 Site Investigation Findings

Contamination was investigated by analyzing surface soil samples in the drainage area for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals that were detected in the surface soil samples are listed in Table 2-2. Figure 2-2 shows the locations were analytes exceeded action levels and indicate possible surface soil contamination.

A single organic, dibenzo(a,h)anthracene, was detected in excess of its 100 µg/kg action level at SS-01 (122.3 µg/kg). Arsenic was detected at the same sample location (SS-01) at its FDEP residential goal action level, 2.7 mg/kg. Arsenic was also detected at SS-02 but not in excess of its action level.

Several other inorganics and organics were detected in subzone 1. The inorganics detected at levels below their screening criteria included aluminum, barium, beryllium, chromium, copper, iron, lead, manganese, mercury, nickel, thallium, and vanadium. SVOCs detected at levels below their action levels included anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. VOCs detected at subzone 1 at levels below their action levels were acetone and methylene chloride.

2.3.3 Conclusions and Recommendations

PAHs, solvents, and metals were considered to be potential contaminants in surface soil at subzone 1. Arsenic and dibenzo(a,h)anthracene were considered exceedances in the drainage area. Estimated risks were calculated for both chemicals as described in Section 1.8.2.2. Calculations and estimates can be found in Appendix C, Table C-1. The detected concentration of arsenic may be due to data variability and not be indicative of contamination. The dibenzo(a,h)anthracene detection probably resulted from treated telephone poles that were stored in the area. Since the finding most likely resulted from the telephone poles and dibenzo(a,h)anthracene was only detected at one sample location, no further action is warranted.

2.4 SUBZONE 4 (SEWAGE LIFT STATION)

The subsections below describe subzone 4, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 4 surface soil.

2.4.1 Subzone Description

Solvents, metals, and oils were considered to be potential soil contaminants in subzone 4 from the lift station. Four surface soil samples were collected in the immediate vicinity of the sewage lift station inside the fence by Government Road. All of the analytical results can be found in Appendix D.

2.4.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil at the sewage lift station for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 2-3.

Figure 2-3 shows the location of analytes that exceeded action levels and indicated possible surface soil contamination.

One inorganic, arsenic, was detected in excess of its action level. Arsenic was detected at three of the four samples in excess of its 2.7 mg/kg action level (SS-02, 5.7 mg/kg; SS-03, 28.8 mg/kg; and SS-04, 6 mg/kg). Inorganics at subzone 4 that were detected below their screening criteria included aluminum, antimony, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, thallium, tin, vanadium, and zinc. No VOCs or SVOCs were detected in excess of their screening values. VOCs detected below their action levels included acetone, methylene chloride, and toluene. SVOCs detected below their action levels included 1,2,4-trichlorobenzene and bis(2-ethylhexyl)phthalate.

2.4.3 Conclusions and Recommendations

Potential contaminants at subzone 4 included solvents, metals, and oils from the lift station. Chemicals detected in excess of their action levels were analyzed further in the estimated risk process as described in Section 1.8.2.2. Calculations and estimates for subzone 4 can be found in Appendix C, Table C-1. Carcinogenic and noncarcinogenic risks estimated for arsenic exceeded the FDEP target risks. Due to the nature and risks of chemicals detected in excess of action levels in subzone 4, further action is recommended. Because arsenic was detected in three of the four samples, a permanent monitoring well was installed in this area.

2.5 SUBZONE 5 (GENERATOR BUILDING I-6536)

The subsections below describe subzone 5, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 5 surface soil.

2.5.1 Subzone Description

The generator shelter is located north of the ponds in Hamaca Hawk Missile Site at Building I-6536. Solvents, oils, and metals were considered potential surface soil contaminants because of operations in the generator building. Two soil samples were collected on the north and south sides of the building. All of the analytical results can be found in Appendix D.

2.5.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in the sewage lift station for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected

from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 2-4. Figure 2-4 shows the sample locations of all surface soil samples collected at subzone 5.

No chemicals were detected in excess of their action levels. Inorganics detected below their action levels included aluminum, barium, chromium, iron, lead, manganese, nickel, selenium, thallium, and vanadium. No VOCs or SVOCs were detected at levels in excess of their action levels. VOCs detected below their screening criteria included acetone, methylene chloride, tetrachloroethene, and toluene. Bis(2-ethylhexyl)phthalate was the only SVOC detected.

2.5.3 Conclusions and Recommendations

Solvents, oils, and metals were considered to be potential surface soil contaminants from operations at the generator building at Hamaca Hawk Missile Site. However, no chemicals were detected in excess of the screening criteria. Therefore, there does not appear to be significant surface soil contamination at subzone 5. No further action is recommended.

2.6 SUBZONE 6 (BURNT BUILDING– FORMER MISSILE MAINTENANCE BAY)

The subsections below describe subzone 6, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 6 surface soil.

2.6.1 Subzone Description

The former missile maintenance bay is located in Building I-6530 which previously had burned. Battery acid, metals, and solvents were considered potential soil contaminants in subzone 6 from its use as a missile maintenance area and from burnt contents of the buildings. Four surface soil samples were collected from the southern side of Building I-6530. All of the analytical results can be found in Appendix D.

2.6.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil at the former missile maintenance bay at Burnt Building I-6530 for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and

research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals that were detected in the surface soil samples are listed in Table 2-5. Figure 2-5 shows the sample locations of all surface soil samples collected at subzone 6.

No chemicals were detected at levels in excess of their action levels. Inorganics detected below their action levels included aluminum, barium, chromium, iron, lead, manganese, nickel, thallium, and vanadium. VOCs detected below their screening values included acetone and toluene. 1,2,4-trichlorobenzene was the only SVOC detected.

2.6.3 Conclusions and Recommendations

Potential chemicals in soil were assumed to include battery acid, metals, and solvents from prior use as missile maintenance area and burnt contents of building. However, no chemicals were detected in excess of their screening criteria. Therefore, significant surface soil contamination does not occur at subzone 6. No further action is recommended.

2.7 SUBZONE 7 (FORMER TRANSFORMER STORAGE AREA)

The subsections below describe subzone 7, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 7 surface soil.

2.7.1 Subzone Description

Dielectric fluids from vandalized Army transformers were considered potential soil contaminants in the former transformer storage area. Four surface soil samples were collected at subzone 7. Three samples were from just outside the fenced perimeter of the area and one sample was from the inside the fenced former storage area. All of the analytical results can be found in Appendix D.

2.7.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in the former transformer storage area for SVOCs, PCBs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources including background levels as discussed in Section 1.8.1.2 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 2-6. Figure 2-6 shows the location of analytes that exceeded action levels and indicate possible surface soil contamination.

A single inorganic, thallium, was detected at one location in excess of its 5.5 mg/kg screening criteria. Inorganics detected below their action levels included aluminum, barium, cadmium, chromium, copper, iron, lead, manganese, nickel, thallium, tin, vanadium, and zinc. No VOCs or SVOCs were detected in excess of their action levels. A single PCB, aroclor-1260, and a single SVOC, bis(2-ethylhexyl)phthalate, were detected below their action levels.

2.7.3 Conclusions and Recommendations

Dielectric fluids from vandalized Army transformers were considered to be potential soil contaminants in the former transformer storage area. However, thallium was the only exceedance. As discussed in Section 1.8.2.1, the frequency of detection indicates a systematic equipment error from the lab. Thallium detections will not be used to drive further action. Therefore, no action is needed at the former transformer storage area.

2.8 SUBZONE 9 (PONDS-SEDIMENT)

The subsections below describe subzone 9, present the contaminants detected, compare the detected concentrations with selected sediment screening values, and provide conclusions on the SI findings for subzone 9 sediment.

2.8.1 Subzone Description

Potential sediment contaminant sources include the storage and/or use of petroleum products, solvents, electrical batteries, lead, hazardous waste, and possibly pesticides. During preparation of the BRAC SI Workplan, six sediment sample locations were selected in subzone 9. However, during initial sampling visits, it was noted that a portion of soil subzone 1 within the fenced area had standing water. It was determined that sediment sampling would be more appropriate on this portion. Therefore, the boundary of subzone 1 was redrawn, placing the portion within the fenced area into subzone 9; two additional sediment samples were collected there. Altogether, eight sediment samples were collected from the subzone 9 at Hamaca Hawk Missile Site. All of the analytical results can be found in Appendix D.

2.8.2 Site Investigation Findings

Contamination was investigated by analyzing samples from sediment in the ponds for VOCs, SVOCs, pesticides, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the sediment samples are listed in Table 2-7.

Figure 2-7 shows the location of analytes that exceeded action levels and indicate possible sediment contamination.

Several inorganics were detected in excess of their action levels at subzone 9. Aluminum and vanadium were detected in excess of their action levels at two locations. Barium and zinc were detected in excess of their action levels only at SD-04. SD-01 was the only location where copper was detected in excess of its 18.7 mg/kg action level (20.15 mg/kg). Lead was detected in excess of its 34.18 mg/kg action level at all sample locations. Lead concentrations ranged from 42.5 mg/kg at SD-02 to 466 mg/kg at SD-05. Other inorganics detected but not in excess of their screening criteria included chromium, iron, manganese, and nickel. Two SVOCs, bis(2-ethylhexyl)phthalate and butyl benzyl phthalate, were detected in excess of their action levels at a single location (SD-05). A single pesticide, 4,4'-DDE, was detected in excess of its 2.07 µg/kg action level at SD-05 (3.1 µg/kg) and SD-08 (7.5 µg/kg). No other SVOCs or pesticides were detected in sediment at Parcel A. No VOCs were detected in sediment at subzone 9.

2.8.3 Conclusions and Recommendations

The storage and/or use of petroleum products, solvents, electrical batteries, lead, hazardous waste, and possibly pesticides at Hamaca Hawk Missile Site are potential sources of sediment contamination. Several inorganics were detected in excess of their action levels in the sediment from ponds at this Parcel. Noncarcinogenic risks were estimated for each chemical detected in excess of its action level but none of the detected concentrations for aluminum, barium, copper, vanadium, or zinc were indicative of significant human health risks. Chemicals detected in excess of their action levels in sediment at subzone 9 exceeded ecological guidelines. However, most of them only slightly exceeded their TEL values, or were infrequently detected. Lead in sample SD-05 is the only chemical exceedance that is considered to pose potential ecological risks. In addition to the lead exceedance at SD-05, five chemicals detected in sample SD-05 exceeded the most conservative ecological guidelines; more analytes than in any other sample. Further sampling in the vicinity of sample SD-05 may serve to better characterize the nature and extent of sediment contamination and associated potential ecological risks. A more detailed discussion of potential ecological risks from chemicals detected in sediment at Hamaca Hawk Missile Site Parcel is included in Appendix C. The NAS Key West Partnering Team discussed this subzone and decided that an interim remedial action should be conducted at subzone 9 in conjunction with the IRAs planned for the other subzones. The IRA Workplan (Bechtel, 1998) provides additional information regarding the IRAs planned for the BRAC properties.

2.9 SUBZONE 10 (PONDS-SURFACE WATER)

The subsections below describe subzone 10, present the contaminants detected, compare the detected concentrations with selected screening values, and provide conclusions on the SI findings for subzone 10 surface water.

2.9.1 Subzone Description

Petroleum, battery acid, and lead were considered potential contaminants in surface water from Parcel A runoff. Seven surface-water samples were collected from the ponds at Hamaca Hawk Missile Site. All of the analytical results can be found in Appendix D.

2.9.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface-water in the ponds for SVOCs and inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface-water samples are listed in Table 2-8. Figure 2-8 shows the location of analytes that exceeded action levels and indicate possible surface-water contamination.

A single inorganic, iron, was detected in excess of its 300 µg/l action level at all seven sample locations. The maximum exceedance was detected at SW-04 (6,300 µg/l), in the small pond near the western berm area. Other inorganics detected at levels lower than their screening criteria included lead and zinc. No SVOCs were detected in the surface-water samples at Hamaca Hawk Missile Site.

2.9.3 Conclusions and Recommendations

Petroleum, battery acid, and lead were considered potential contaminants in surface water from Parcel A runoff. However, none of these were detected in excess of their action levels. Only a single inorganic, iron, was detected in excess of its action level. The noncarcinogenic human health risk posed by the detected concentration of iron in surface water at Hamaca Hawk Missile Site was not significant. Iron was the only chemical in surface water that exceeded ecological guidelines. Iron did not exceed ecological guidelines in sediment. Since no other chemicals exceeded guidelines in surface water, and since iron does not appear to be accumulating in sediment, iron in surface water probably does not pose potentially significant risks to ecological receptors. Therefore, due to the limited nature of contamination at subzone 10, no further action is recommended.

2.10 SUBZONE 11 (GROUNDWATER)

The subsections below describe subzone 11, present the contaminants detected, compare the detected concentrations with selected screening values, and provide conclusions on the SI findings for subzone 11 groundwater.

2.10.1 Subzone Description

Potential groundwater contaminant sources at Hamaca Hawk Missile Site included the storage and/or use of petroleum products, solvents, electrical batteries, lead, and electrical transformers. Subzone 11 includes groundwater from the entire Hamaca Hawk Missile Site area. Nine groundwater screening samples were collected to determine the location of three permanent wells installed during the SI field effort. These samples were analyzed for VOCs, SVOCs, and inorganics. Three permanent monitoring wells were installed and sampled. All of the analytical results can be found in Appendix D.

2.10.2 Site Investigation Findings

Contamination was investigated by analyzing groundwater in three monitoring wells installed at Hamaca Hawk Missile Site during the field effort for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the groundwater samples are listed in Table 2-9. Figure 2-9 shows the location of analytes that exceeded action levels and indicate possible groundwater contamination.

A single inorganic, arsenic, was detected in excess of its 50 µg/L action level at a single location (MW-04, 154 µg/L). Arsenic was not detected in either of the other two monitoring wells. Barium, iron, lead, and zinc were detected at subzone 11, but not in excess of their screening values. A single VOC, vinyl chloride, was detected in excess of its 1 µg/L screening value at MW-05 (8.6 µg/L), but not at the other monitoring well locations. Other VOCs detected below their screening values included 1,1-dichloroethane and 1,1-dichloroethene. No SVOCs were detected in groundwater at Hamaca Hawk Missile Site.

2.10.3 Conclusions and Recommendations

Petroleum products, solvents, electrical batteries, lead, and electrical transformers were considered to be potential sources of groundwater contamination at Hamaca Hawk Missile Site. Arsenic and vinyl chloride were detected in excess of their action levels in groundwater. Groundwater-to-surface-water migration of contaminants is possible at Parcel A, especially since groundwater at Key West is shallow. However,

ecological receptors are not directly exposed to groundwater, and no groundwater thresholds have been developed based on ecological concerns. Therefore, groundwater concentrations of analytes that exceeded action levels or had no action levels were compared to surface-water screening values (where applicable) as a conservative scenario (e.g., no attenuation or dilution) in accordance with EPA Region 4 (EPA 1995a) and FDEP (1996a) requirements. Arsenic was detected in four of the nine groundwater screening samples. With a single exception (GS-03), the highest detected value was 7.51 µg/L. The FDEP criteria for total arsenic in marine surface water is 50 µg/L (FDEP, 1996). A monitoring well was installed at the location of groundwater screening sample GS-03, and arsenic was detected in the resulting monitoring well sample (MW-04) at 154 µg/L, which is three times greater than the surface-water screening value. Arsenic was not detected in surface-water or sediment samples. Thus, migration of arsenic from MW-04/GS-03 sample location to surface water and sediment appears to be negligible.

Vinyl chloride was detected at 8.6 µg/L at MW-05. There are no EPA Region 4 nor FDEP ecological screening levels for this contaminant, but the detected concentration is well below the EPA Region 3 (EPA 1995b) screening level of 224,000 µg/L for marine surface water. In addition, vinyl chloride was not detected in any surface-water or sediment samples. Thus, migration of vinyl chloride from sample location MW-05 to surface water or sediment appears to be negligible and there is no evidence of ecological risks from vinyl chloride at Parcel A. Therefore, no further action is recommended for groundwater at the Hamaca Hawk Missile Site.

2.11 PARCEL A CONCLUSIONS AND RECOMMENDATIONS

Five soil subzones were included in the Hamaca Hawk Missile Site SI field investigation. Contaminants that may have resulted from various site and adjacent property uses and activities were considered. PAHs, solvents, battery acid, oils, dielectric fluid from vandalized Army transformers, and metals were potential contaminants identified during the DQO Process used to prepare the BRAC SI Workplan. Thallium was detected at all five soil subzones but exceeded its action level only at subzone 7. However, as discussed at the NAS Key West Partnering Team meeting in October 1998, thallium detections from SI sampling events are suspect and will not be used to drive further action. Arsenic and dibenzo(a,h)anthracene were detected in excess of their action levels in soil at subzone 1. The concentration of arsenic was not indicative of significant human health risks although the concentration of dibenzo(a,h)anthracene was indicative of potential carcinogenic human health risks. However, the dibenzo(a,h)anthracene detected was probably due to the storage of treated telephone poles in the area. No further action is recommended at subzone 1. There does not appear to be significant surface soil contamination at soil subzones 5, 6, and 7, and no further action is recommended at these subzones. At subzone 4, arsenic was also detected in excess of its action level at a concentration indicative of possible

human health risks. Further action is recommended at subzone 4. Removal of contaminated soils, is recommended at the sewage lift station.

Potential sediment and surface-water contaminant sources identified during the DQO process used to prepare the BRAC SI Workplan included the storage and/or use of petroleum products, solvents, electrical batteries, lead, hazardous waste, and pesticides. Several inorganics, including lead, were detected in excess of their action levels in sediment. Although none of these detections were at concentrations indicative of significant human health risks, further sampling may be needed to characterize potential ecological risks. A single inorganic, iron, was detected in excess of its action level in surface water. The maximum concentration of iron was not indicative of significant noncarcinogenic human health risks or ecological risks. Therefore, since there does not appear to be significant surface-water contamination at the Hamaca Hawk Missile Site Parcel. No further action is recommended.

There does not appear to be a complete migration pathway from the isolated detections of arsenic and vinyl chloride in groundwater to nearby surface water and sediment, and thus, ecological risks posed by these two analytes in groundwater appear to be insignificant and no further action is recommended for groundwater at Parcel A.

TABLE 2-1

PARAMETER GROUPS AND MEDIA OF INTEREST AT HAMACA HAWK MISSILE SITE (PARCEL A) NAS KEY WEST

Subzone	Building/Area	Medium	Number of Locations	Parameter Group				
				VOCs	SVOCs	Inorganics	PCBs	Pesticides
Subzone 1	Drainage Area	SO	4	X	X	X		
Subzone 4	Sewage Lift Station	SO	4	X	X	X		
Subzone 5	Generator Building I-6536	SO	4	X	X	X		
Subzone 6	Burnt Building I-6530 – Former Missile Maintenance Bay	SO	4	X	X	X		
Subzone 7	Former Transformer Storage Area	SO	4		X	X	X	
Subzone 9	Ponds	SD	8	X	X	X		X
Subzone 10	Ponds	SW	7		X	X		
Subzone 11	Groundwater	GW	3	X	X	X		

SO = Surface soil.
SD = Sediment.
SW = Surface water.
GW = Groundwater.

Subzones 2, 3, 8, 12, and 13 were eliminated from sampling during the DQO Process.

TABLE 2-2

CHEMICALS DETECTED IN PARCEL A SUBZONE 1 SURFACE SOIL
NAS KEY WEST
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Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg))			
A01-SS-01	Aluminum	2,445	J
A01-SS-02	Aluminum	1,390	
A01-SS-04	Aluminum	733	
A01-SS-03	Aluminum	136	
A01-SS-01	Arsenic	2.7	
A01-SS-02	Arsenic	1.9	
A01-SS-01	Barium	14.4	J
A01-SS-02	Barium	12.2	
A01-SS-04	Barium	9.5	
A01-SS-03	Barium	8.5	
A01-SS-01	Beryllium	0.13	
A01-SS-01	Chromium	5.85	
A01-SS-02	Chromium	5.5	
A01-SS-04	Chromium	3.7	
A01-SS-03	Chromium	2.5	
A01-SS-01	Copper	1.35	
A01-SS-01	Iron	1,084	
A01-SS-02	Iron	700	
A01-SS-04	Iron	360	
A01-SS-03	Iron	107	
A01-SS-02	Lead	2	
A01-SS-04	Lead	1.8	
A01-SS-01	Lead	1.75	
A01-SS-01	Manganese	26.5	J
A01-SS-02	Manganese	12.9	
A01-SS-04	Manganese	10.7	
A01-SS-03	Manganese	2.7	
A01-SS-02	Mercury	0.03	
A01-SS-04	Mercury	0.03	
A01-SS-01	Mercury	0.02	
A01-SS-01	Nickel	2.1	
A01-SS-02	Nickel	1.3	
A01-SS-04	Nickel	1.3	
A01-SS-03	Nickel	0.7	
A01-SS-02	Thallium	3.1	
A01-SS-04	Thallium	2.8	
A01-SS-03	Thallium	2.7	
A01-SS-02	Vanadium	3.9	
A01-SS-01	Vanadium	3.75	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
A01-SS-02	Anthracene	41.7	J
A01-SS-01	Anthracene	21.8	J
A01-SS-04	Anthracene	9.5	J
A01-SS-01	Benzo(a)anthracene	84.7	
A01-SS-04	Benzo(a)pyrene	20.5	J
A01-SS-01	Benzo(a)pyrene	20	J
A01-SS-04	Benzo(b)fluoranthene	85.5	
A01-SS-01	Benzo(b)fluoranthene	35.2	J
A01-SS-02	Benzo(b)fluoranthene	24.8	J
A01-SS-01	Benzo(g,h,i)perylene	15.3	J
A01-SS-04	Benzo(g,h,i)perylene	10.6	J
A01-SS-04	Benzo(k)fluoranthene	28.1	J
A01-SS-01	Benzo(k)fluoranthene	26	J
A01-SS-01	Chrysene	78.3	
A01-SS-01	Dibenzo(a,h)anthracene	122.3	
A01-SS-01	Fluoranthene	169.5	
A01-SS-04	Fluoranthene	147	

TABLE 2-2

CHEMICALS DETECTED IN PARCEL A SUBZONE 1 SURFACE SOIL
NAS KEY WEST
PAGE 2 OF 2

Location	Parameter	Result	Qual(*)
A01-SS-02	Fluoranthene	131	J
A01-SS-01	Indeno(1,2,3-cd)pyrene	170.3	
A01-SS-04	Indeno(1,2,3-cd)pyrene	90.1	
A01-SS-01	Phenanthrene	58.3	J
A01-SS-01	Pyrene	114	J
A01-SS-04	Pyrene	103	
A01-SS-02	Pyrene	101	J
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
A01-SS-01	Acetone	1,742.9	J
A01-SS-03	Acetone	45.9	
A01-SS-04	Acetone	12.3	
A01-SS-02	Acetone	4.1	J
A01-SS-02	Methylene chloride	9.5	
A01-SS-03	Methylene chloride	8	
A01-SS-01	Methylene chloride	2.85	

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:

J – The associated value is an estimated quantity.

TABLE 2-3

CHEMICALS DETECTED IN PARCEL A SUBZONE 4 SURFACE SOIL
NAS KEY WEST
PAGE 1 OF 2

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
A04-SS-03	Aluminum	1,970	
A04-SS-01	Aluminum	1,170	J
A04-SS-02	Aluminum	946	J
A04-SS-04	Aluminum	713	J
A04-SS-02	Antimony	1.8	
A04-SS-04	Antimony	1.2	
A04-SS-03	Arsenic	28.8	
A04-SS-04	Arsenic	6	
A04-SS-02	Arsenic	5.7	
A04-SS-02	Barium	14.7	J
A04-SS-03	Barium	14.2	
A04-SS-01	Barium	11.6	J
A04-SS-04	Barium	9.2	J
A04-SS-02	Cadmium	0.71	
A04-SS-01	Cadmium	0.3	
A04-SS-04	Chromium	6.3	
A04-SS-02	Chromium	5.8	
A04-SS-03	Chromium	5.5	
A04-SS-01	Chromium	4.9	
A04-SS-02	Copper	12.2	
A04-SS-01	Copper	11.9	
A04-SS-04	Copper	8.2	
A04-SS-04	Iron	1,490	J
A04-SS-02	Iron	1,270	J
A04-SS-03	Iron	1,020	
A04-SS-04	Lead	69.2	
A04-SS-02	Lead	41.2	
A04-SS-01	Lead	24.4	
A04-SS-03	Lead	2.7	
A04-SS-03	Manganese	16.4	
A04-SS-02	Manganese	15.3	J
A04-SS-04	Manganese	12.5	J
A04-SS-01	Manganese	11.2	J
A04-SS-02	Mercury	0.05	J
A04-SS-03	Mercury	0.04	
A04-SS-04	Mercury	0.03	J
A04-SS-01	Mercury	0.03	J
A04-SS-02	Nickel	3.1	
A04-SS-01	Nickel	2.4	
A04-SS-04	Nickel	1.9	
A04-SS-03	Nickel	1.5	
A04-SS-03	Thallium	3.4	
A04-SS-02	Tin	1.8	
A04-SS-01	Tin	1.5	
A04-SS-04	Vanadium	5.8	
A04-SS-02	Vanadium	4.9	
A04-SS-01	Vanadium	3.5	
A04-SS-03	Vanadium	2.7	
A04-SS-02	Zinc	172	
A04-SS-01	Zinc	107	
A04-SS-04	Zinc	78.4	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
A04-SS-03	1,2,4-trichlorobenzene	6.5	J
A04-SS-01	Bis(2-ethylhexyl)phthalate	115	
A04-SS-04	Bis(2-ethylhexyl)phthalate	105	
A04-SS-02	Bis(2-ethylhexyl)phthalate	104	

TABLE 2-3

CHEMICALS DETECTED IN PARCEL A SUBZONE 4 SURFACE SOIL
NAS KEY WEST
PAGE 2 OF 2

Location	Parameter	Result	Qual(*)
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
A04-SS-04	Acetone	9.3	
A04-SS-03	Acetone	4.5	J
A04-SS-02	Acetone	4.1	J
A04-SS-01	Methylene chloride	1	J
A04-SS-04	Methylene chloride	0.9	J
A04-SS-02	Methylene chloride	0.83	J
A04-SS-03	Toluene	0.38	J

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 2-4

CHEMICALS DETECTED IN PARCEL A SUBZONE 5 SURFACE SOIL
NAS KEY WEST

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
A05-SS-02	Aluminum	581	
A05-SS-04	Aluminum	480	
A05-SS-01	Aluminum	380	
A05-SS-03	Aluminum	231	
A05-SS-01	Barium	36.4	
A05-SS-02	Barium	7	
A05-SS-04	Barium	6.2	
A05-SS-03	Barium	5.4	
A05-SS-04	Chromium	24.1	
A05-SS-01	Chromium	4.7	
A05-SS-02	Chromium	4.2	
A05-SS-03	Chromium	2.65	
A05-SS-04	Iron	2,120	
A05-SS-02	Iron	358	
A05-SS-01	Iron	262	
A05-SS-03	Iron	162.5	
A05-SS-04	Lead	91.5	
A05-SS-02	Lead	35.4	
A05-SS-01	Lead	9.8	
A05-SS-03	Lead	0.6	
A05-SS-04	Manganese	17.4	
A05-SS-02	Manganese	6.2	
A05-SS-01	Manganese	5.3	
A05-SS-03	Manganese	4.45	
A05-SS-02	Nickel	1.4	
A05-SS-04	Nickel	1.4	
A05-SS-03	Nickel	1.12	
A05-SS-01	Nickel	1.1	
A05-SS-02	Selenium	2.5	
A05-SS-02	Thallium	4.8	
A05-SS-01	Thallium	4	
A05-SS-03	Thallium	3.8	
A05-SS-04	Thallium	3.5	
A05-SS-01	Vanadium	3.7	
A05-SS-04	Vanadium	2.8	
A05-SS-02	Vanadium	2.7	
A05-SS-03	Vanadium	2.5	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
A05-SS-01	Bis(2-ethylhexyl)phthalate	1,020	J
A05-SS-04	Bis(2-ethylhexyl)phthalate	255	J
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
A05-SS-02	Acetone	1,360	J
A05-SS-04	Acetone	1,040	J
A05-SS-01	Acetone	376	J
A05-SS-03	Methylene chloride	7.55	
A05-SS-01	Tetrachloroethene	2.4	
A05-SS-02	Toluene	0.5	J
A05-SS-03	Toluene	0.48	J
A05-SS-01	Toluene	0.29	J

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 2-5

CHEMICALS DETECTED IN PARCEL A SUBZONE 6 SURFACE SOIL
NAS KEY WEST

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
A06-SS-02	Aluminum	278	
A06-SS-03	Aluminum	251	
A06-SS-04	Aluminum	245	
A06-SS-01	Aluminum	195	
A06-SS-04	Barium	6.3	
A06-SS-03	Barium	5.9	
A06-SS-02	Barium	5.8	
A06-SS-01	Barium	5.5	
A06-SS-04	Chromium	3.3	
A06-SS-03	Chromium	2.8	
A06-SS-02	Chromium	2.8	
A06-SS-01	Chromium	2.8	
A06-SS-02	Iron	308	
A06-SS-03	Iron	186	
A06-SS-04	Iron	183	
A06-SS-01	Iron	142	
A06-SS-03	Lead	1.4	
A06-SS-04	Lead	0.83	
A06-SS-01	Lead	0.75	
A06-SS-02	Manganese	7.1	
A06-SS-03	Manganese	4.7	
A06-SS-01	Manganese	4.5	
A06-SS-04	Manganese	4.2	
A06-SS-03	Nickel	1.4	
A06-SS-01	Nickel	1.3	
A06-SS-02	Nickel	1.2	
A06-SS-04	Nickel	1.2	
A06-SS-04	Thallium	4.7	
A06-SS-02	Thallium	3.8	
A06-SS-01	Thallium	3.3	
A06-SS-03	Thallium	2.9	
A06-SS-01	Vanadium	3.6	
A06-SS-03	Vanadium	2.6	
A06-SS-02	Vanadium	2.5	
A06-SS-04	Vanadium	2.2	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
A06-SS-04	1,2,4-trichlorobenzene	3.4	J
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
A06-SS-01	Acetone	354	J
A06-SS-02	Acetone	136	J
A06-SS-04	Acetone	36.8	
A06-SS-03	Toluene	0.41	J

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 2-6

CHEMICALS DETECTED IN PARCEL A SUBZONE 7 SURFACE SOIL
NAS KEY WEST

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
A07-SS-04	Aluminum	486	J
A07-SS-03	Aluminum	484	
A07-SS-03	Barium	7.7	
A07-SS-04	Barium	6.6	J
A07-SS-02	Barium	6.3	J
A07-SS-01	Barium	6.2	J
A07-SS-01	Cadmium	0.69	
A07-SS-04	Cadmium	0.48	
A07-SS-02	Cadmium	0.3	
A07-SS-04	Chromium	6.1	
A07-SS-03	Chromium	5.4	
A07-SS-01	Chromium	5.2	
A07-SS-02	Chromium	4	
A07-SS-04	Copper	5.9	
A07-SS-01	Copper	5.2	
A07-SS-02	Copper	2.5	
A07-SS-03	Iron	681	
A07-SS-03	Lead	320	
A07-SS-01	Lead	157	
A07-SS-04	Lead	135	
A07-SS-02	Lead	33.8	
A07-SS-04	Manganese	9.3	J
A07-SS-03	Manganese	7	
A07-SS-01	Manganese	6.6	J
A07-SS-02	Manganese	6.6	J
A07-SS-03	Nickel	1.8	
A07-SS-01	Nickel	1.7	
A07-SS-04	Nickel	1.6	
A07-SS-02	Nickel	1.1	
A07-SS-04	Thallium	6.2	
A07-SS-03	Thallium	4.2	
A07-SS-02	Tin	1.7	
A07-SS-01	Vanadium	4.1	
A07-SS-03	Vanadium	4	
A07-SS-04	Vanadium	3.3	
A07-SS-02	Vanadium	2.5	
A07-SS-03	Zinc	303	
A07-SS-01	Zinc	233	
A07-SS-04	Zinc	134	
A07-SS-02	Zinc	65.6	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
A07-SS-04	Bis(2-ethylhexyl)phthalate	96.1	
POLYCHLORINATED BIPHENYLS (µg/kg)			
A07-SS-03	Aroclor-1260	148	J
A07-SS-01	Aroclor-1260	10.7	
A07-SS-02	Aroclor-1260	5.4	

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 2-7

CHEMICALS DETECTED IN PARCEL A SUBZONE 9 SEDIMENT
NAS KEY WEST
PAGE 1 OF 2

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
A09-SD-01	Aluminum	1,267	
A09-SD-02	Aluminum	1,080	
A09-SD-03	Aluminum	928	
A09-SD-04	Aluminum	1,250	
A09-SD-05	Aluminum	566	
A09-SD-06	Aluminum	1,480	
A09-SD-07	Aluminum	4,180	
A09-SD-08	Aluminum	3,680	
A09-SD-04	Barium	187	
A09-SD-01	Cadmium	0.8825	
A09-SD-05	Cadmium	0.89	
A09-SD-07	Cadmium	0.76	
A09-SD-01	Chromium	7.75	
A09-SD-02	Chromium	8.8	
A09-SD-03	Chromium	5.5	
A09-SD-04	Chromium	8.3	
A09-SD-05	Chromium	51.4	
A09-SD-06	Chromium	6	
A09-SD-07	Chromium	12.4	
A09-SD-08	Chromium	10.1	
A09-SD-01	Copper	20.15	
A09-SD-02	Copper	13.8	
A09-SD-03	Copper	8.5	
A09-SD-04	Copper	12.8	
A09-SD-05	Copper	11.8	
A09-SD-06	Copper	5.2	
A09-SD-07	Copper	16	

Location	Parameter	Result	Qual(*)
A09-SD-08	Copper	10.7	
A09-SD-01	Iron	1,263	
A09-SD-02	Iron	937	
A09-SD-03	Iron	922	
A09-SD-04	Iron	1,720	
A09-SD-05	Iron	1,160	
A09-SD-06	Iron	877	
A09-SD-07	Iron	1,980	
A09-SD-08	Iron	1,550	
A09-SD-01	Lead	65.15	
A09-SD-02	Lead	42.5	
A09-SD-03	Lead	62.8	
A09-SD-04	Lead	43.4	
A09-SD-05	Lead	466	
A09-SD-07	Lead	63.4	
A09-SD-08	Lead	81.6	
A09-SD-01	Manganese	14.1	
A09-SD-02	Manganese	12.7	
A09-SD-03	Manganese	14	
A09-SD-04	Manganese	17.7	
A09-SD-05	Manganese	11.9	
A09-SD-06	Manganese	11.3	
A09-SD-07	Manganese	31.2	
A09-SD-08	Manganese	16.6	
A09-SD-07	Nickel	8.3	
A09-SD-05	Vanadium	8.9	
A09-SD-07	Vanadium	11.5	
A09-SD-08	Vanadium	14.4	

TABLE 2-7

CHEMICALS DETECTED IN PARCEL A SUBZONE 9 SEDIMENT
NAS KEY WEST
PAGE 2 OF 2

Location	Parameter	Result	Qual(*)
A09-SD-01	Zinc	72.6	
A09-SD-02	Zinc	90.1	
A09-SD-03	Zinc	46.2	
A09-SD-04	Zinc	518	
A09-SD-05	Zinc	104	
A09-SD-06	Zinc	40.6	
A09-SD-07	Zinc	84.6	
A09-SD-08	Zinc	38	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
A09-SD-05	Bis(2-ethylhexyl)phthalate	710	
A09-SD-05	Butyl benzyl phthalate	292	J
PESTICIDES (µg/kg)			
A09-SD-05	4,4'-DDE	3.1	J
A09-SD-08	4,4'-DDE	7.5	

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 2-8

CHEMICALS DETECTED IN PARCEL A SUBZONE 10 SURFACE WATER NAS KEY WEST

Location	Parameter	Result	Qual(*)
INORGANICS (µg/L)			
A10-SW-01	Iron	6,020	
A10-SW-02	Iron	1,140	
A10-SW-03	Iron	1,540	
A10-SW-04	Iron	6,300	
A10-SW-05	Iron	1,170	
A10-SW-06	Iron	1,320	
A10-SW-07	Iron	1,305	
A10-SW-02	Lead	5.5	
A10-SW-03	Lead	3.7	
A10-SW-05	Lead	4.0	
A10-SW-06	Lead	5.3	
A10-SW-07	Lead	5.55	
A10-SW-02	Zinc	54.2	
A10-SW-03	Zinc	42.3	
A10-SW-05	Zinc	47.6	
A10-SW-06	Zinc	73.2	
A10-SW-07	Zinc	66.5	

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:

J – The associated value is an estimated quantity.

TABLE 2-9

CHEMICALS DETECTED IN PARCEL A SUBZONE 11 GROUNDWATER
NAS KEY WEST

Sample	Parameter	Result	Qual(*)
INORGANICS (µg/L)			
A11-MW-04	Arsenic	154	
A11-MW-05	Barium	968	
A11-MW-04	Iron	708	
A11-MW-05	Iron	1,050	
A11-MW-06	Iron	1,170	
A11-MW-04	Lead	4	
A11-MW-06	Lead	3.9	
A11-MW-04	Zinc	54.6	
A11-MW-05	Zinc	35.2	
A11-MW-06	Zinc	28.6	
VOLATILE ORGANIC COMPOUNDS (µg/L)			
A11-MW-05	1,1-dichloroethane	10	
A11-MW-05	1,1-dichloroethene	2.3	
A11-MW-05	Vinyl chloride	8.6	

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

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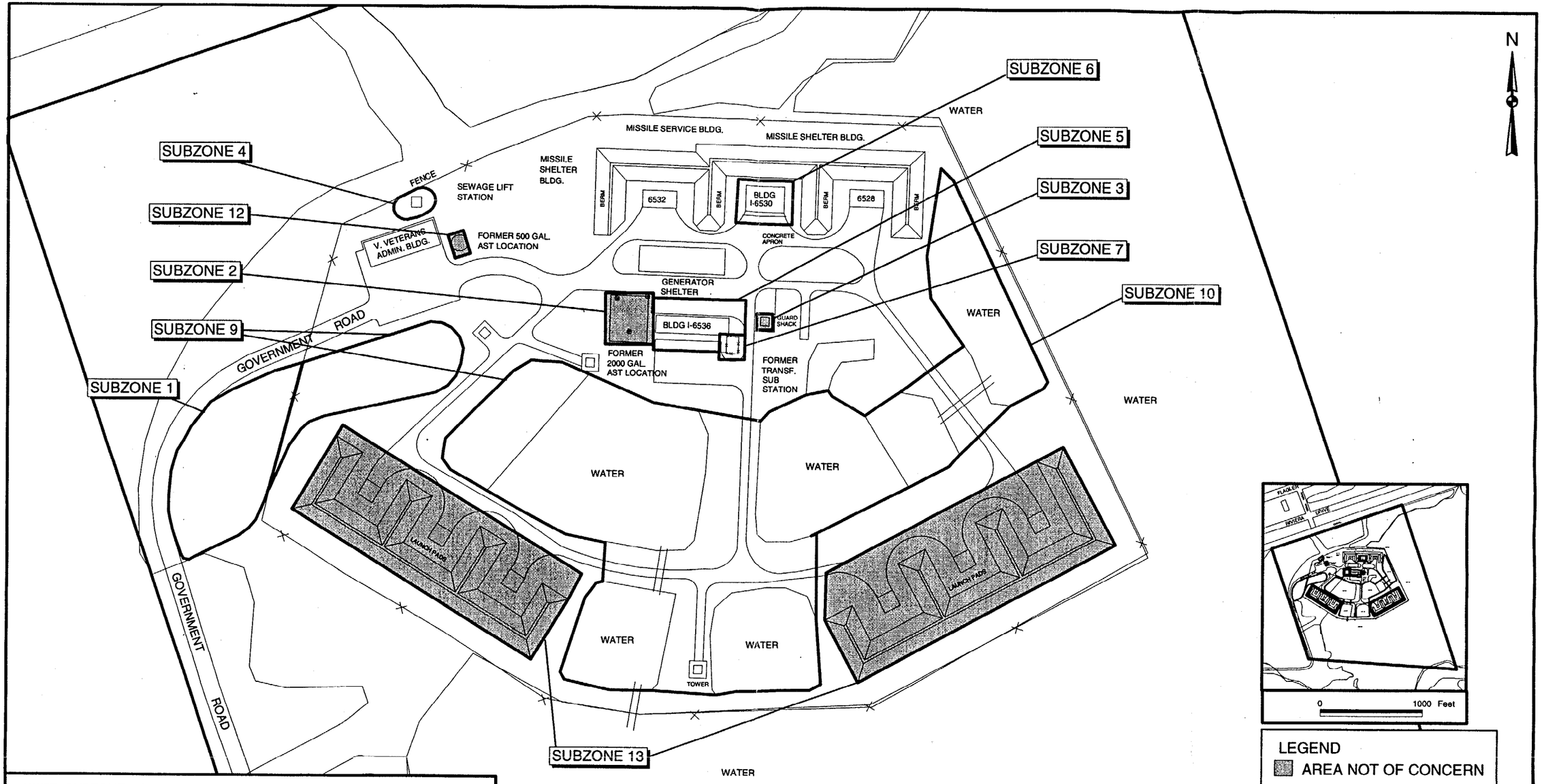

NOTE: SUBZONE 8 (REMAINDER OF PARCEL A SOIL) IS NOT OF CONCERN
SUBZONE 11 (GROUNDWATER) INCLUDES ALL OF PARCEL A

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 2-1. SUBZONE AND PARCEL BOUNDARIES
HAMACA HAWK MISSILE SITE - BRAC PARCEL A
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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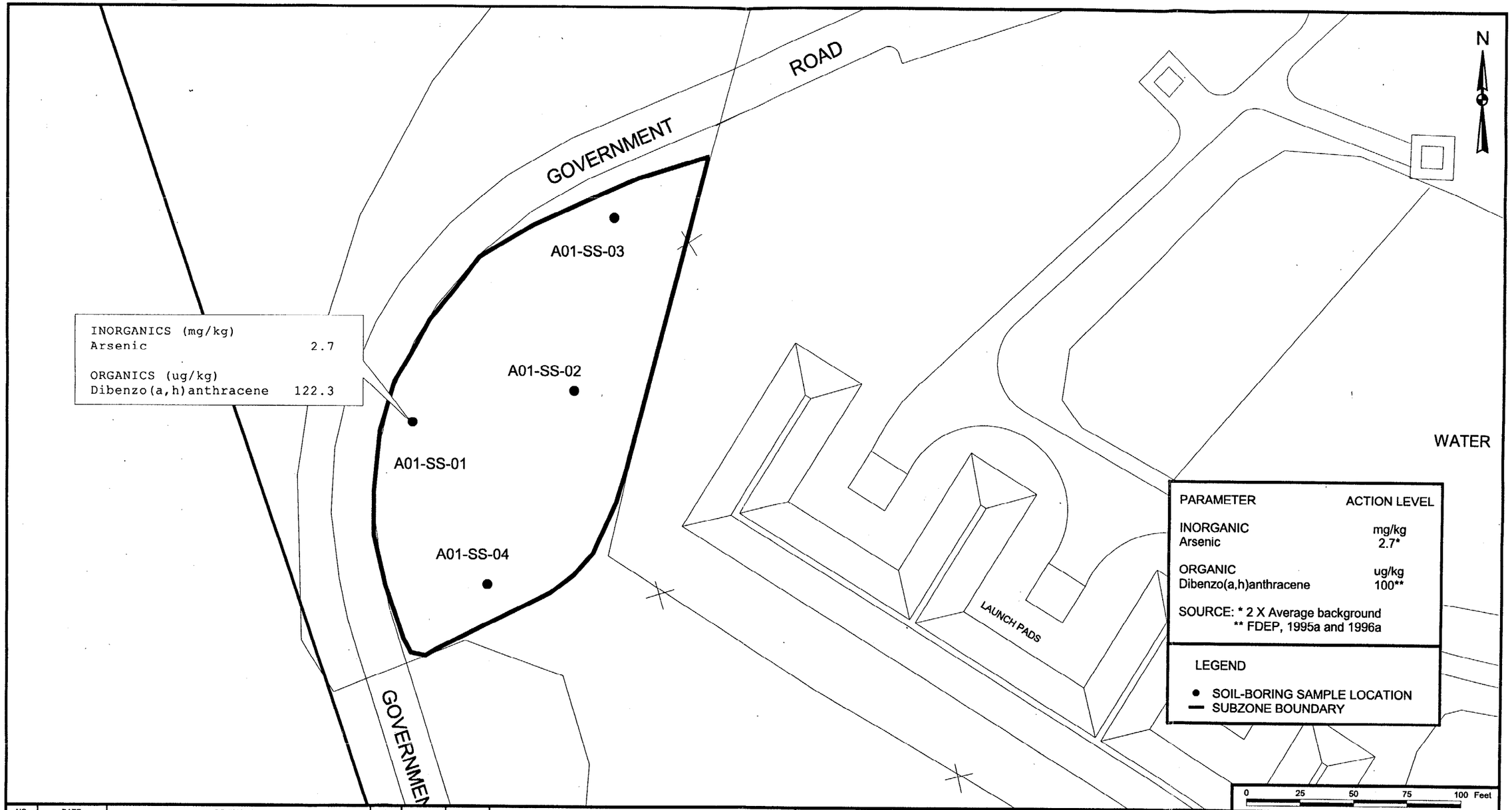

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DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 2-2. SUBZONE 1 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
HAMACA HAWK MISSILE SITE - BRAC PARCEL A
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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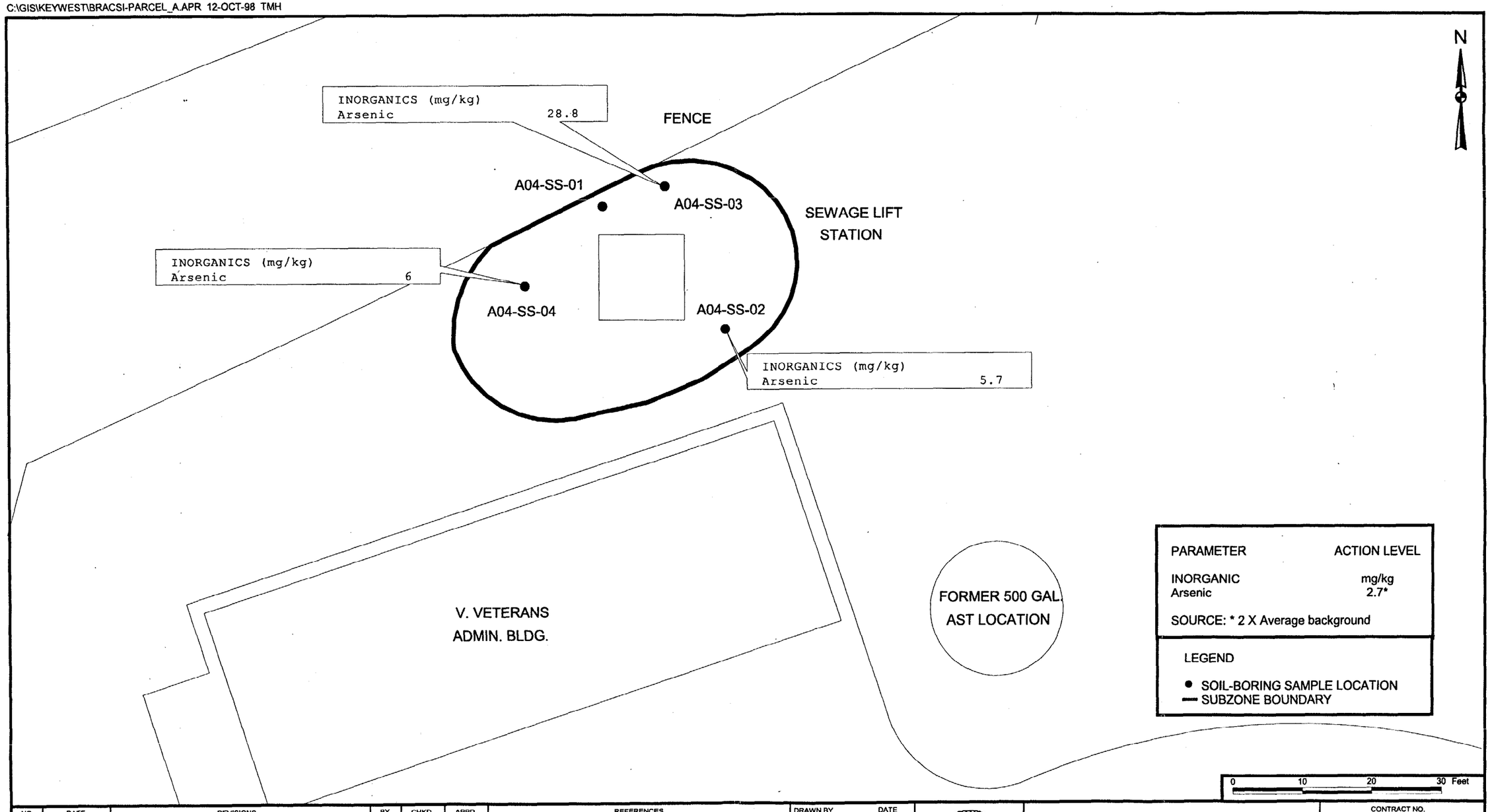

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SCALE APPROXIMATE SCALE AS NOTED

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 2-3. SUBZONE 4 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
HAMACA HAWK MISSILE SITE - BRAC PARCEL A
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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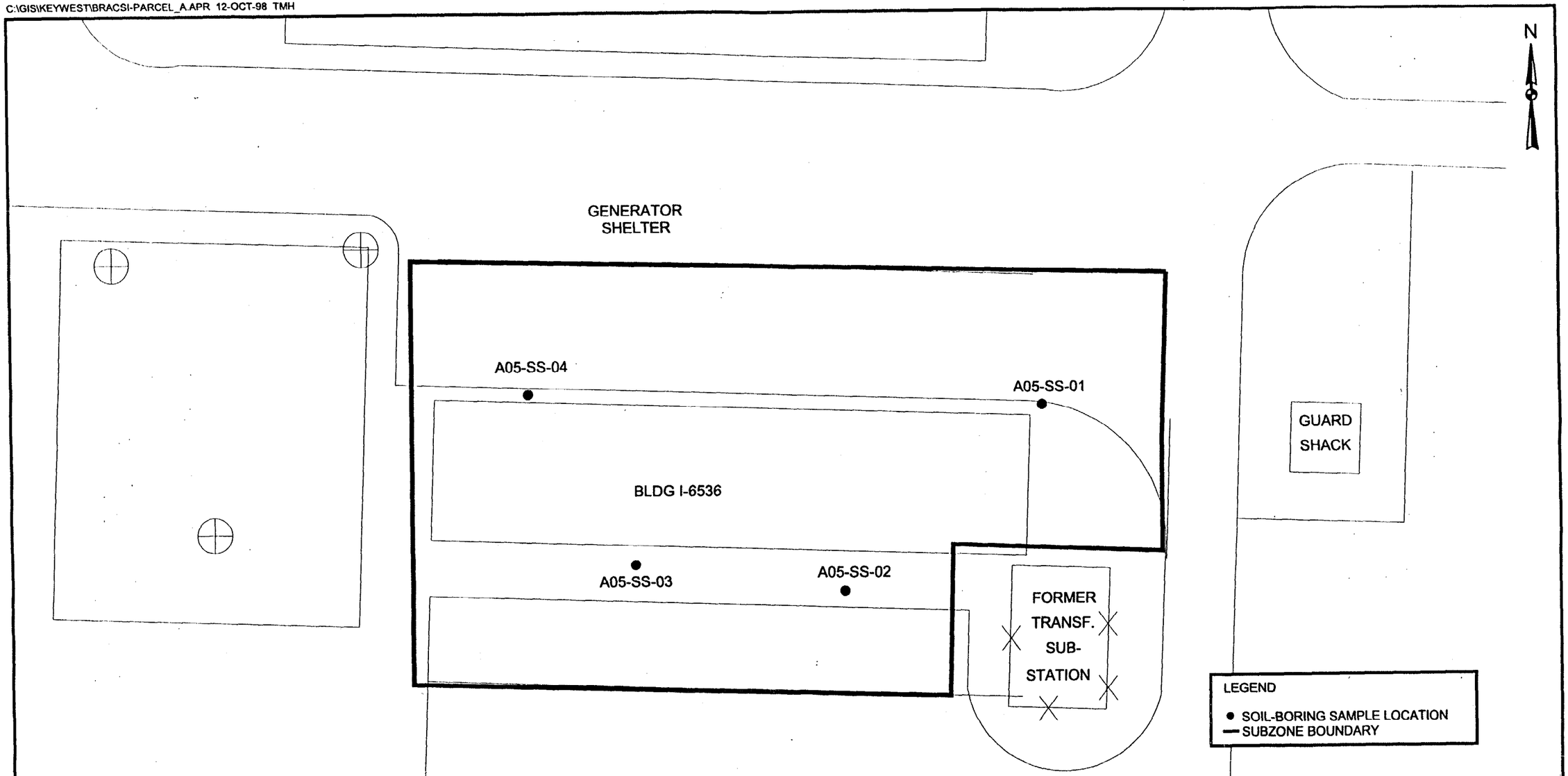

NOTE: There were no chemical exceedances detected in surface soil at subzone 5.

0 10 20 30 Feet

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 2-4. SUBZONE 5 SURFACE SOIL
SAMPLE LOCATIONS
HAMACA HAWK MISSILE SITE – BRAC PARCEL A
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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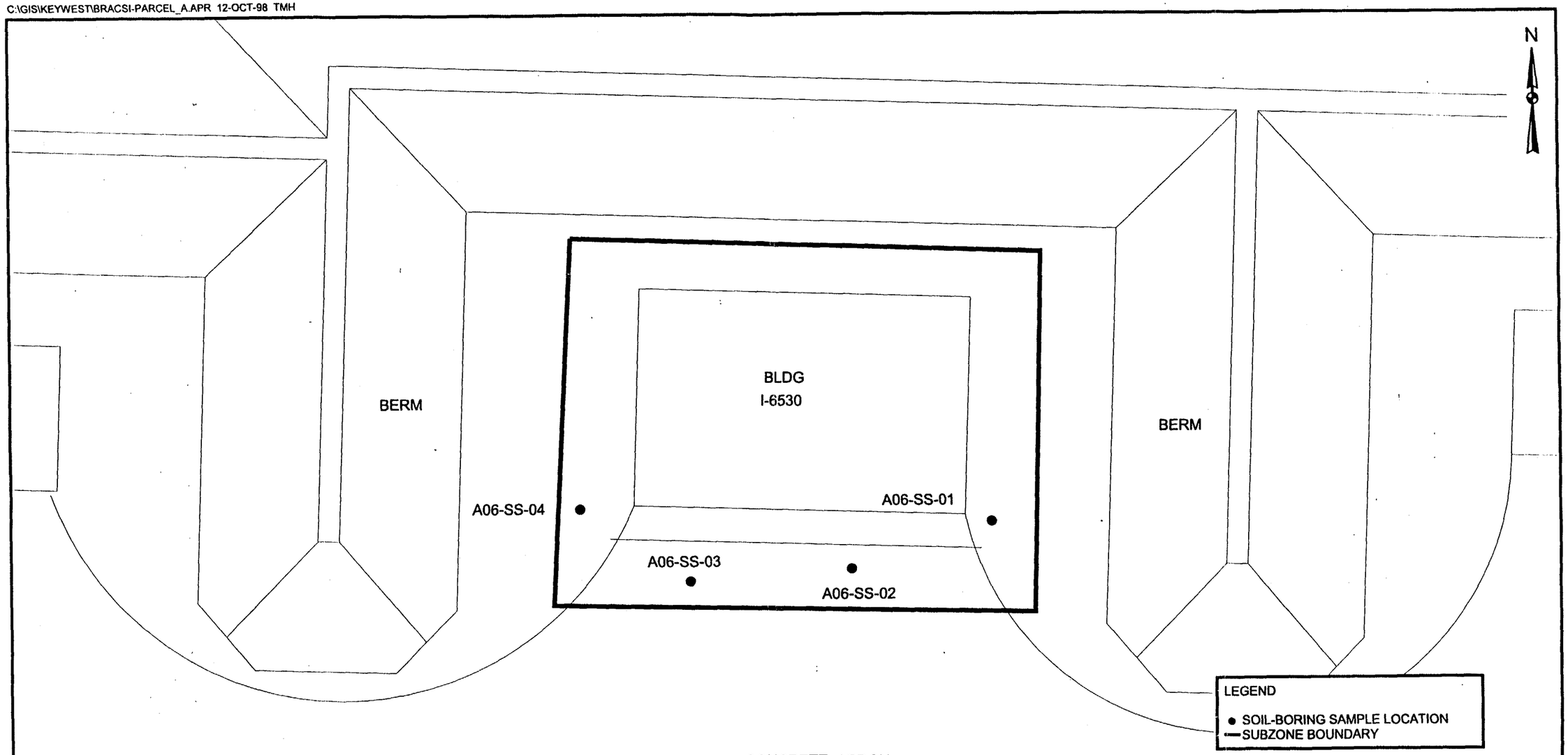

NOTE: There were no chemical exceedances detected in surface soil at subzone 6.

0 10 20 30 Feet

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 2-5. SUBZONE 6 SURFACE SOIL SAMPLE LOCATIONS
HAMACA HAWK MISSILE SITE – BRAC PARCEL A
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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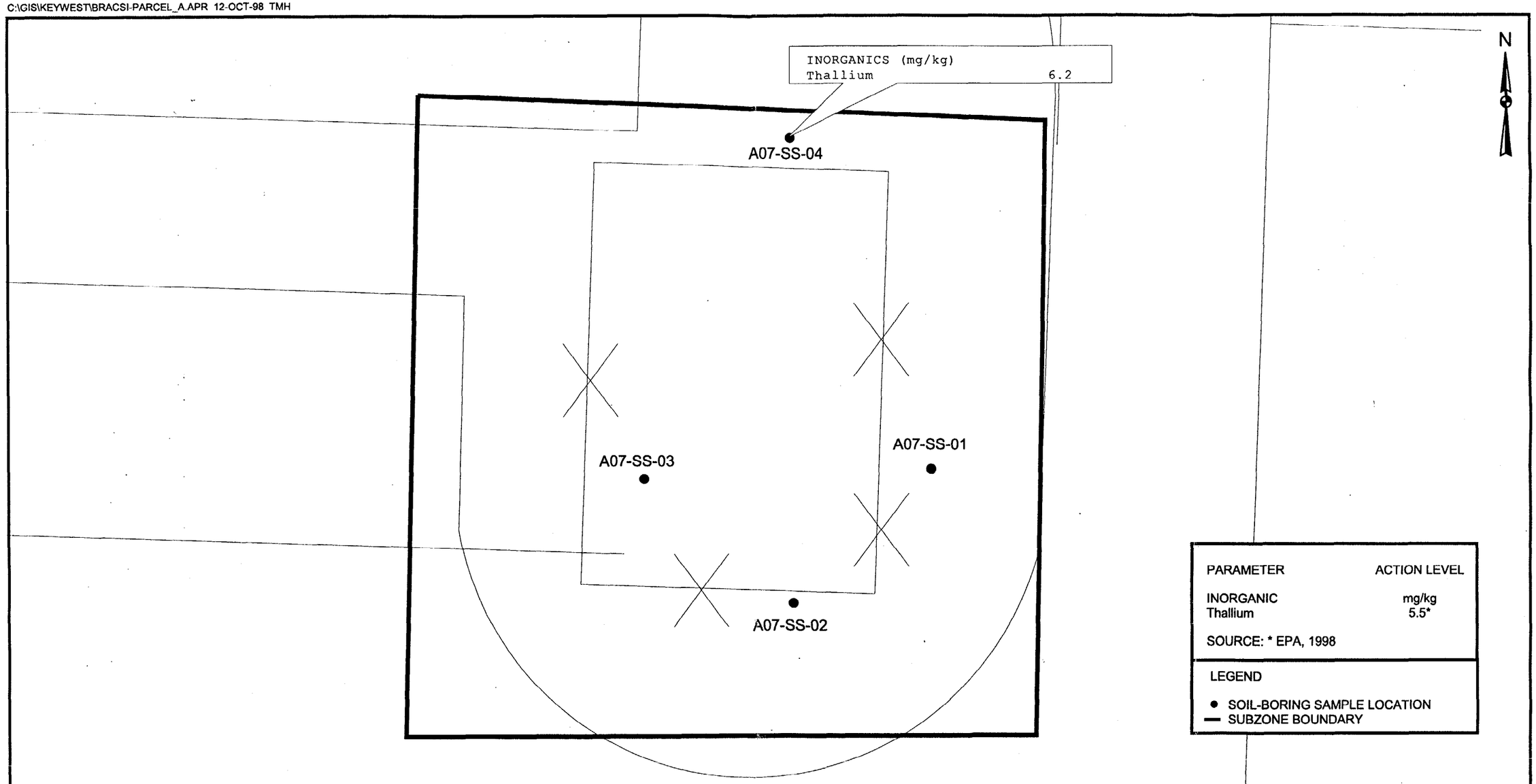

PARAMETER	ACTION LEVEL
INORGANIC	mg/kg
Thallium	5.5*

SOURCE: * EPA, 1998

LEGEND

- ● SOIL-BORING SAMPLE LOCATION
- — SUBZONE BOUNDARY

0 5 10 Feet

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 2-6. SUBZONE 7 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
HAMACA HAWK MISSILE SITE - BRAC PARCEL A
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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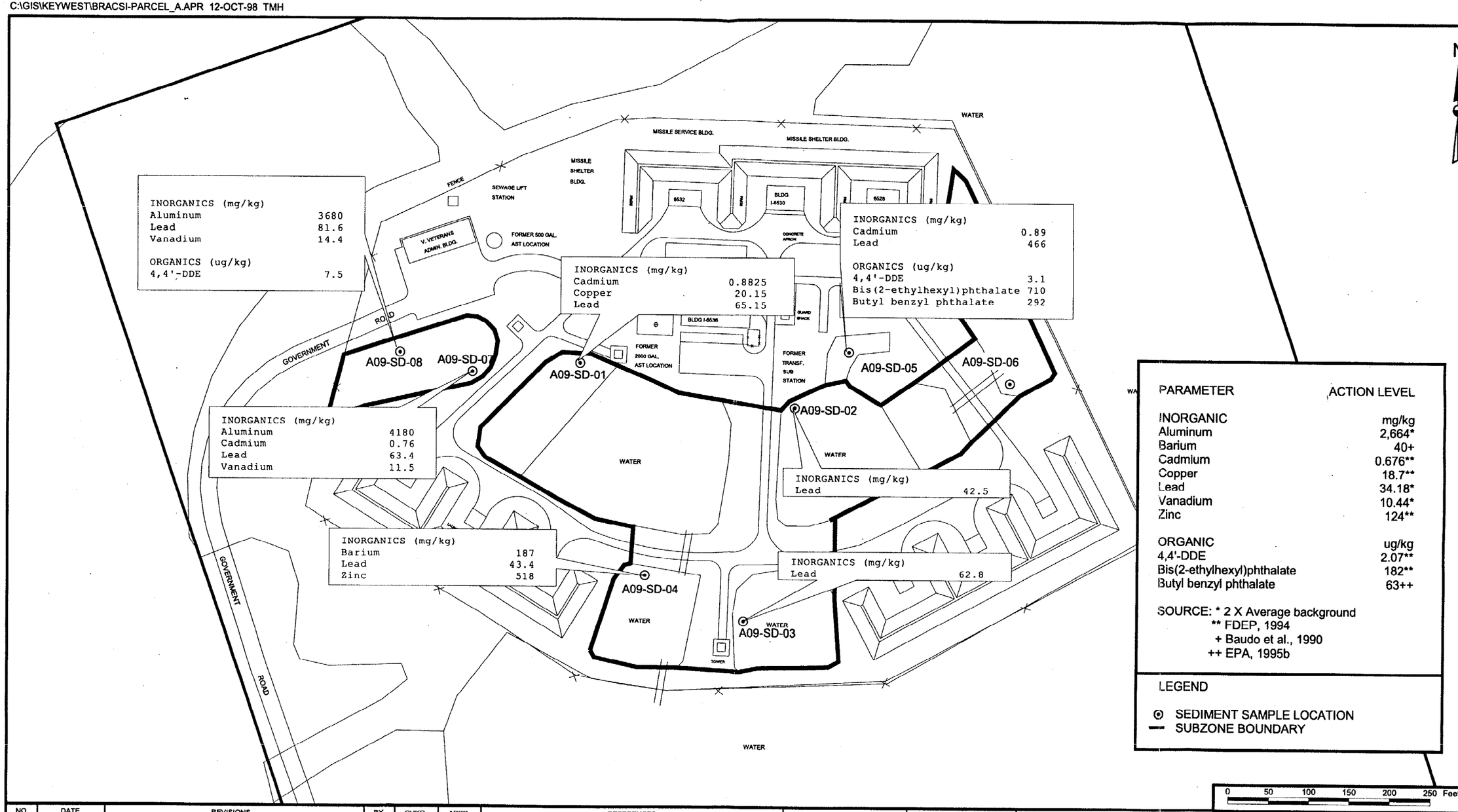

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DEPARTMENT OF THE NAVY * SOUTHERN DIVISION * NAVAL FACILITIES ENGINEERING COMMAND

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 2-7. SUBZONE 9 SEDIMENT SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
HAMACA HAWK MISSILE SITE - BRAC PARCEL A
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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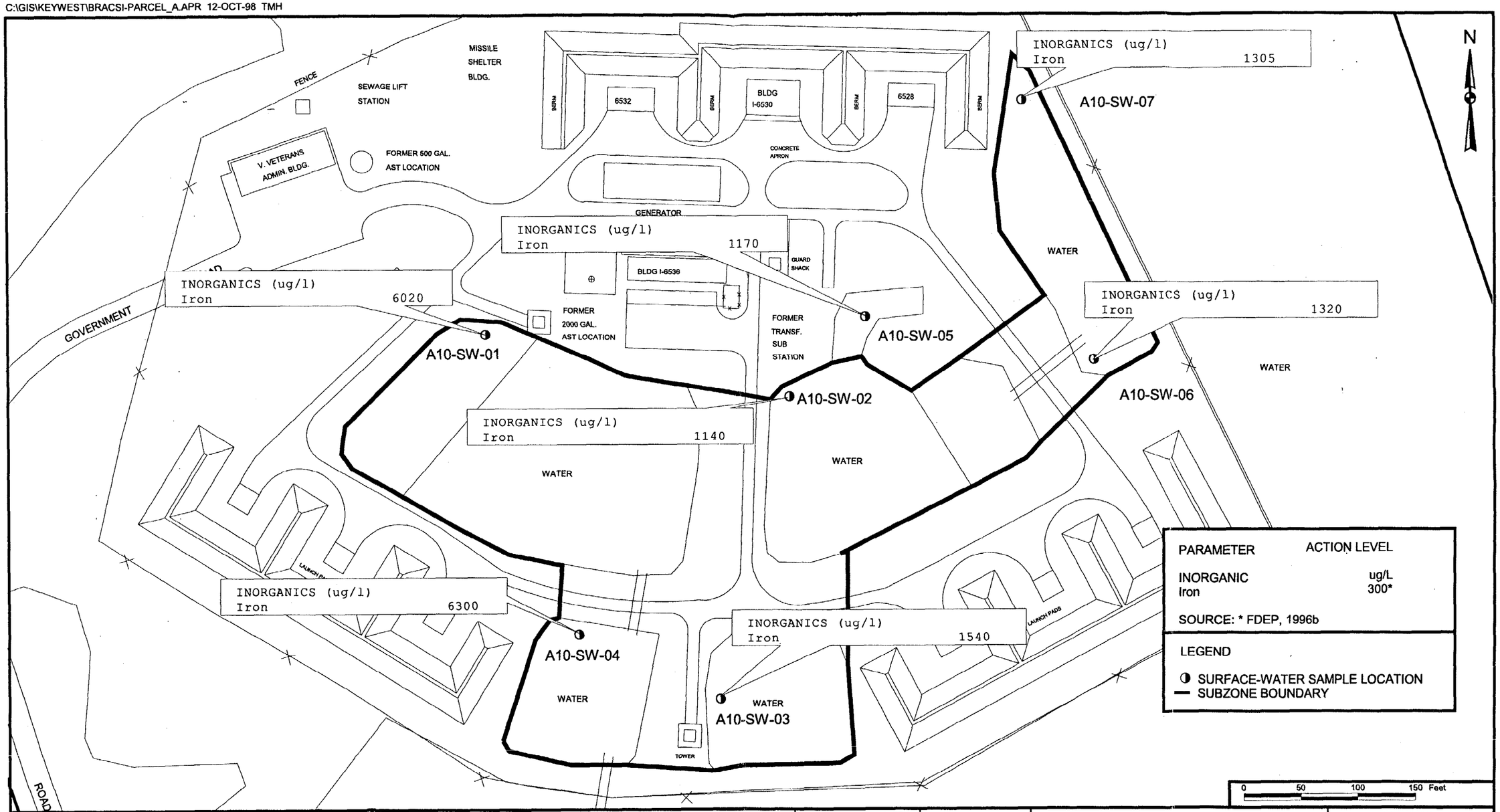

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COST/SCHED-AREA	
SCALE	APPROXIMATE SCALE AS NOTED

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 2-8. SUBZONE 10 SURFACE-WATER SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
HAMACA HAWK MISSILE SITE - BRAC PARCEL A
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

CONTRACT NO.	7593
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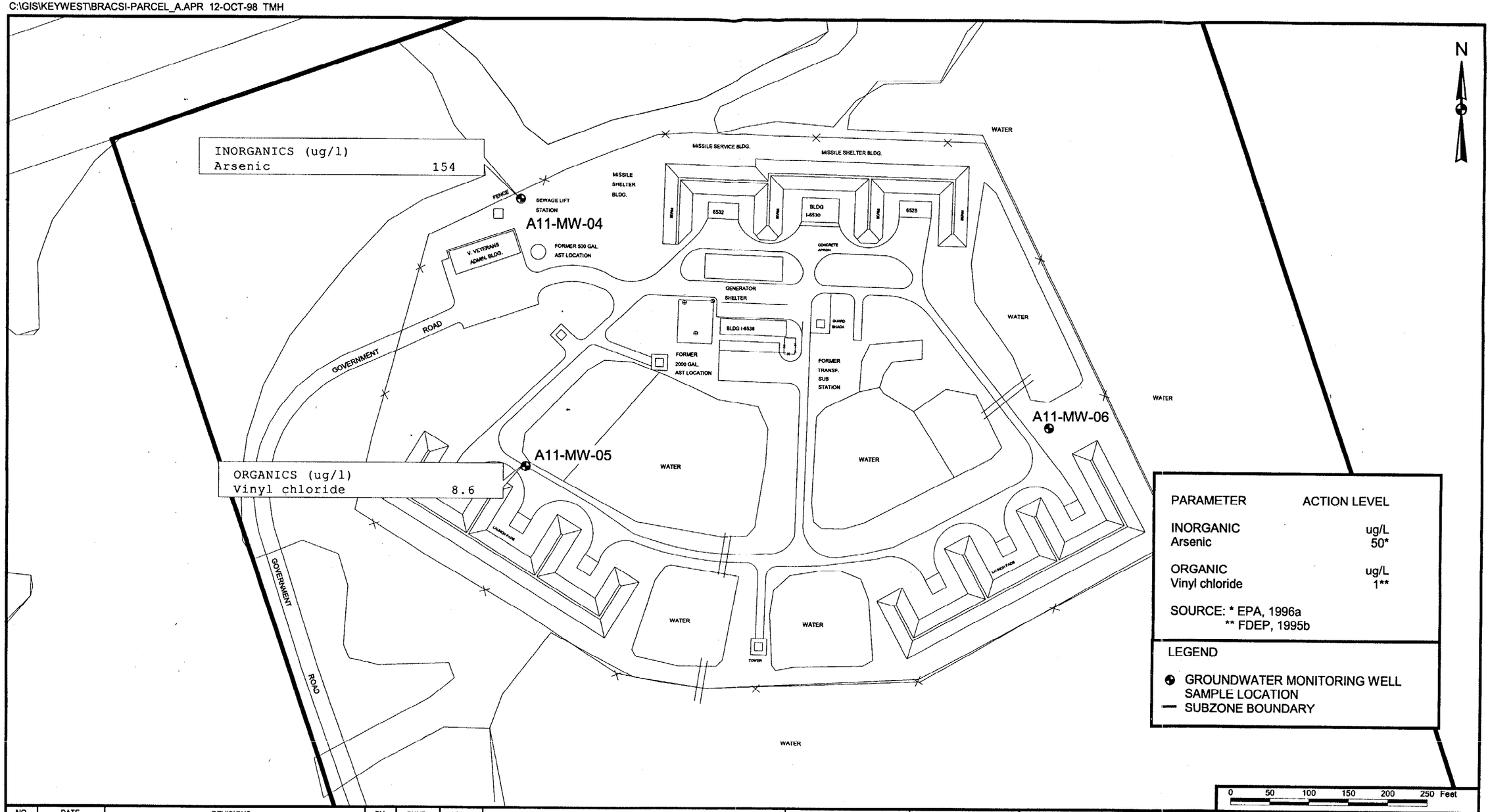

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APPROXIMATE SCALE AS NOTED	

DEPARTMENT OF THE NAVY ★ NAVAL FACILITIES ENGINEERING COMMAND ★ SOUTHERN DIVISION

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 2-9. SUBZONE 11 GROUNDWATER SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
HAMACA HAWK MISSILE SITE - BRAC PARCEL A
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

CONTRACT NO.	7593
APPROVED BY	DATE
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3.0 EAST MARTELLO BATTERY (PARCEL B)

3.1 PARCEL DESCRIPTION

The U.S. Army built East Martello Battery in the early 1940s for use as a Coastal Defense Battery. It was used as such until the property was transferred to the Navy in 1950 (Figure 3-1). The Navy developed the property in the early 1950s to accommodate 100 trailers to be used as housing. The trailer housing project also included two laundry facilities, but no dry cleaning operations were known to have been conducted. The trailer project was deactivated in 1956, and all trailers and buildings were removed from the site. Monroe County Civil Defense used the bunker from 1985 until 1992 as an administrative command post. The county has placed yard and tree cuttings on the property to dry prior to mulching and replacing.

The East Martello Battery Parcel is located on the western border of Key West International Airport, at the end of the runway. The airport stores and uses petroleum products. The Parcel is bounded on the north by old residential communities and on the south and west by saltwater ponds and undeveloped woodlands.

3.2 INVESTIGATION HISTORY

This section describes previous and current investigations for the East Martello Battery Parcel.

3.2.1 Previous Investigations

Existing documents include the USN-NPWC Lead and Asbestos Survey of East Martello Battery (USN-NPWC, 1995b) and the USN-SUPSHIP Predraft EBS Realignment Parcels (USN-SUPSHIP, 1996). No previous soil or groundwater analytical data exist. Based on the 1995 inspection performed by the NPWC, both LBP and suspected ACBMs are present in East Martello Battery facilities and infrastructure.

The EBS (USN-SUPSHIP, 1996) documented a number of factors that are potentially helpful in characterizing the site:

- Although the storage of hazardous or petroleum substances at the site in the past has been documented, no visible sheen or discoloration of surface water has been observed.

- No stains were observed on site soils, although old stains of an indeterminate nature were found on the floors of several site facilities.

- A freshwater tower and tank were previously located at the site but have been removed.

- Concrete freshwater storage and sewage dosing tanks are in the northeast and northwest corners of Parcel B but appear to have been out of service for many years.

- A septic drain field is on the southwest portion of the property, but it has not been used since the 1950s, when the sanitary waste dosing station ceased operation.

- There is no reason to suspect PCB contamination at this facility.

- Although pesticides are commonly used for mosquito and pest control throughout NAS Key West, there is no evidence of pesticide misuse at the site.

3.2.2 Current Investigation

The DQO Process evaluated three subzones for the East Martello Battery Parcel. Subzone 2 was eliminated from further consideration. It was assumed that the septic field located on the site would be addressed in the groundwater assessment of subzone 3 which includes the same area. Two subzones within Parcel B required sampling and analysis under the BRAC SI. The environmental medium of each subzone and the parameter groups selected for analysis at each subzone, are presented in Table 3-1. The four soil sample locations in subzone 1 (East Martello Battery) are shown in Figure 3-2, while the placement of three permanent monitoring wells that were sampled in subzone 3 is shown in Figure 3-3. Analytical results for samples collected at Parcel B were compared to an industrial set of action levels (see Section 1.8.2.1).

3.3 SUBZONE 1 (EAST MARTELLO BATTERY)

The subsections below describe subzone 1, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 1 surface soil.

3.3.1 Subzone Description

Petroleum, solvents, fuels, and lead were considered potential soil contaminants in subzone 1. Four surface soil samples were collected. All of the analytical results can be found in Appendix D.

3.3.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in subzone 1 for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 3-2. Figure 3-2 shows the sample locations of all surface soil samples collected at subzone 1.

No VOCs were detected in excess of their action levels. VOCs detected below their screening criteria included 2-butanone, 2-hexanone, acetone, chlorobenzene, chloromethane, ethylbenzene, toluene, and xylenes. No SVOCs or inorganics were detected in excess of their action levels. SVOCs detected in surface soil at subzone 1 but not in excess of action levels included 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, and butyl benzyl phthalate. Inorganics detected below their action levels included aluminum, antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, tin, vanadium, and zinc.

3.3.3 Conclusions and Recommendations

Petroleum, solvents, fuels, and lead from past uses as a defense battery were considered to be potential surface soil contaminants. However, no chemicals were detected in excess of action levels. Therefore, there does not appear to be significant contamination in the surface soil at subzone 1 and no further action is recommended.

3.4 SUBZONE 3 (GROUNDWATER)

The subsections below describe subzone 3, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 3 groundwater.

3.4.1 Subzone Description

Solvents, fuels, and lead from past use as a defense battery and trailer park were considered to be potential groundwater contaminants at East Martello Battery. Subzone 3 includes groundwater under the East Martello Battery Parcel. Nine groundwater screening samples were collected in subzone 3 for use in determining the location of three permanent wells installed during the SI field effort. These samples were analyzed for VOCs, SVOCs, and inorganics. All of the results can be found in Appendix D. Three permanent monitoring wells were installed during the field effort: one in the northern portion of the site

near some ponds, one in the center of the site to the east of the battery, one west of the battery and road. Samples were taken from these wells during the SI. All of the analytical results can be found in Appendix D.

3.4.2 Site Investigation Findings

Contamination was investigated by analyzing groundwater in three monitoring wells installed at East Martello Battery for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the groundwater samples are listed in Table 3-3. Figure 3-3 shows the locations of all monitoring wells sampled at subzone 3.

No VOCs, SVOCs, or inorganics were detected in excess of their screening values in groundwater at subzone 3. Iron, lead, and zinc were the only chemicals detected in groundwater monitoring well samples from East Martello Battery.

3.4.3 Conclusions and Recommendations

Solvents, fuels, and lead from past uses as a defense battery and trailer park were considered to be potential contaminant sources in groundwater at Parcel B. However, no chemicals were detected in excess of action levels. Therefore, there does not appear to be significant contamination in the groundwater in East Martello Battery and no further action is recommended.

3.5 PARCEL B CONCLUSIONS AND RECOMMENDATIONS

The Base Reuse Plan (BAP, 1997) proposes a combination of zoning categories for East Martello Battery including Public and Semi-Private Services (PS) and two Conservation districts: Outstanding Florida Waters (C-OW) and Tidal Wetlands of the State (C-TW). The majority of the East Martello Battery site is proposed for use by the Key West International Airport as a runway clear zone and obstruction-free zone; the remainder of the site is proposed for preservation and passive open space recreation (nature trails, scenic overlooks, etc.).

Petroleum, solvents, fuels, and lead were identified as potential contaminants at the East Martello Battery Parcel during the DQO Process. Petroleum, solvents, fuels, and lead were not detected in surface soil or groundwater in excess of their action levels. Therefore, it does not appear that there is significant soil or groundwater contamination at East Martello Battery and no further action is recommended.

TABLE 3-1

PARAMETER GROUPS AND MEDIA OF INTEREST AT EAST MARTELLO BATTERY (PARCEL B) NAS KEY WEST

Subzone	Building/Area	Medium	Number of Locations	Parameter Group				
				VOCs	SVOCs	Inorganics	PCBs	Pesticides
Subzone 1	East Martello Battery	SO	4	X	X	X		
Subzone 3	Groundwater	GW	3	X	X	X		

SO = Surface soil.
GW = Groundwater.

Subzone 2 was eliminated from sampling during the DQO Process.

TABLE 3-2

CHEMICALS DETECTED IN PARCEL B SUBZONE 1 SURFACE SOIL
NAS KEY WEST
PAGE 1 OF 2

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
B01-SS-02	Aluminum	909	J
B01-SS-03	Aluminum	610	J
B01-SS-04	Aluminum	498	J
B01-SS-03	Antimony	1.8	
B01-SS-02	Antimony	1.5	
B01-SS-04	Antimony	1.3	
B01-SS-03	Arsenic	1.8	
B01-SS-03	Barium	157	J
B01-SS-02	Barium	29.8	J
B01-SS-04	Barium	6.5	J
B01-SS-01	Barium	4.9	J
B01-SS-03	Cadmium	3.6	
B01-SS-02	Cadmium	1.2	
B01-SS-03	Chromium	10.9	
B01-SS-02	Chromium	7	
B01-SS-04	Chromium	3.3	
B01-SS-01	Chromium	3	
B01-SS-03	Copper	100	
B01-SS-02	Copper	22	
B01-SS-04	Copper	1.1	
B01-SS-01	Copper	1	
B01-SS-03	Iron	2,700	J
B01-SS-02	Iron	1,430	J
B01-SS-02	Lead	249	
B01-SS-03	Lead	225	
B01-SS-04	Lead	0.9	
B01-SS-03	Manganese	30	J
B01-SS-02	Manganese	24.5	J
B01-SS-04	Manganese	4.6	J
B01-SS-01	Manganese	3.7	J
B01-SS-03	Mercury	0.74	J
B01-SS-02	Mercury	0.03	J
B01-SS-03	Nickel	4.6	
B01-SS-02	Nickel	3.3	
B01-SS-01	Nickel	0.96	
B01-SS-04	Nickel	0.82	
B01-SS-03	Tin	6.6	
B01-SS-02	Tin	1.9	
B01-SS-02	Vanadium	6.5	
B01-SS-03	Vanadium	4.4	
B01-SS-01	Vanadium	2	
B01-SS-04	Vanadium	1.9	
B01-SS-03	Zinc	489	
B01-SS-02	Zinc	301	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
B01-SS-03	1,2-dichlorobenzene	0.77	J
B01-SS-03	1,3-dichlorobenzene	0.46	J
B01-SS-03	1,4-dichlorobenzene	0.48	J
B01-SS-02	Benzo(k)fluoranthene	506	
B01-SS-03	Bis(2-ethylhexyl)phthalate	1,040	
B01-SS-02	Bis(2-ethylhexyl)phthalate	430	
B01-SS-01	Bis(2-ethylhexyl)phthalate	109	
B01-SS-04	Bis(2-ethylhexyl)phthalate	91.2	
B01-SS-02	Butyl benzyl phthalate	431	
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
B01-SS-03	2-butanone	737	J
B01-SS-03	2-hexanone	19.2	

TABLE 3-2

CHEMICALS DETECTED IN PARCEL B SUBZONE 1 SURFACE SOIL
NAS KEY WEST
PAGE 2 OF 2

Location	Parameter	Result	Qual(*)
B01-SS-01	Acetone	528	
B01-SS-03	Acetone	127	
B01-SS-04	Acetone	56.1	
B01-SS-03	Chlorobenzene	0.37	J
B01-SS-03	Chloromethane	10.8	
B01-SS-03	Ethylbenzene	0.19	J
B01-SS-02	Toluene	0.32	J
B01-SS-03	Xylenes, total	0.39	J

* Qualifier (Qual.) Codes:
J The associated value is an estimated quantity.

TABLE 3-3

CHEMICALS DETECTED IN PARCEL B SUBZONE 3 GROUNDWATER
NAS KEY WEST

Location	Parameter	Result	Qual(*)
INORGANICS (µg/L)			
B03-MW-02	Iron	887	
B03-MW-02	Lead	4.8	
B03-MW-02	Zinc	56.3	

* Qualifier (Qual.) Codes:
J The associated value is an estimated quantity.

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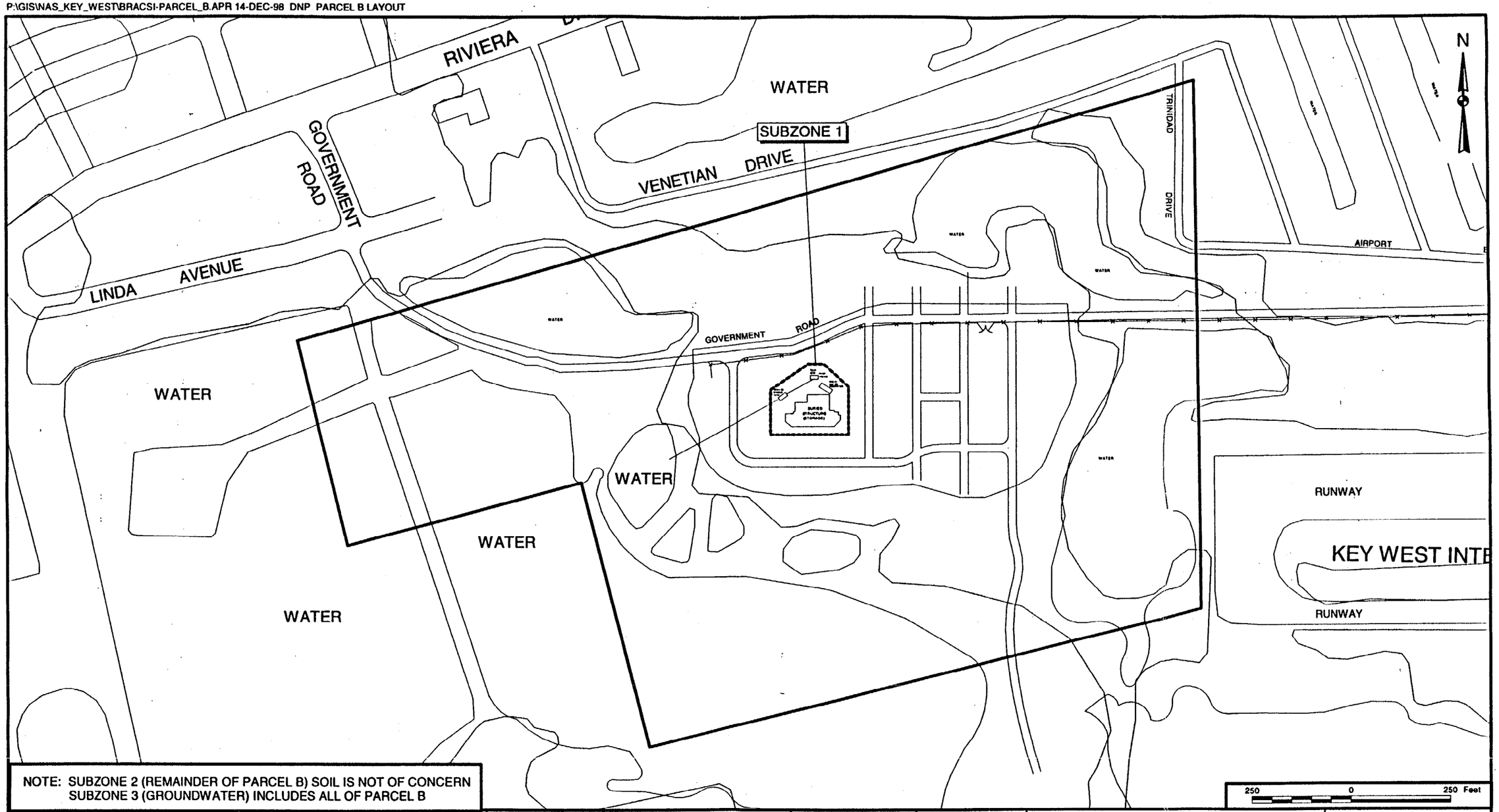

NOTE: SUBZONE 2 (REMAINDER OF PARCEL B) SOIL IS NOT OF CONCERN
SUBZONE 3 (GROUNDWATER) INCLUDES ALL OF PARCEL B

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY TMH — DATE 15-OCT-98
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SCALE APPROXIMATE SCALE AS NOTED

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 3-1. SUBZONE AND PARCEL BOUNDARIES
EAST MARTELLO BATTERY – BRAC PARCEL B
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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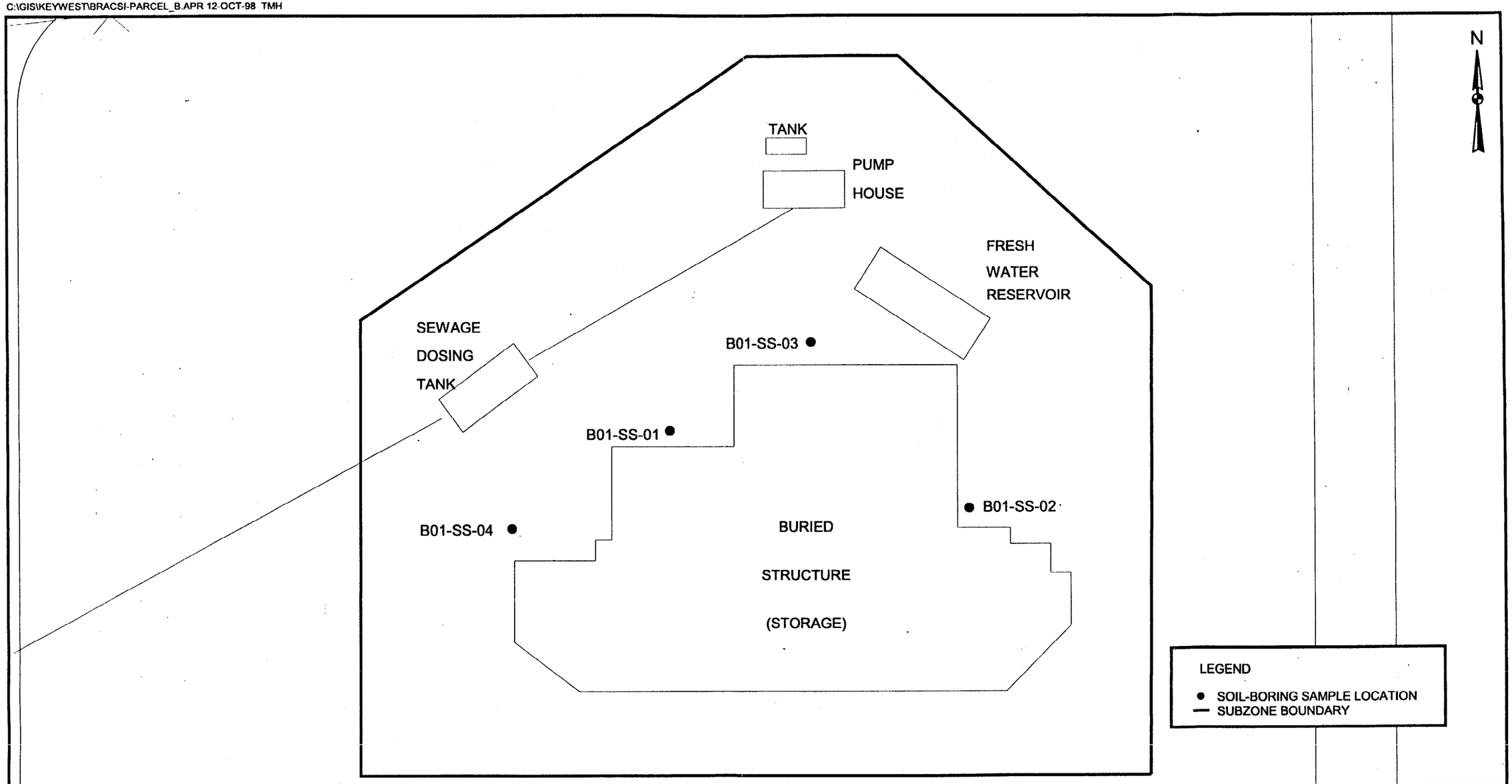

NOTE: There were no chemical exceedances detected in surface soil at subzone 1.

0 10 20 30 40 50 Feet

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DRAWN BY TMH DATE 12-OCT-98
CHECKED BY ____ DATE ____
COST/SCHED-AREA
SCALE APPROXIMATE SCALE AS NOTED

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 3-2. SUBZONE 1 SURFACE SOIL SAMPLE LOCATIONS
EAST MARTELLO BATTERY – BRAC PARCEL B
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

CONTRACT NO. 7593
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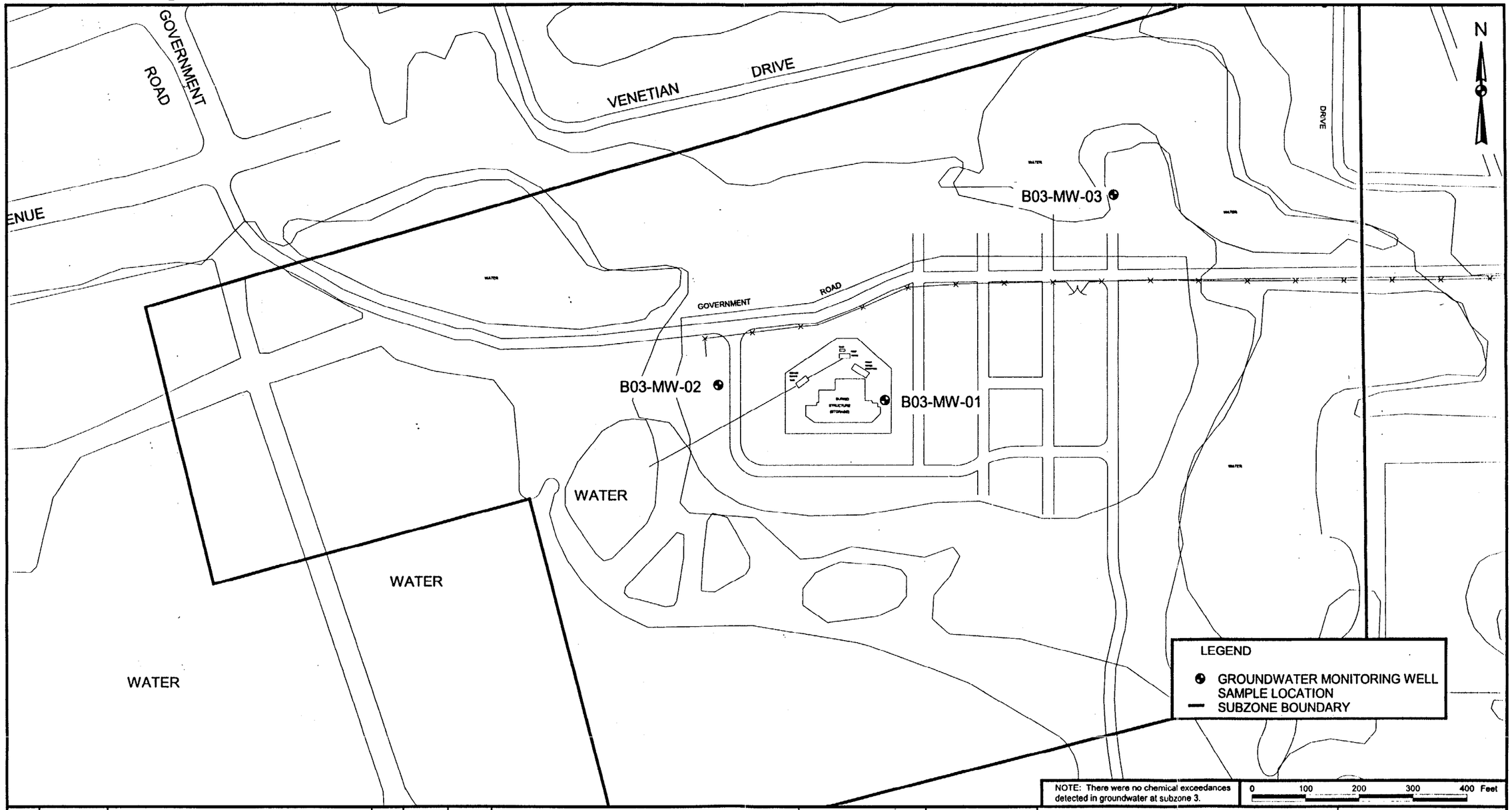

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SCALE APPROXIMATE SCALE AS NOTED	

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 3-3. GROUNDWATER MONITORING WELL SAMPLE LOCATIONS
EAST MARTELLO BATTERY – BRAC PARCEL B
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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4.0 TRUMAN ANNEX DRMO WASTE STORAGE AREA (PARCEL C)

4.1 PARCEL DESCRIPTION

The DRMO Waste Storage Area includes Buildings 795, 284, and 261 and two large fenced storage areas (Figure 4-1). The DRMO receives excess government materials. In the recent past, Building 261 stored hazardous materials and Building 795 stored inert materials. A cleared area in front of Building 795, known as IR 2, has been investigated for PCB contamination under the Navy's Installation Restoration (IR) Program. The PCBs were the result of PCB-contaminated oil used for dust suppression in the area. The investigation recommended no further action for the site based on sampling and risk assessment results. The two large storage areas primarily stored metal debris. In addition, motors, vehicles, boats, refugee debris, and fuel trucks have been stored in those areas. Currently, metal debris including some machinery with motors is present in one of the storage areas (B&R Environmental, 1997b). A review of maps from the 1940s and 1950s also indicated the presence of oil racks within the other storage area.

4.2 INVESTIGATION HISTORY

This section describes previous and current investigations for the Truman Annex DRMO Waste Storage Area.

4.2.1 Previous Investigations

Existing documents include the USN-NPWC Lead and Asbestos Survey of Truman Pier (USN-NPWC, 1996) and USN-NFEC NAS Key West Predraft EBS Truman Annex; Excess Property (USN-NFEC, 1996a). No previous soil or groundwater analytical data exist.

4.2.2 Current Investigation

The DQO Process evaluated five subzones of the DRMO Waste Storage Area Parcel. Subzones 2 and 5 were eliminated from further consideration. Three subzones within Parcel C required sampling and analysis under the BRAC SI. The environmental medium of each subzone and the parameter groups selected for analysis in each subzone are presented in Table 4-1. Subzone 1 (Building 261 Hazardous Material Storage [Former DRMO]), subzone 3 (Former Oil Container [Pre-1942] and Scrap Metal and Refugee Item Storage Areas), and subzone 4 (Former Scrap Metal Storage Area [Former DRMO]) were identified as soil subzones, and the four sample locations in each subzone are shown on Figures 4-2

through 4-4. Analytical results for samples collected at Parcel C were compared to a residential set of action levels (see Section 1.8.2.1).

Although the BRAC SI Workplan (B&R Environmental, 1998a) describes five groundwater subzones at Truman Annex, one at each Parcel (i.e., C, D, E, F, and K), the DQO Process considered the groundwater at Truman Annex as a single unit in the decision-making process. Discussion of sampling and analytical results for groundwater at Truman Annex (including Parcels C, D, E, F, and K) are included in Section 4.6. The locations of four permanent monitoring wells and a single previously existing monitoring well at Truman Annex are shown in Figure 4-5.

4.3 SUBZONE 1 (BUILDING 261 HAZARDOUS MATERIAL STORAGE)

The subsections below describe subzone 1, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 1 surface soil.

4.3.1 Subzone Description

Solvents, fuels, and pesticides were considered potential soil contaminants in subzone 1 from past waste storage activities at Building 261. Four surface soil samples were collected around Building 261. All of the analytical results can be found in Appendix D.

4.3.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in subzone 1 for VOCs, SVOCs, pesticides, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.2 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 4-2. Figure 4-2 shows the location of analytes that exceeded action levels and indicate possible surface soil contamination.

Two inorganics, lead and thallium, were detected in excess of their screening criteria. Lead was detected in excess of its 500 mg/kg action level at a single soil sample location (SS-01; 978 mg/kg). Thallium was detected at three of the four soil samples at Building 261, but was an exceedance only at SS-02 (5.5 mg/kg). Other inorganics detected, but not in excess of their action levels included aluminum, barium, cadmium, chromium, copper, iron, manganese, mercury, nickel, selenium, vanadium, and zinc.

Aroclor-1260, a PCB, was detected in a single soil sample (SS-04, 2,700 µg/kg) and was in excess of its 900 µg/kg residential soil action level. One SVOC, benzo(a)pyrene, was detected in excess of its 100 µg/kg screening value at two of the four soil sample locations (SS-01, 478 µg/kg; SS-03, 189 µg/kg). Other SVOCs detected below their screening criteria included benzo(a)anthracene, benzo(b)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. No pesticides were detected in excess of their screening values. Pesticides detected in soil at Building 261 included 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, and alpha-BHC.

4.3.3 Conclusions and Recommendations

Petroleum, solvents, fuels, and lead from past hazardous material storage were considered to be potential surface soil contaminants in subzone 1. Chemicals that were detected in excess of their action levels were analyzed further in the estimated risk process as described in Section 1.8.2.2. Calculations and estimates for subzone 1 can be found in Appendix C, Table C-3. Lead and thallium were considered as exceedances. The maximum lead detection is indicative of possible human health risks. SI thallium results are suspect and will not be used to drive further action. Therefore, although thallium does not pose a significant human health risk in subzone 1 soil, but lead may. The benzo(a)pyrene concentration was not indicative of significant carcinogenic human health risk. Aroclor-1260 concentration was indicative of possible carcinogenic human health risks. Therefore, due to the contamination at subzone 1, further action is recommended.

4.4 SUBZONE 3 [FORMER OIL CONTAINER (PRE-1942) AND SCRAP METAL AND REFUGEE ITEM STORAGE AREAS]

The subsections below describe subzone 3, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 3 surface soil.

4.4.1 Subzone Description

Fuels, oil, and metal were considered potential soil contaminants at subzone 3 from past oil and metal storage activities in the former oil container and scrap metal and refugee item storage areas. During the DQO Process, four sample locations were chosen in subzone 3. After further consideration, the NAS Key West Partnering Team decided to add four more sample locations based on the sensitive reuses proposed for the area. Eight surface soil samples were collected during the SI field effort around the storage area. All of the analytical results can be found in Appendix D.

4.4.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in subzone 3 for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 4-3. Figure 4-3 shows the location of analytes that exceeded action levels and indicate possible surface soil contamination.

A single SVOC, benzo(a)pyrene, was detected in excess of its 100 µg/kg action level in a single sample (SS-01; 180 µg/kg). This detection was near the center of the subzone and at the southeastern corner of the parking lot. Benzo(a)pyrene was detected at four out of the seven other sample locations. Antimony, lead, and thallium were the only inorganics detected in excess of their action levels. Antimony was detected in excess of its action level at one sample location (SS-06, 41.1 mg/kg) and below its action level at two sample locations. Lead was detected at all eight sample locations but was in excess of its action level only at SS-06 (2,110 mg/kg) and SS-08 (1,840 mg/kg). Thallium was detected at all eight soil samples and was considered as an exceedance at three of these locations. Thallium concentrations ranged from 4 mg/kg to 6.05 mg/kg. No VOCs were detected in excess of their screening values. A number of chemicals were detected at levels below their action levels. VOCs detected, but not in excess of their action levels, included acetone, toluene, and xylenes. 1,2,4-trichlorobenzene, acenaphthylene, anthracene, benzo(b)fluoranthene, benzo(g,h,i) perylene, benzo(k)fluoranthene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene were the SVOCs detected below their screening values in surface soil at subzone 3. Inorganics detected at concentrations less than their action levels included aluminum, arsenic, barium, cadmium, chromium, cobalt, copper, iron, manganese, nickel, silver, vanadium, and zinc.

4.4.3 Conclusions and Recommendations

Fuels, oil, and metal from past uses as oil container and scrap metal and refugee item storage areas were considered to be potential surface soil contaminants at subzone 3. Estimated risks were calculated for chemicals detected in excess of their action levels as described in Section 1.8.2.1. Calculations and estimates can be found in Appendix C, Table C-1. Lead, thallium, and antimony detections in surface soil exceeded action levels. As a result, a permanent monitoring well was installed in this subzone during the SI field effort. Noncarcinogenic risks may be posed by antimony detected in soil at subzone 3. The maximum lead concentration was indicative of potential human health risks. The maximum detection of thallium also was indicative of potential noncarcinogenic human health risks but will not drive further action, as discussed in Section 1.8.2.1. Benzo(a)pyrene was detected in excess of its action level and

may be indicative of potential carcinogenic human health risks. Therefore, due to the nature of contamination at subzone 3, further action is recommended.

4.5 SUBZONE 4 [FORMER SCRAP METAL STORAGE AREA (FORMER DRMO)]

The subsections below describe subzone 4, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 4 surface soil.

4.5.1 Subzone Description

Subzone 4 was considered to contain potential metal contaminants from its past metal storage activities. During the DQO Process, four soil samples were sited in subzone 4. However, due to the sensitive nature of reuses proposed for this area, the NAS Key West Partnering Team requested that four additional samples be located in subzone 4. Eight surface soil samples were collected from in and around the miscellaneous scrap metal pile and storage area. All of the analytical results can be found in Appendix D.

4.5.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in this subzone for VOCs, SVOCs, and inorganics. (Sample SS-03 was inadvertently not tested for VOCs.) The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 4-4. Figure 4-4 shows the location of analytes that exceeded action levels and indicate possible surface soil contamination.

A single SVOC, benzo(a)pyrene, was detected in excess of its 100 µg/kg action level in two samples. One of these detections was at the fence on the north side of the subzone (SS-02, 394 µg/kg). The second was at the eastern fence boundary of the subzone (SS-07, 532.5 µg/kg). Benzo(a)pyrene was not detected at any of the other six samples. Antimony (93.5 mg/kg) and lead (7,690 mg/kg) were detected in excess of their screening criteria, 26 mg/kg and 500 mg/kg, respectively, at SS-06. This was the only detection of antimony in subzone 4; however, lead was detected in all eight samples. Thallium was detected in all eight soil samples, but was an exceedance at only one location (SS-01, 10 mg/kg). No VOCs were detected in excess of their action levels; however acetone, ethylbenzene, methylene chloride, and toluene were detected in subzone 4 soil samples. A number of SVOCs were detected below their action levels including benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene,

benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. Inorganics detected at concentrations less than their screening criteria included aluminum, barium, cadmium, chromium, copper, iron, manganese, mercury, nickel, selenium, tin, vanadium, and zinc.

4.5.3 Conclusions and Recommendations

Metal from past uses was considered a potential source for surface soil contamination in the former scrap metal storage area. Estimated risks were calculated for chemicals detected in excess of their action levels as described in Section 1.8.2.2. Calculations and estimates can be found in Appendix C, Table C-1. Lead was detected in surface soil in excess of its action level. A new permanent monitoring well was installed at SS-02. The estimated noncarcinogenic risks for antimony were indicative of possible human health risks. The maximum lead concentration also was indicative of possible human health risks. The maximum thallium detection was indicative of potential noncarcinogenic human health risks, but thallium results are suspect and will not be used to drive further action. Benzo(a)pyrene was detected in excess of its action level and had an estimated carcinogenic risk indicative of potential human health risks. Therefore, due to the nature of contamination at subzone 4, further action is recommended.

4.6 TRUMAN ANNEX GROUNDWATER

The subsections below describe groundwater at Truman Annex, present the contaminants detected, compare the detected concentrations with selected screening values, and provide conclusions on the SI findings for groundwater at Truman Annex.

4.6.1 Subzone Description

Fuels, oils, metals, and solvents were considered potential groundwater contaminants at Truman Annex. Nine groundwater screening samples were collected in Parcels C, E, F, and K. Four groundwater screening samples were collected in Parcel D. These groundwater screening samples were used in determining the location of permanent wells installed during the SI field effort. These groundwater samples were analyzed for VOCs, SVOCs, and inorganics. All of the results can be found in Appendix D. Two permanent monitoring wells were installed near the scrap metal pile area and the water tower at Parcel C during the SI field effort. A permanent monitoring well was installed at both Parcels K and F. Samples were taken from these wells during the SI. An existing monitoring well also was sampled in Parcel E. All of the analytical results can be found in Appendix D.

4.6.2 Site Investigation Findings

Contamination was investigated by analyzing groundwater in five monitoring wells at Truman Annex during the field effort for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the groundwater samples are listed in Table 4-5. Figure 4-5 shows the location of analytes that exceeded action levels and indicate possible groundwater contamination.

A single SVOC, phenanthrene, and a single VOC, benzene, were detected in excess of their screening criteria. Both were detected at a single sample location, K05-MW-01. Other SVOCs detected but not in excess of their action levels included 2,4-dimethylphenol, 3,4-methylphenol, 2-methylnaphthalene, acenaphthene, anthracene, dibenzofuran, fluoranthene, fluorene, naphthalene, and pyrene. Other VOCs detected at levels below their screening criteria included 2-butanone, 2-hexanone, ethylbenzene, toluene, and xylene. Iron, lead, manganese, and zinc were detected at concentrations lower than their screening values in groundwater at Truman Annex.

4.6.3 Conclusions and Recommendations

Fuels, oils, metals, and solvents were considered to be potential sources of contamination in the groundwater at Truman Annex. One SVOC and one VOC were considered as exceedances. Groundwater-to-surface water migration of groundwater contaminants is possible at NAS Key West, because the groundwater on the station is shallow. However, ecological receptors are not directly exposed to groundwater, and no groundwater thresholds have been developed based on ecological concerns. Therefore, groundwater concentrations of analytes that exceeded action levels or had no action levels were compared to surface-water screening values (where applicable) as a conservative scenario (e.g., no attenuation or dilution) in accordance with EPA Region 4 (EPA, 1995a) and FDEP (FDEP, 1996a) requirements. 2-methylnaphthalene was detected in K05-MW-01 at 262 µg/L. There are no EPA Region 4 or FDEP ecological screening levels for this contaminant, but the EPA Region 3 BTAG screening level (EPA, 1995b) is 300 µg/L in marine surface water. Thus, ecological risks from 2-methylnaphthalene in groundwater are insignificant. Benzene was detected above its action level in Truman Annex groundwater (K05-MW-01). However, the benzene concentration is well below ecological screening values from both FDEP and EPA. There is no evidence of ecological risks from benzene in groundwater. The detection of phenanthrene at K05-MW-01 (187 µg/L) is substantially higher than the 8.3 µg/L screening level in marine surface water (EPA, 1996b). However, phenanthrene was only detected in one well and was not detected in any screening samples taken between K05-MW-01 and nearby surface water bodies. Based on the lack of detection, phenanthrene does not seem to be

migrating to surface water. Therefore, because of phenanthrene was only detected in one well and is not migrating to surface water, the potential for risks to ecological receptors appears to be negligible. Ecological risks for phenanthrene and benzene in Truman Annex groundwater are estimated in Appendix C. No further action is recommended for Truman Annex groundwater except at Parcel E in the vicinity of Buildings 102, 103, and 104 (Parcel E, subzone 7).

4.7 PARCEL C AND TRUMAN ANNEX GROUNDWATER CONCLUSIONS AND RECOMMENDATIONS

Fuels, oils, metals, and solvents from past metal waste storage activities were considered potential sources of contamination in the DRMO Waste Storage Area during the DQO Process. Lead and thallium were considered exceedances in all three soil subzones of the Parcel. However, thallium detections will not be used to drive further action in the SI, as described in Section 1.8.2.1. Antimony also was detected in excess of its action level in soil subzones 3 and 4. The maximum detections of antimony and lead were indicative of potential human health risks in subzones 3 and 4. Subzone 1 soil exceedances of lead and subzone 3 and 4 exceedances of antimony, lead, and thallium pose potential human health risks. Benzo(a)pyrene in subzones 3 and 4 and aroclor-1260 detections in subzone 1 were at concentrations indicative of potential carcinogenic human health risks. Therefore, further action is recommended to address soil contamination at Parcel C and the potential risks posed by these contaminants. An interim remedial action at subzones 1, 3, and 4 is recommended to remove contaminated soils.

Phenanthrene and benzene were exceedances in groundwater at Truman Annex. The detection of phenanthrene was well above its EPA marine surface-water screening level and may pose a risk to environmental receptors. The detections of phenanthrene and benzene were limited to K05-MW-01. Potential ecological risks from phenanthrene and benzene are negligible; however, risks are estimated to be negligible due to the lack of chemical detections in groundwater screening samples collected in the vicinity of KO5-MW-01.

TABLE 4-1

PARAMETER GROUPS AND MEDIA OF INTEREST AT TRUMAN ANNEX DRMO WASTE STORAGE AREA (PARCEL C) NAS KEY WEST

Subzone	Building/Area	Medium	Number of Locations	Parameter Group				
				VOCs	SVOCs	Inorganics	PCBs	Pesticides
Subzone 1	Building 261 Hazardous Material Storage (Former DRMO)	SO	4[a]	X	X	X		X
Subzone 3	Former Oil Container (Pre-1942) and Scrap Metal and Refugee Item Storage Areas	SO	8	X	X	X		
Subzone 4	Former Scrap Metal Storage Area (Former DRMO)	SO	8[b]	X	X	X		

Notes:

a A single sample taken at one of these locations was initially not submitted for SVOC and metals analysis. The location was resampled and a sample was resubmitted for these fractions during the February 1998 field effort.

b A sample taken at one of these locations was inadvertantly not tested for VOCs.

SO = Surface soil.

Subzones 2 and 5 were eliminated from sampling during the DQO Process.

TABLE 4-2

CHEMICALS DETECTED IN PARCEL C SUBZONE 1 SURFACE SOIL
NAS KEY WEST

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
C01-SS-01	Aluminum	3,130	
C01-SS-03	Aluminum	560	
C01-SS-02	Aluminum	494	
C01-SS-04	Aluminum	436	
C01-SS-01	Barium	63.2	
C01-SS-03	Barium	42.3	
C01-SS-02	Barium	16.9	
C01-SS-04	Barium	23.6	
C01-SS-04	Cadmium	2.8	
C01-SS-01	Chromium	6.4	
C01-SS-02	Chromium	6.20	
C01-SS-04	Chromium	9.3	
C01-SS-03	Copper	27.9	
C01-SS-02	Copper	19.6	
C01-SS-01	Copper	19	
C01-SS-04	Copper	28.8	
C01-SS-01	Iron	3,120	
C01-SS-03	Iron	916	
C01-SS-02	Iron	682	
C01-SS-04	Iron	1,960	
C01-SS-01	Lead	978	
C01-SS-03	Lead	111	
C01-SS-02	Lead	53.9	
C01-SS-04	Lead	443	
C01-SS-01	Manganese	203	
C01-SS-03	Manganese	29	
C01-SS-02	Manganese	9.7	
C01-SS-04	Manganese	21.7	
C01-SS-02	Mercury	0.44	
C01-SS-01	Mercury	0.23	
C01-SS-03	Mercury	0.16	
C01-SS-04	Nickel	10.2	
C01-SS-01	Selenium	2.2	
C01-SS-02	Thallium	5.5	
C01-SS-03	Thallium	5.4	
C01-SS-01	Thallium	4.4	
C01-SS-02	Vanadium	7.3	
C01-SS-01	Vanadium	7	
C01-SS-03	Zinc	411	
C01-SS-01	Zinc	284	
C01-SS-02	Zinc	143	
C01-SS-04	Zinc	185	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
C01-SS-01	Benzo(a)anthracene	86	J
C01-SS-01	Benzo(a)pyrene	478	
C01-SS-03	Benzo(a)pyrene	189	
C01-SS-03	Benzo(b)fluoranthene	536	
C01-SS-01	Chrysene	641	
C01-SS-03	Chrysene	159	
C01-SS-01	Fluoranthene	1,250	
C01-SS-03	Fluoranthene	199	
C01-SS-01	Indeno(1,2,3-cd)pyrene	311	
C01-SS-03	Indeno(1,2,3-cd)pyrene	183	
C01-SS-01	Phenanthrene	367	
C01-SS-01	Pyrene	1,140	
C01-SS-03	Pyrene	216	
PESTICIDE COMPOUNDS (µg/kg)			
C01-SS-03	4,4'-DDD	4.7	J
C01-SS-02	4,4'-DDE	438	
C01-SS-01	4,4'-DDE	17	
C01-SS-03	4,4'-DDE	14	
C01-SS-02	4,4'-DDT	60	J
C01-SS-03	4,4'-DDT	8	J
C01-SS-01	4,4'-DDT	7.9	J
C01-SS-01	Alpha-BHC	1.6	J
POLYCHLORINATED BIPHENYLS (µg/kg)			
C01-SS-04	Aroclor-1260	2,700	

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:

J The associated value is an estimated quantity.

TABLE 4-3

CHEMICALS DETECTED IN PARCEL C SUBZONE 3 SURFACE SOIL
NAS KEY WEST
PAGE 1 OF 3

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
C03-SS-07	Aluminum	217	
C03-SS-01	Aluminum	215	
C03-SS-04	Aluminum	161	
C03-SS-08	Aluminum	154	
C03-SS-05	Aluminum	104	
C03-SS-06	Aluminum	98.5	
C03-SS-06	Antimony	41.1	
C03-SS-04	Antimony	1.8	
C03-SS-07	Antimony	1.5	
C03-SS-06	Arsenic	1.7	
C03-SS-06	Barium	18.4	
C03-SS-02	Barium	10.15	J
C03-SS-07	Barium	9.9	
C03-SS-01	Barium	9.8	J
C03-SS-05	Barium	9.6	
C03-SS-08	Barium	8.3	
C03-SS-04	Barium	7.6	J
C03-SS-03	Barium	7.2	J
C03-SS-06	Cadmium	0.4	
C03-SS-08	Cadmium	0.28	
C03-SS-06	Chromium	6	
C03-SS-05	Chromium	5	
C03-SS-07	Chromium	3.7	
C03-SS-08	Chromium	2.8	
C03-SS-05	Cobalt	0.46	
C03-SS-08	Cobalt	0.3	
C03-SS-06	Copper	28.2	
C03-SS-08	Copper	13.2	
C03-SS-05	Copper	11.4	
C03-SS-01	Copper	10.2	

Location	Parameter	Result	Qual(*)
C03-SS-07	Copper	10.2	
C03-SS-04	Copper	7.1	
C03-SS-02	Copper	3.25	
C03-SS-03	Copper	1.1	
C03-SS-05	Iron	4,340	
C03-SS-06	Iron	2,210	
C03-SS-04	Iron	1,080	
C03-SS-07	Iron	681	
C03-SS-08	Iron	430	
C03-SS-01	Iron	314	
C03-SS-02	Iron	118	
C03-SS-03	Iron	112	
C03-SS-06	Lead	2,110	
C03-SS-08	Lead	1,840	
C03-SS-07	Lead	117	
C03-SS-04	Lead	69.5	
C03-SS-05	Lead	24.4	
C03-SS-01	Lead	14.8	
C03-SS-02	Lead	3.6	
C03-SS-03	Lead	2.6	
C03-SS-05	Manganese	25.3	
C03-SS-06	Manganese	10.8	
C03-SS-07	Manganese	7.7	
C03-SS-04	Manganese	7.6	
C03-SS-08	Manganese	6.2	
C03-SS-01	Manganese	3.9	
C03-SS-02	Manganese	3.1	
C03-SS-03	Manganese	2	
C03-SS-05	Nickel	3.5	
C03-SS-06	Nickel	2.8	
C03-SS-08	Nickel	1.4	

TABLE 4-3

CHEMICALS DETECTED IN PARCEL C SUBZONE 3 SURFACE SOIL
NAS KEY WEST
PAGE 2 OF 3

Location	Parameter	Result	Qual[(a)]
C03-SS-07	Nickel	1	
C03-SS-06	Silver	0.91	
C03-SS-08	Silver	0.78	
C03-SS-07	Silver	0.75	
C03-SS-05	Silver	0.73	
C03-SS-02	Thallium	6.05	
C03-SS-08	Thallium	5.8	
C03-SS-04	Thallium	5.5	
C03-SS-07	Thallium	4.9	
C03-SS-06	Thallium	4.8	
C03-SS-05	Thallium	4.8	
C03-SS-01	Thallium	4.7	
C03-SS-03	Thallium	4	
C03-SS-01	Vanadium	2.3	
C03-SS-07	Vanadium	2.1	
C03-SS-02	Vanadium	2.05	
C03-SS-08	Vanadium	2	
C03-SS-04	Vanadium	1.4	
C03-SS-06	Vanadium	1.3	
C03-SS-05	Vanadium	1.2	
C03-SS-03	Vanadium	0.94	
C03-SS-06	Zinc	48.7	
C03-SS-08	Zinc	43.4	
C03-SS-05	Zinc	26.6	
C03-SS-07	Zinc	26	
C03-SS-04	Zinc	20.7	
C03-SS-01	Zinc	13	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
C03-SS-08	1,2,4-trichlorobenzene	5.6	J
C03-SS-01	Acenaphthylene	32.1	J
C03-SS-08	Acenaphthylene	9.5	J

Location	Parameter	Result	Qual[(a)]
C03-SS-01	Anthracene	13	J
C03-SS-08	Anthracene	3.6	J
C03-SS-04	Anthracene	3.6	J
C03-SS-01	Benzo(a)pyrene	180	
C03-SS-02	Benzo(a)pyrene	55.2	J
C03-SS-04	Benzo(a)pyrene	53.1	
C03-SS-08	Benzo(a)pyrene	39.6	
C03-SS-05	Benzo(a)pyrene	36.4	J
C03-SS-01	Benzo(b)fluoranthene	318	
C03-SS-04	Benzo(b)fluoranthene	85.2	
C03-SS-08	Benzo(b)fluoranthene	60.4	
C03-SS-02	Benzo(b)fluoranthene	59.85	J
C03-SS-03	Benzo(b)fluoranthene	34	J
C03-SS-05	Benzo(b)fluoranthene	28.8	J
C03-SS-01	Benzo(g,h,i)perylene	173	
C03-SS-05	Benzo(g,h,i)perylene	90.3	J
C03-SS-08	Benzo(g,h,i)perylene	61.3	
C03-SS-04	Benzo(g,h,i)perylene	56	
C03-SS-02	Benzo(g,h,i)perylene	53.55	J
C03-SS-08	Benzo(k)fluoranthene	24.3	J
C03-SS-06	Fluoranthene	68.7	J
C03-SS-02	Fluoranthene	50.3	J
C03-SS-01	Fluoranthene	35.8	J
C03-SS-08	Fluoranthene	33.5	J
C03-SS-05	Fluoranthene	16	J
C03-SS-04	Fluoranthene	13.3	J
C03-SS-03	Fluoranthene	8.1	J
C03-SS-05	Indeno(1,2,3-cd)pyrene	324	
C03-SS-01	Indeno(1,2,3-cd)pyrene	286	
C03-SS-04	Indeno(1,2,3-cd)pyrene	111	
C03-SS-08	Indeno(1,2,3-cd)pyrene	101	

TABLE 4-3

CHEMICALS DETECTED IN PARCEL C SUBZONE 3 SURFACE SOIL
NAS KEY WEST
PAGE 3 OF 3

Location	Parameter	Result	Qual(*)
C03-SS-02	Indeno(1,2,3-cd)pyrene	88.2	
C03-SS-01	Pyrene	67.2	J
C03-SS-06	Pyrene	60.3	J
C03-SS-02	Pyrene	51.1	J
C03-SS-08	Pyrene	30.6	J
C03-SS-05	Pyrene	14.6	J
C03-SS-04	Pyrene	14	J
C03-SS-03	Pyrene	10.5	J
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
C03-SS-01	Acetone	15.1	J
C03-SS-07	Toluene	0.65	J
C03-SS-06	Toluene	0.35	J
C03-SS-07	Xylenes, total	0.52	J

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 4-4

CHEMICALS DETECTED IN PARCEL C SUBZONE 4 SURFACE SOIL
NAS KEY WEST
PAGE 1 OF 2

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
C04-SS-02	Aluminum	1,220	
C04-SS-06	Aluminum	395	
C04-SS-07	Aluminum	314	
C04-SS-03	Aluminum	274	
C04-SS-08	Aluminum	274	
C04-SS-05	Aluminum	246	
C04-SS-01	Aluminum	202	
C04-SS-04	Aluminum	123	
C04-SS-06	Antimony	93.5	
C04-SS-06	Barium	118	
C04-SS-02	Barium	41.5	
C04-SS-05	Barium	21.7	
C04-SS-01	Barium	14.4	
C04-SS-03	Barium	9.5	
C04-SS-04	Barium	9.05	
C04-SS-07	Barium	8.5	
C04-SS-08	Barium	7.4	
C04-SS-07	Cadmium	0.66	
C04-SS-06	Chromium	191	
C04-SS-02	Chromium	18.1	
C04-SS-05	Chromium	4.3	
C04-SS-07	Chromium	3.35	
C04-SS-08	Chromium	2.9	
C04-SS-07	Copper	74.75	
C04-SS-02	Copper	36.5	
C04-SS-02	Iron	2,640	
C04-SS-06	Iron	1,790	
C04-SS-05	Iron	1,570	
C04-SS-07	Iron	1,566	
C04-SS-08	Iron	550	
C04-SS-04	Iron	348.5	
C04-SS-01	Iron	328	
C04-SS-03	Iron	263	
C04-SS-06	Lead	7,690	
C04-SS-08	Lead	144	
C04-SS-02	Lead	135	
C04-SS-05	Lead	55.2	
C04-SS-07	Lead	43.4	
C04-SS-03	Lead	8.3	
C04-SS-04	Lead	7.1	
C04-SS-01	Lead	1.4	
C04-SS-05	Manganese	25.2	
C04-SS-02	Manganese	24	
C04-SS-06	Manganese	14.6	
C04-SS-07	Manganese	9.25	
C04-SS-08	Manganese	6.5	
C04-SS-01	Manganese	5.7	
C04-SS-04	Manganese	4.25	
C04-SS-03	Manganese	3.6	
C04-SS-02	Mercury	0.24	
C04-SS-06	Mercury	0.17	
C04-SS-05	Mercury	0.06	
C04-SS-07	Mercury	0.045	
C04-SS-08	Mercury	0.02	
C04-SS-05	Nickel	3.5	
C04-SS-06	Nickel	2.2	
C04-SS-08	Nickel	1.6	

TABLE 4-4

CHEMICALS DETECTED IN PARCEL C SUBZONE 4 SURFACE SOIL
NAS KEY WEST
PAGE 2 OF 2

Location	Parameter	Result	Qual(*)
C04-SS-07	Nickel	1.55	
C04-SS-06	Selenium	2.7	
C04-SS-01	Thallium	10	
C04-SS-05	Thallium	4.7	
C04-SS-03	Thallium	4.3	
C04-SS-06	Thallium	4.2	
C04-SS-04	Thallium	4.15	
C04-SS-02	Thallium	3.9	
C04-SS-08	Thallium	3.6	
C04-SS-07	Thallium	3.4	
C04-SS-06	Tin	2.2	
C04-SS-07	Tin	1.4	
C04-SS-08	Tin	1.2	
C04-SS-02	Vanadium	4.8	
C04-SS-07	Vanadium	2.8	
C04-SS-06	Vanadium	2.7	
C04-SS-05	Vanadium	2.5	
C04-SS-08	Vanadium	2.5	
C04-SS-02	Zinc	145	
C04-SS-07	Zinc	70.6	
C04-SS-05	Zinc	66.7	
C04-SS-06	Zinc	38.3	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
C04-SS-02	Benzo(a)anthracene	135	J
C04-SS-07	Benzo(a)pyrene	532.5	J
C04-SS-02	Benzo(a)pyrene	394	
C04-SS-02	Benzo(b)fluoranthene	904	
C04-SS-07	Benzo(b)fluoranthene	595.5	J
C04-SS-02	Benzo(g,h,i)perylene	226	
C04-SS-07	Benzo(k)fluoranthene	515.5	J
C04-SS-02	Chrysene	389	
C04-SS-04	Chrysene	30	J
C04-SS-07	Fluoranthene	568.5	J
C04-SS-02	Fluoranthene	470	
C04-SS-04	Fluoranthene	52.4	J
C04-SS-06	Fluoranthene	39	J
C04-SS-02	Indeno(1,2,3-cd)pyrene	255	
C04-SS-02	Phenanthrene	186	
C04-SS-02	Pyrene	695	
C04-SS-07	Pyrene	660.5	J
C04-SS-04	Pyrene	49.95	J
C04-SS-06	Pyrene	42	J
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
C04-SS-07	Acetone	157	J
C04-SS-02	Acetone	62.3	
C04-SS-05	Ethylbenzene	0.43	J
C04-SS-02	Methylene chloride	2.4	
C04-SS-04	Methylene chloride	0.975	
C04-SS-05	Toluene	2.4	
C04-SS-02	Toluene	0.91	J

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 4-5

CHEMICALS DETECTED IN TRUMAN ANNEX GROUNDWATER NAS KEY WEST

Location	Parameter	Result	Qual(*)
INORGANICS (µg/L)			
C06-MW-01	Iron	665	
C06-MW-02	Iron	638	
F07-MW-08	Iron	603	
F07-MW-08	Lead	5.8	
C06-MW-01	Lead	5	
C06-MW-02	Lead	4.6	
C06-MW-02	Manganese	17.4	
C06-MW-01	Zinc	51	
C06-MW-02	Zinc	48.9	
F07-MW-08	Zinc	42.7	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/L)			
K05-MW-01	2,4-dimethylphenol	31.05	J
K05-MW-01	3,4-methylphenol	10.6	J
K05-MW-01	2-methylnaphthalene	262	
K05-MW-01	Acenaphthene	219.5	
K05-MW-01	Anthracene	25.65	
K05-MW-01	Dibenzofuran	143.5	
K05-MW-01	Fluoranthene	28.2	
K05-MW-01	Fluorene	154.5	
K05-MW-01	Naphthalene	1,615	
K05-MW-01	Phenanthrene	187	
K05-MW-01	Pyrene	17.35	J
VOLATILE ORGANIC COMPOUNDS (µg/L)			
K05-MW-01	2-butanone	11.1	J
K05-MW-01	2-hexanone	11.1	J
K05-MW-01	Benzene	1.2	J
K05-MW-01	Ethylbenzene	16.5	
K05-MW-01	Toluene	14.5	
K05-MW-01	Xylenes, total	54.05	

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:

J – The associated value is an estimated quantity.

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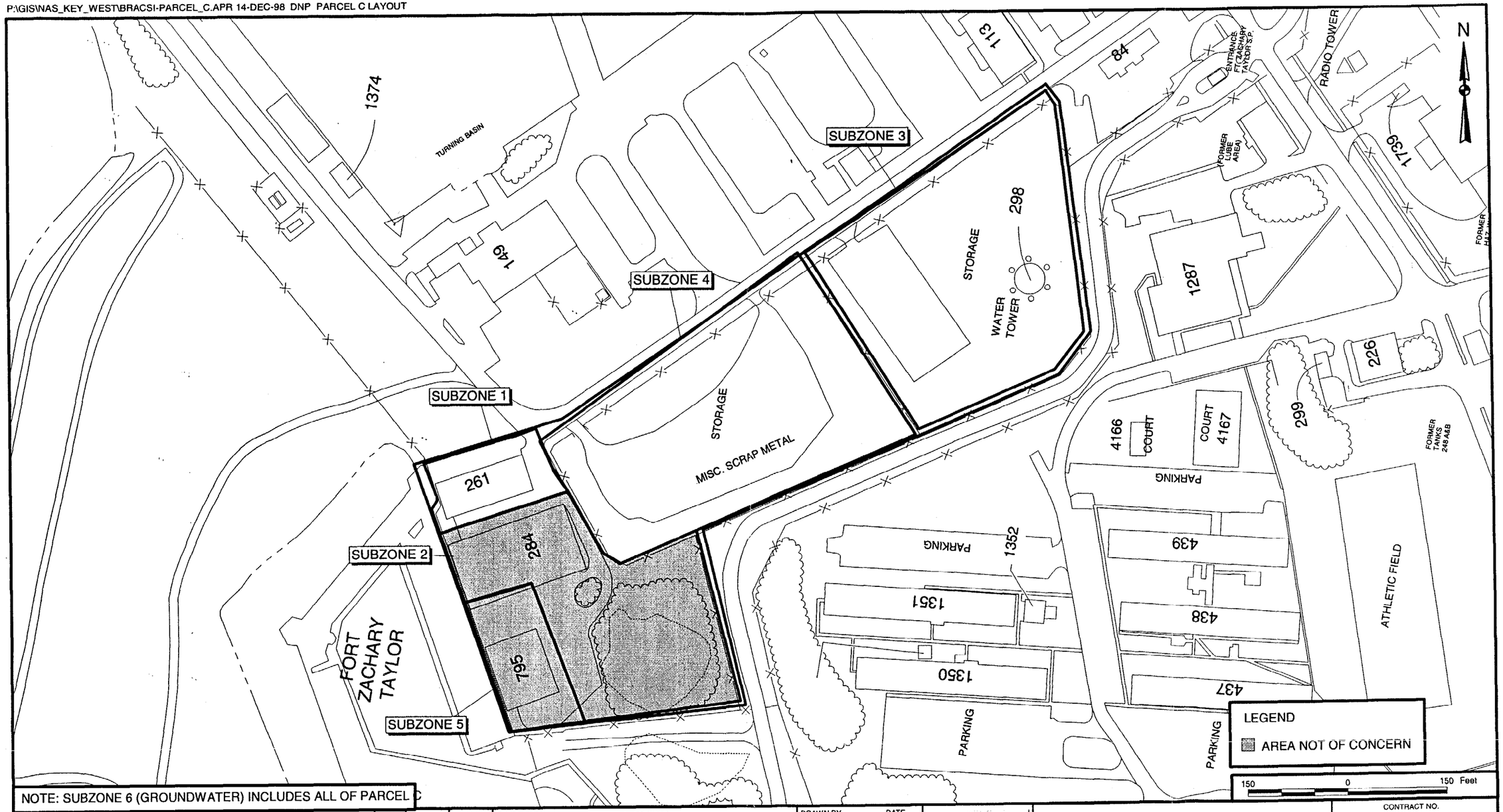

NOTE: SUBZONE 6 (GROUNDWATER) INCLUDES ALL OF PARCEL C

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 4-1. SUBZONE AND PARCEL BOUNDARIES
DRMO WASTE STORAGE AREA - BRAC PARCEL C
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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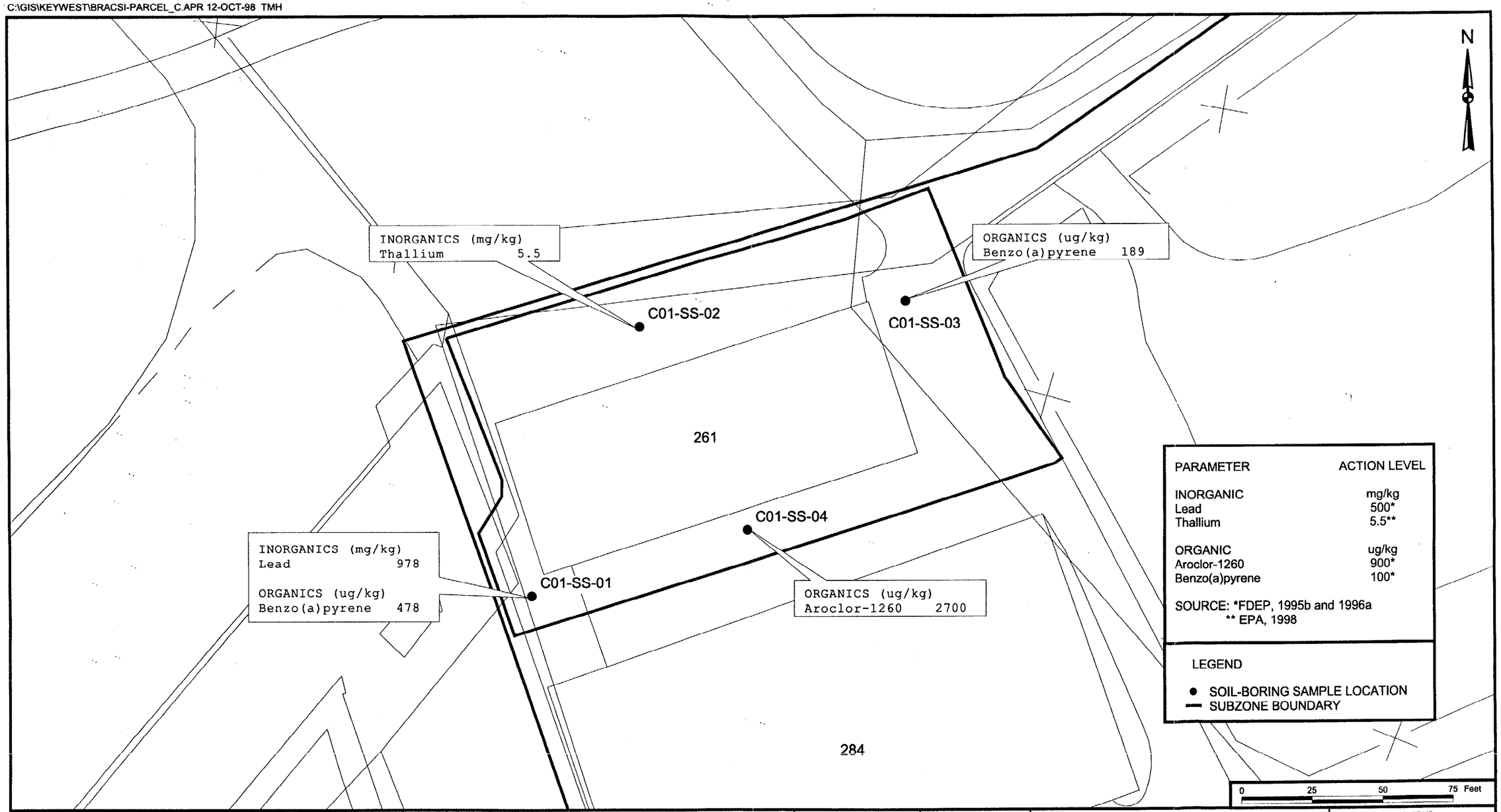

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 4-2. SUBZONE 1 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
DRMO WASTE STORAGE AREA - BRAC PARCEL C
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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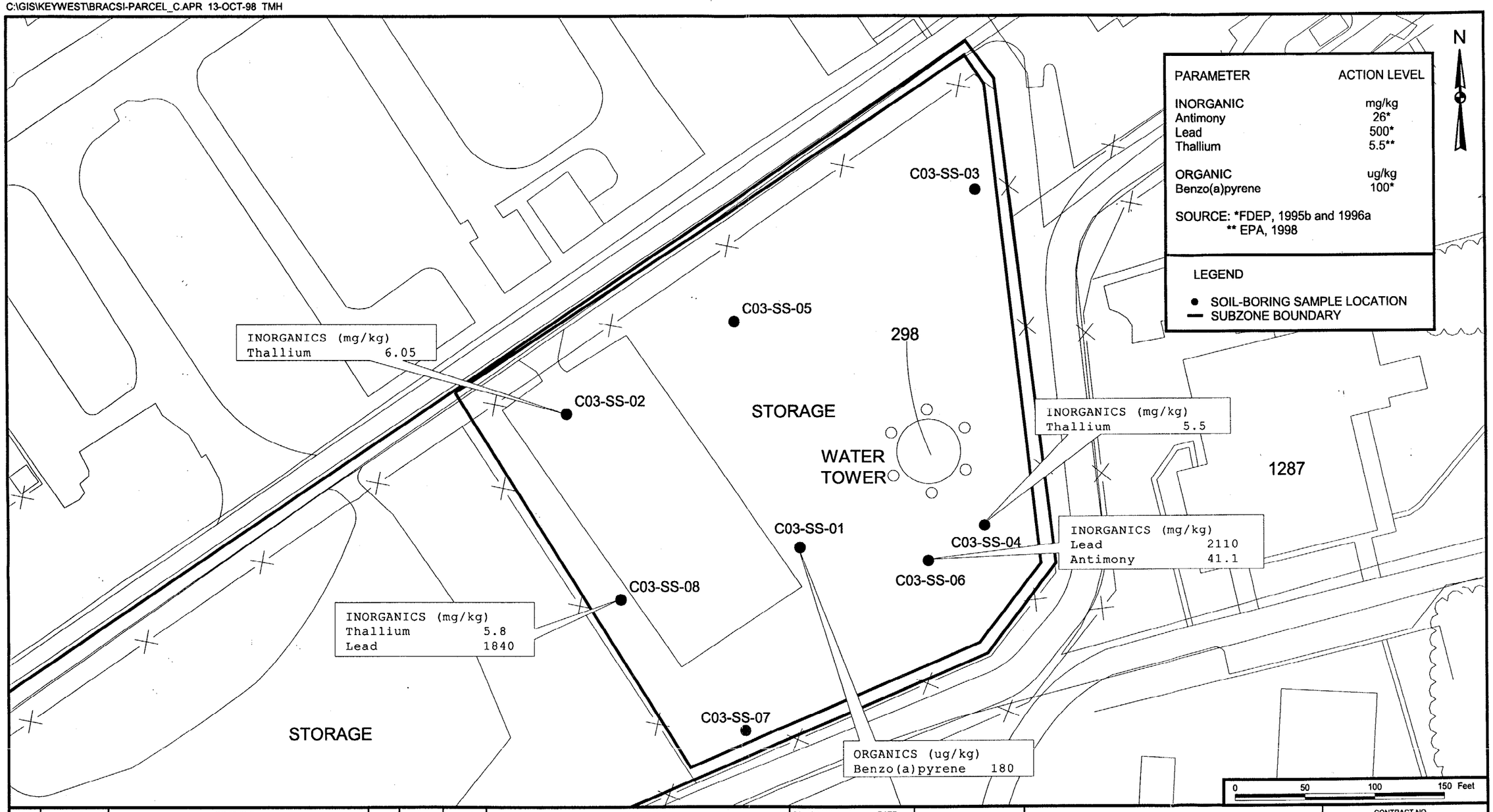

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APPROXIMATE SCALE AS NOTED	

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 4-3. SUBZONE 3 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
DRMO WASTE STORAGE AREA - BRAC PARCEL C
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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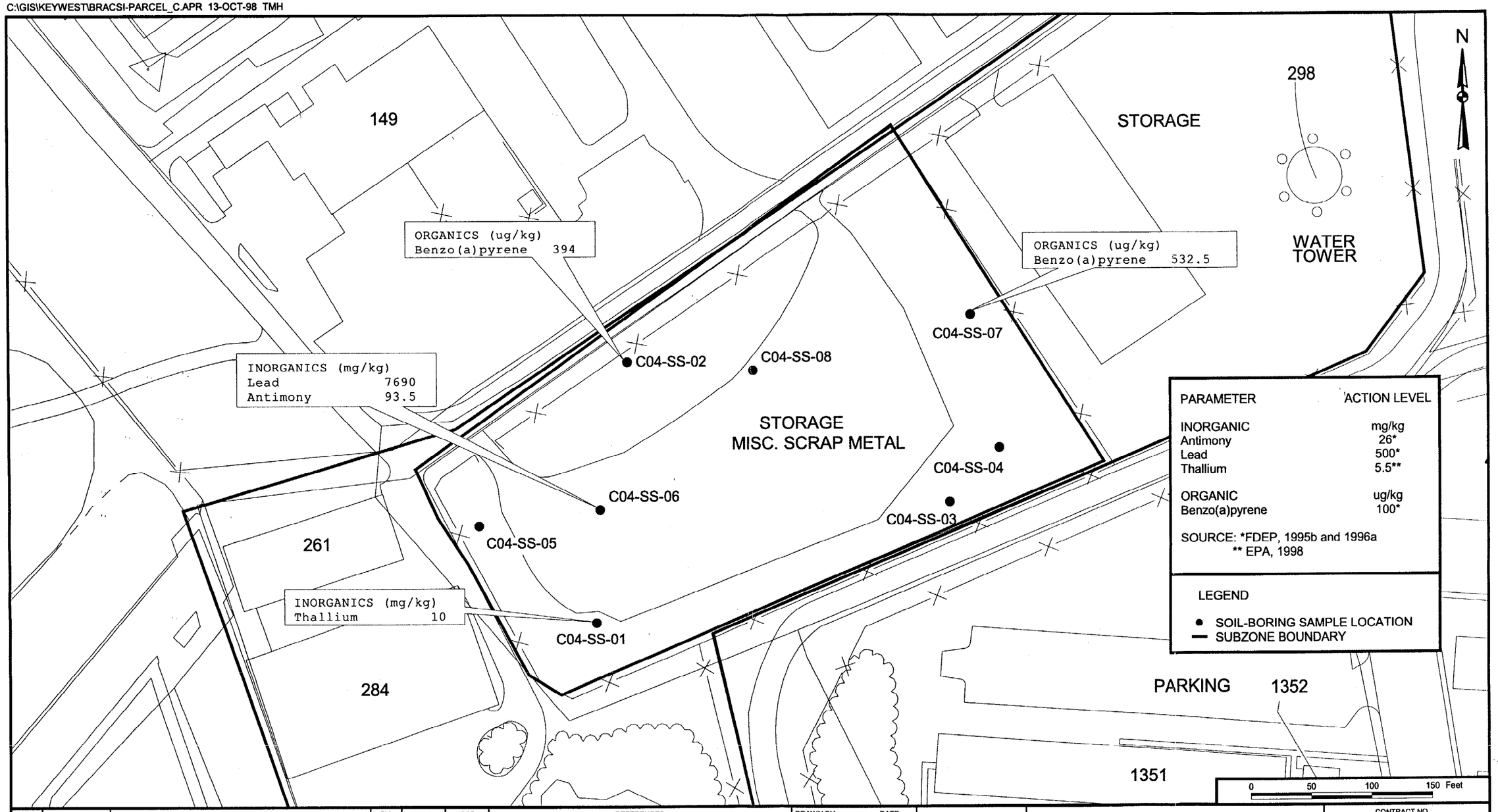

PARAMETER	ACTION LEVEL
INORGANIC	mg/kg
Antimony	26*
Lead	500*
Thallium	5.5**
ORGANIC	ug/kg
Benzo(a)pyrene	100*

SOURCE: *FDEP, 1995b and 1996a
** EPA, 1998

LEGEND

- SOIL-BORING SAMPLE LOCATION
- SUBZONE BOUNDARY

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 4-4. SUBZONE 4 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
DRMO WASTE STORAGE AREA - BRAC PARCEL C
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 4-5. TRUMAN ANNEX GROUNDWATER MONITORING WELL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
BRAC PARCELS C, D, E, F, AND K
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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5.0 TRUMAN ANNEX SEMINOLE BATTERY (PARCEL D)

5.1 PARCEL DESCRIPTION

Parcel D (Figure 5-1) includes the Seminole Battery and an adjacent area known to include a former fueling area and grease rack that operated in the 1940s and 1950s (B&R Environmental, 1996). The battery was constructed during the Civil War; a modern battery addition was added similar in construction to the East Martello Battery in the 1950s. Both structures are currently unused, and entry is restricted. The materials used while the batteries were in operation are unknown. The oldest portion of the battery has the remnants of a generator exhaust system.

The former fueling area known as 248 Tanks A&B is located west of Seminole Battery. The fueling island and the tanks were removed in August 1995. The area is now covered in asphalt. The UST Closure Report (OES, 1995) recommended a study of groundwater in the area. To the northeast of the former tank location, concrete slabs are present from former grease racks used to lubricate and service vehicles. No visible stains are present on or near the slabs (B&R Environmental, 1996).

5.2 INVESTIGATION HISTORY

This section describes previous and current investigations for the Truman Annex Seminole Battery Parcel.

5.2.1 Previous Investigations

Existing documents include the UST Closure Report (OES, 1995) that details the closure of Tanks 248A and 248B formerly located at the gas station, and the Army dispensing facility at Seminole Battery (subzone 4). Soil screening samples and groundwater samples were collected and analyzed during the closure. The closure report concluded that the tanks were closed in accordance with Florida guidelines.

5.2.2 Current Investigation

The DQO Process evaluated three subzones for the Seminole Battery Parcel. Subzone 4 was eliminated from further consideration. Two subzones within Parcel D required sampling and analysis under the BRAC SI. The environmental medium of each subzone and the parameter groups selected for analysis at each subzone, are presented in Table 5-1. The random placement of four soil sample locations in

subzone 1 (Seminole Battery) and subzone 2 (Former Grease Racks) are shown in Figures 5-2 and 5-3, respectively. Analytical results for samples collected at Parcel D were compared to a residential set of action levels (see Section 1.8.2.1).

Although the BRAC SI Workplan (B&R Environmental, 1998a) describes five groundwater subzones at Truman Annex, one at each Parcel (i.e., C, D, E, F, and K), the DQO Process considered the groundwater at Truman Annex as a single unit in the decision-making process. Discussion of sampling and analytical results for groundwater at Truman Annex (including Parcels C, D, E, F, and K) is included in Section 4.6. The locations of four permanent monitoring wells and a single previously existing monitoring well at Truman Annex are shown in Figure 4-5.

5.3 SUBZONE 1 (SEMINOLE BATTERY)

The subsections below describe subzone 1, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 1 surface soil.

5.3.1 Subzone Description

Used oils, cleaning agents, solvents, fuel, and metals were considered to be potential contaminants at Seminole Battery from past activities including storage of hazardous materials and vehicles. Four surface soil samples were collected from near the entrances to the battery. All of the analytical results can be found in Appendix D.

5.3.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in Seminole Battery for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 5-2. Figure 5-2 shows the location of analytes that exceeded action levels and indicate possible surface soil contamination.

A single inorganic, arsenic, was detected at its 2.7 mg/kg action level at a single sample, SS-03. Two SVOCs also were detected at SS-03 in excess of their screening values. Benzo(a)pyrene (505 µg/kg) and benzo(b)fluoranthene (1,900 µg/kg) were detected in excess of their 100 µg/kg and 1,400 µg/kg

action levels, respectively. Benzo(a)pyrene also was detected at SS-01 and benzo(b)fluoranthene also was detected at the three other sample locations, but not in excess of their action levels. No VOCs were detected in excess of their action levels. A single detection of methylene chloride was the only VOC detected at subzone 1. Benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were the SVOCs detected at levels below their screening criteria. Inorganics that were detected but did not exceed the action levels included aluminum, antimony, barium, chromium, copper, iron, lead, manganese, mercury, vanadium, and zinc.

5.3.3 Conclusions

Potential contaminants at subzone 1 included used oils, cleaning agents, solvents, fuel, and metals from past activities including storage of hazardous materials and vehicles. Arsenic was detected at its 2.7 mg/kg action level at a single soil sample location. Benzo(a)pyrene and benzo(b)fluoranthene were the only SVOCs detected in excess of their action levels in surface soil at subzone 1. The maximum detections of benzo(a)pyrene and benzo(b)fluoranthene were used in the estimated risk process as described in Section 1.8.2.2. Calculations and estimates can be found in Appendix C, Table C-2. Although neither benzo(a)pyrene nor benzo(b)fluoranthene pose potential carcinogenic risk to humans at the detected concentrations, further action is recommended around the sample location (DO1-SS-03) where all exceedances occurred.

5.4 SUBZONE 2 (FORMER GREASE RACKS)

The subsections below describe subzone 2, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 2 surface soil.

5.4.1 Subzone Description

Lubricants and grease were considered to be potential contaminations at the former grease racks in subzone 2. Four surface soil samples were collected, one from each side of the racks. All of the analytical results can be found in Appendix D.

5.4.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in the vicinity of the former grease racks for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources including background levels as discussed in

Section 1.8.1.2 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 5-3. Figure 5-3 shows the sample locations of all surface soil samples collected at subzone 1.

No VOCs, SVOCs, or inorganics were detected in excess of action levels in surface soil at the former grease racks area. No VOCs were detected. SVOCs were detected at levels below their screening criteria including benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene. Inorganics were detected at concentrations below their action levels including aluminum, arsenic, barium, chromium, copper, iron, lead, manganese, mercury, vanadium, and zinc.

5.4.3 Conclusions

Lubricants and grease were considered to be potential soil contaminants in the former grease racks area. However, no chemicals were detected in excess of action levels. Therefore, there does not appear to be significant contamination in the surface soil at the former grease racks and no further action is recommended.

5.5 PARCEL D CONCLUSIONS AND RECOMMENDATIONS

Lubricants, grease, oils, cleaning agents, solvents, fuel, and metals were identified as potential contaminants during the DQO Process utilized to prepare the BRAC SI Workplan. These sources of contamination were considered as potential contaminants from past activities including storage of hazardous materials and vehicles at Seminole Battery. No chemicals were detected in excess of their action levels at subzone 2, the former grease racks. However, arsenic, benzo(a)pyrene, and benzo(b)fluoranthene were detected in excess of their action levels at a single soil sample location (SS-03) in the eastern portion of subzone 1. Further action is recommended at subzone 1 around soil sampling location DOI-SS-03.

TABLE 5-1

PARAMETER GROUPS AND MEDIA OF INTEREST AT TRUMAN ANNEX SEMINOLE BATTERY (PARCEL D) NAS KEY WEST

Subzone	Building/Area	Medium	Number of Locations	Parameter Group				
				VOCs	SVOCs	Inorganics	PCBs	Pesticides
Subzone 1	Seminole Battery	SO	4	X	X	X		
Subzone 2	Former Grease Racks	SO	4	X	X	X		

SO = Surface soil.

Subzone 4 was eliminated from sampling during the DQO Process.

TABLE 5-2

CHEMICALS DETECTED IN PARCEL D SUBZONE 1 SURFACE SOIL
NAS KEY WEST

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
D01-SS-03	Aluminum	1,110	J
D01-SS-04	Aluminum	847	J
D01-SS-01	Aluminum	366	J
D01-SS-02	Aluminum	177	J
D01-SS-04	Antimony	1.3	
D01-SS-03	Arsenic	2.7	
D01-SS-01	Arsenic	1.7	
D01-SS-03	Barium	34.4	
D01-SS-04	Barium	23.9	
D01-SS-01	Barium	18.4	
D01-SS-02	Barium	6.4	
D01-SS-04	Chromium	9.7	
D01-SS-03	Chromium	4.4	
D01-SS-01	Chromium	4.1	
D01-SS-02	Chromium	2.5	
D01-SS-04	Copper	17.8	J
D01-SS-03	Copper	11.3	J
D01-SS-03	Iron	1,800	
D01-SS-04	Iron	1,020	
D01-SS-01	Iron	416	
D01-SS-02	Iron	233	
D01-SS-03	Lead	136	J
D01-SS-04	Lead	47.8	J
D01-SS-01	Lead	26	J
D01-SS-02	Lead	5.8	J
D01-SS-03	Manganese	97.7	
D01-SS-04	Manganese	17.5	
D01-SS-01	Manganese	14.2	
D01-SS-02	Manganese	5.4	
D01-SS-03	Mercury	0.2	J
D01-SS-01	Mercury	0.12	J
D01-SS-02	Mercury	0.11	J
D01-SS-04	Vanadium	5.2	
D01-SS-03	Vanadium	5	
D01-SS-01	Vanadium	1.4	
D01-SS-02	Vanadium	1.2	
D01-SS-04	Zinc	46.4	J
D01-SS-03	Zinc	35.5	J
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
D01-SS-03	Benzo(a)pyrene	505	
D01-SS-01	Benzo(a)pyrene	37.9	
D01-SS-03	Benzo(b)fluoranthene	1,900	
D01-SS-04	Benzo(b)fluoranthene	622	
D01-SS-01	Benzo(b)fluoranthene	147	
D01-SS-02	Benzo(b)fluoranthene	121	
D01-SS-03	Benzo(g,h,i)perylene	308	J
D01-SS-03	Chrysene	538	
D01-SS-01	Chrysene	29.8	J
D01-SS-03	Fluoranthene	1,180	
D01-SS-01	Fluoranthene	32.9	J
D01-SS-03	Indeno(1,2,3-cd)pyrene	567	
D01-SS-01	Indeno(1,2,3-cd)pyrene	54.4	
D01-SS-03	Phenanthrene	338	J
D01-SS-03	Pyrene	1,080	
D01-SS-01	Pyrene	34.5	J
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
D01-SS-02	Methylene chloride	2.1	

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 5-3

CHEMICALS DETECTED IN PARCEL D SUBZONE 2 SURFACE SOIL
NAS KEY WEST

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
D02-SS-03	Aluminum	755	J
D02-SS-04	Aluminum	555	J
D02-SS-02	Aluminum	500	J
D02-SS-01	Aluminum	371	J
D02-SS-02	Arsenic	1.6	
D02-SS-04	Barium	36.5	
D02-SS-03	Barium	19.85	
D02-SS-02	Barium	16.1	
D02-SS-01	Barium	8.3	
D02-SS-03	Chromium	4.2	
D02-SS-04	Chromium	3.9	
D02-SS-01	Chromium	2.9	
D02-SS-02	Chromium	2.6	
D02-SS-02	Copper	65.1	J
D02-SS-03	Copper	9.675	J
D02-SS-03	Iron	1,990	
D02-SS-04	Iron	818	
D02-SS-02	Iron	417	
D02-SS-01	Iron	359	
D02-SS-03	Lead	141.55	J
D02-SS-04	Lead	70.8	J
D02-SS-01	Lead	8.2	J
D02-SS-02	Lead	7.9	J
D02-SS-03	Manganese	21.4	
D02-SS-02	Manganese	12.9	
D02-SS-04	Manganese	11.9	
D02-SS-01	Manganese	7	
D02-SS-01	Mercury	0.16	J
D02-SS-04	Mercury	0.15	J
D02-SS-03	Mercury	0.14	J
D02-SS-03	Vanadium	2.35	
D02-SS-04	Vanadium	2.1	
D02-SS-02	Vanadium	2	
D02-SS-01	Vanadium	1.7	
D02-SS-03	Zinc	37.9	J
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
D02-SS-01	Benzo(a)pyrene	71.1	
D02-SS-03	Benzo(b)fluoranthene	832	
D02-SS-01	Benzo(b)fluoranthene	247	
D02-SS-01	Benzo(g,h,i)perylene	67.5	
D02-SS-01	Chrysene	49	
D02-SS-03	Fluoranthene	147.5	J
D02-SS-01	Fluoranthene	35	
D02-SS-01	Indeno(1,2,3-cd)pyrene	79.9	
D02-SS-03	Pyrene	150	J
D02-SS-01	Pyrene	36.2	

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

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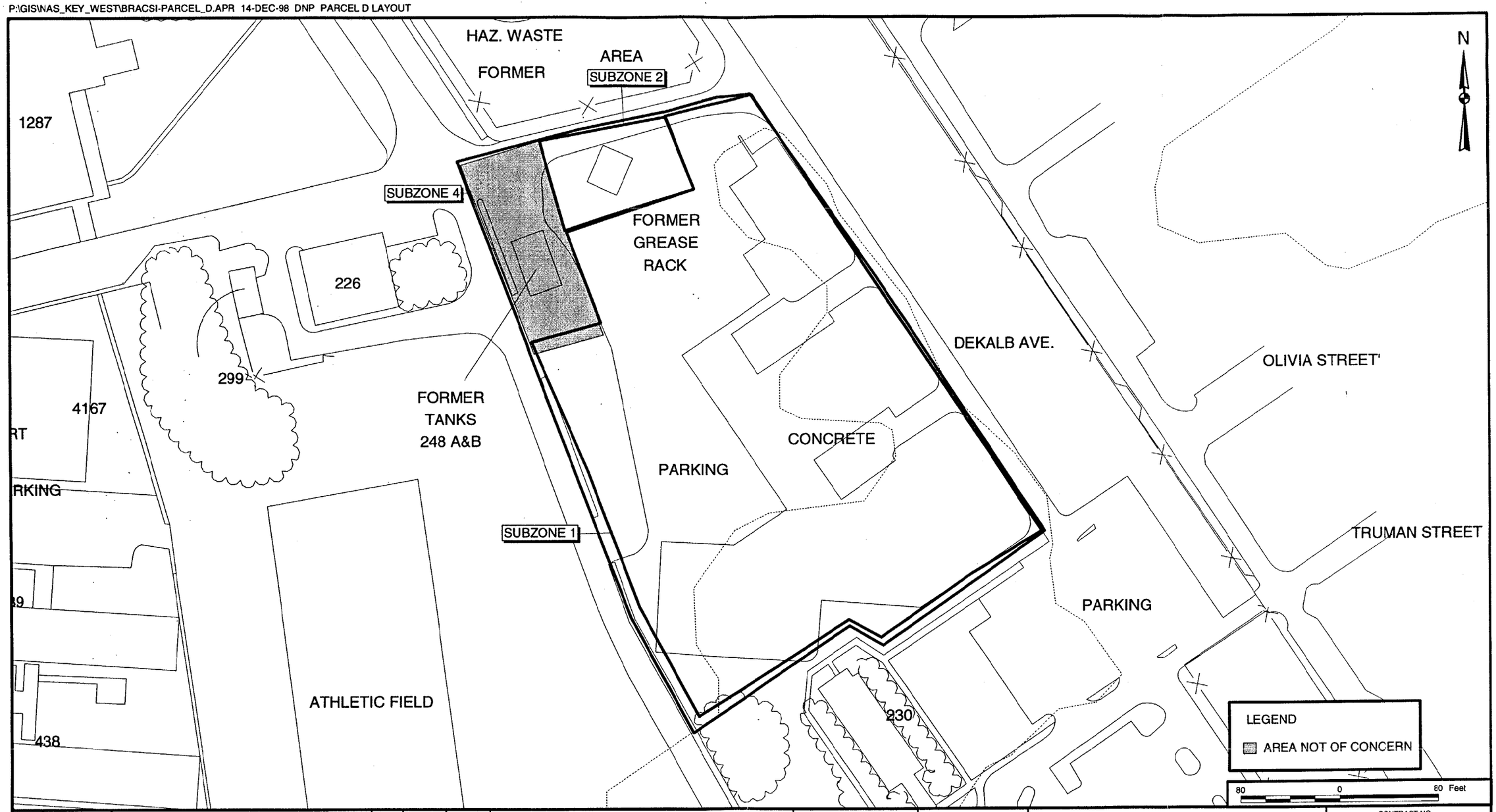

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SCALE	
APPROXIMATE SCALE AS NOTED	

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 5-1. SUBZONE AND PARCEL BOUNDARIES
SEMINOLE BATTERY - BRAC PARCEL D
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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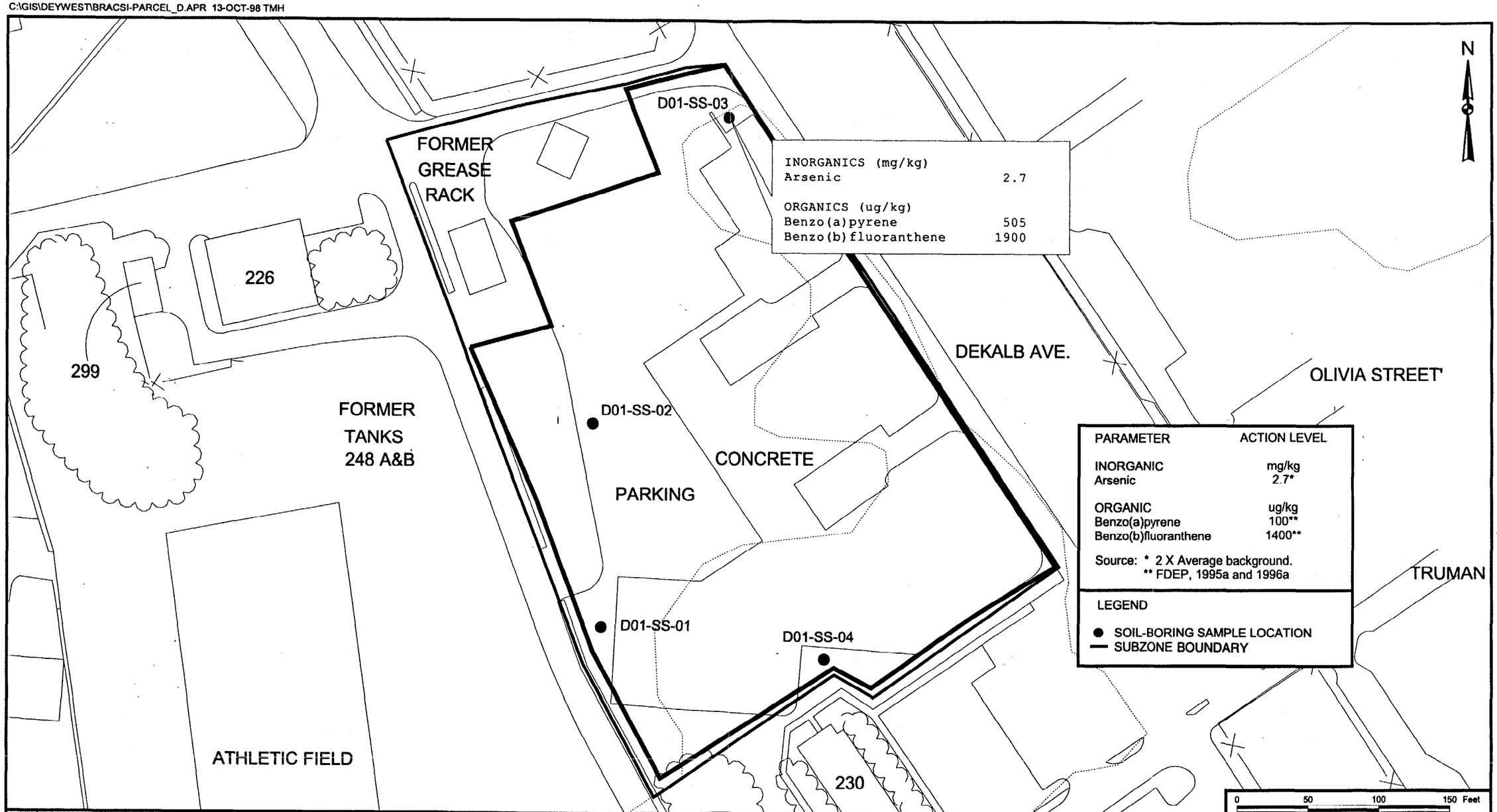

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 5-2. SUBZONE 1 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
SEMINOLE BATTERY - BRAC PARCEL D
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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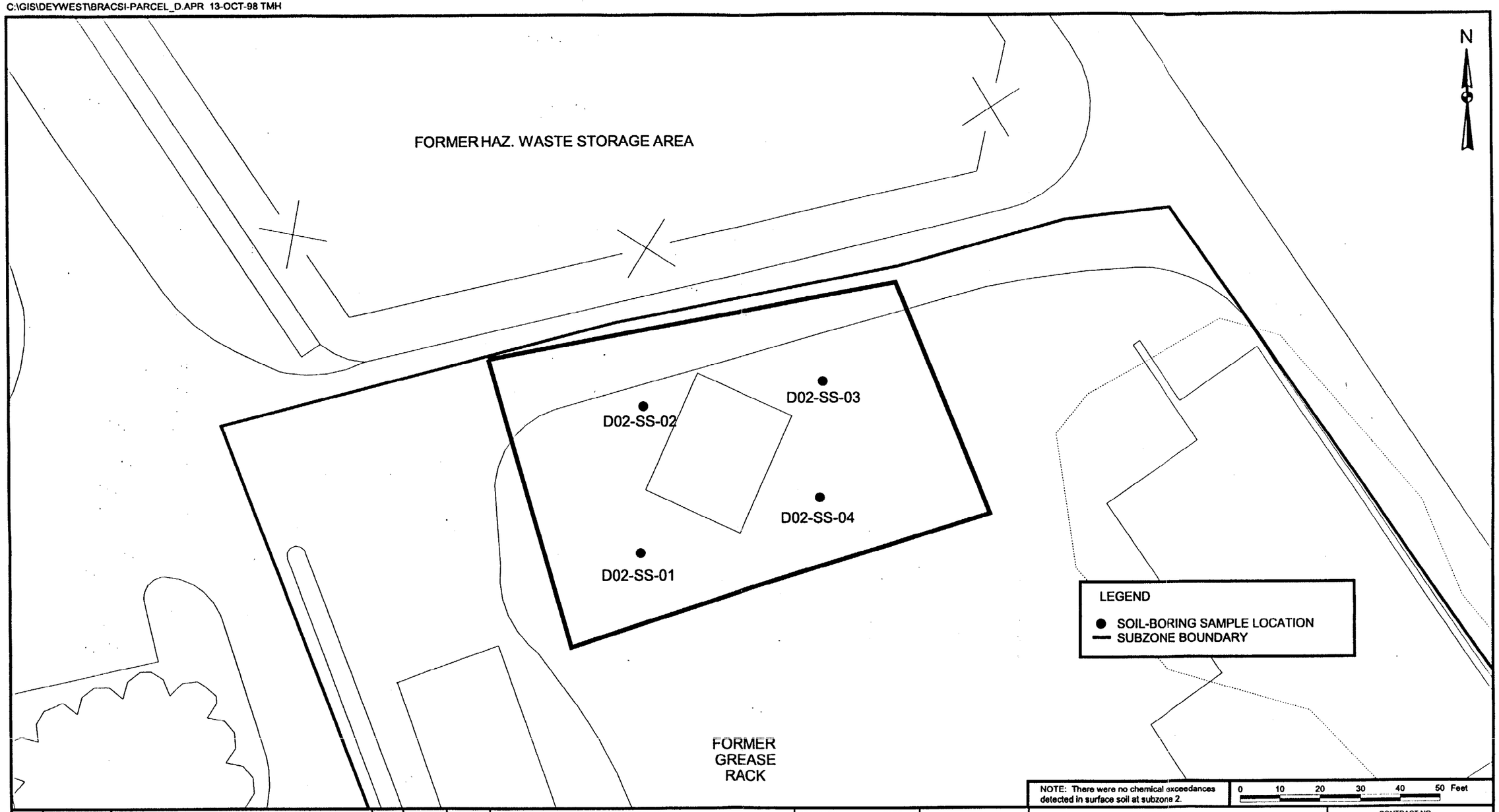

NOTE: There were no chemical exceedances detected in surface soil at subzone 2.

0 10 20 30 40 50 Feet

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SCALE	APPROXIMATE SCALE AS NOTED

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 5-3. SUBZONE 2 SURFACE SOIL SAMPLE LOCATIONS
SEMINOLE BATTERY – BRAC PARCEL D
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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6.0 TRUMAN ANNEX BUILDINGS 102, 103, AND 104 (PARCEL E)

6.1 PARCEL DESCRIPTION

Parcel E (Figure 6-1) includes the area known as the Inner Mole Pier. The area has served as a naval docking and support facility for more than a century. Most records of the area date to the period of World War II. In the late 1980s, the Inner Mole Pier waterfront was refurbished along with the Outer Mole Pier (Parcel K).

Building 102 (Former Torpedo Overhaul and Storehouse), Building 103 (Former Central Power Plant), and Building 104 (Former Battery Overhaul and Storage) are still standing but are out of service. Knowledge of the operations in these buildings is limited to naval submarine support activities. Hazardous materials, specifically VOCs, SVOCs, and inorganics, are believed to have been used in each of the buildings. PCBs are known to have been present in transformers at Building 103. In the mid 1980s, these transformers were removed from the building. A petroleum Contamination Assessment Report (CAR) was prepared for the area around the three buildings. The CAR recommended the preparation of a Remedial Action Plan (RAP) that was approved in April 1995 by FDEP (USN-NFEC, 1992a, 1993a).

Building 189 (former Liquor Store) is adjacent to an area affected by a petroleum leak from an underground pipeline that serviced the docks. The pipeline enters the Parcel from Eaton Street and runs along the waterfront across Parcel E and Parcel K ending on Outer Mole Pier. A petroleum CAR was prepared for the area north of Building 189. The CAR recommended the preparation of a RAP that was approved in November 1995 by FDEP (USN-NFEC, 1992b, 1993b).

Former Building 136 (Shipfitters and prior to 1951 the Plate and Mold Shop) was demolished and the debris was buried in and around the building's footprint. According to base personnel, the debris in the area was later removed for disposal and is known to have failed Toxicity Characteristic Leaching Procedure (TCLP) testing for lead. The area around the former Building 136 is currently level graded limestone. Buildings in the Parcel that have been razed include the following:

- 26 - Cistern (distilled water)
- 59 - Storehouse
- 60 - Boiler Shop
- 79 - Electrical Shop

- 100 - Cold Storage
- 101 - Submarine General Shops and Offices
- 115 - Diesel Oil Storage Tank
- 116 - Steam Plant
- 117 - Fuel Oil Storage
- 118 - Battery Water Storage Tank
- 122 - Fire Station
- 123 - Public Works Maintenance Office, Garage, and Shops
- 136 - Shipfitters/former Plate and Mold Shop (pre-1951)
- 147 - Sound School Shop and Laboratory
- 148 - Fresh Water Tank
- 156 - Submarine Storage Shed
- 157 - Equipment Shed
- 160 - Ordnance Warehouse/former Anti-Aircraft Trainer (pre-1951)
- 168 - Storage Building
- 169 - General Storage
- 171 - Storehouse
- 172 - Women Accepted for Volunteer Emergency Service (WAVES) Officers' Quarters
- 173 - WAVES Officers' Quarters
- 174 - Cistern

6.2 INVESTIGATION HISTORY

This section describes previous and current investigations for the Truman Annex Buildings 102, 103, and 104 Parcel.

6.2.1 Previous Investigations

Existing documents include the USN-NFEC NAS Key West Predraft EBS Truman Annex; Excess Property (USN-NFEC, 1996a) and USN-NFEC Draft EBS Truman Annex Outer Mole Pier 8/Buildings 149, 1374, 4080 (USN-NFEC, 1997). Also the USN-NFEC Contamination Assessment Report (CAR) Addendum for Electric Power Plant Building 103 (USN-NFEC, 1993a), the USN-NFEC Contamination Assessment Report (CAR) for Electric Power Plant Building 103 (USN-NFEC, 1992a), and the USN-NFEC Remedial Action Plan (RAP) for Electric Power Plant Building 103 (USN-NFEC, 1994a).

6.2.2 Current Investigation

The DQO Process evaluated 10 subzones for Parcel E. Subzones 6, 8, 10, and 11 were eliminated from further evaluation. Six subzones required sampling and analysis under the BRAC SI. The environmental medium of each subzone and the parameter groups selected for analysis at each subzone, are presented in Table 6-1. Subzone 1 (Former Building Sites South End of Parcel E), subzone 2 (Former Building 136), subzone 3 (Buildings 102 and 104), subzone 4 (Transformer Site near Building 675), subzone 5 (Former Building Sites North End of Parcel E), and subzone 9 (Building 103) were identified as soil subzones. Four locations were sampled within each subzone, except six sample locations were placed in subzone 3. Sample locations are shown on Figures 6-2 through 6-7. Analytical results for samples collected at Parcel E were compared to a residential set of action levels (see Section 1.8.2.1).

Although the BRAC SI Workplan (B&R Environmental, 1998a) describes five groundwater subzones at Truman Annex, one at each Parcel (i.e., C, D, E, F, and K), the DQO Process considered the groundwater at Truman Annex as a single unit in the decision-making process. Discussion of sampling and analytical results for groundwater at Truman Annex (including Parcels C, D, E, F, and K) are included in Section 4.6. The location of four permanent monitoring wells and a single previously existing monitoring well at Truman Annex are shown in Figure 4-5.

6.3 SUBZONE 1 (FORMER BUILDING SITES SOUTH END OF PARCEL E)

The subsections below describe subzone 1, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 1 surface soil.

6.3.1 Subzone Description

Metals, solvents, and fuels from former building operations and demolition debris were considered as potential contaminants at the former building sites at the south end of Parcel E. Four surface soil samples were collected. All of the analytical results can be found in Appendix D.

6.3.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in the vicinity of the former building sites at the south end of Parcel E for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies

and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 6-2. Figure 6-2 shows the location of analytes that exceeded action levels and indicate possible surface soil contamination.

Thallium was detected at all four sample locations in excess of its 5.5 mg/kg action level. However, it has been determined that the thallium results from the SI are suspect and will not be used to drive further action. Inorganics detected at concentrations below their action levels including aluminum, barium, cobalt, copper, iron, lead, manganese, mercury, vanadium, and zinc. No VOCs or SVOCs were detected in excess of action levels in surface soil at the former building sites at the south end of Parcel E. Acetone was the only VOC detected in subzone 1. SVOCs detected at levels below their screening criteria including benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene.

6.3.3 Conclusions and Recommendations

Metals, solvents, and fuels from former building operations and demolition debris were considered as potential contaminants at the former building sites at the south end of Parcel E. However, thallium was the only exceedance. The maximum detection of thallium was used in the estimated risk process as described in Section 1.8.2.2. Calculations and estimates can be found in Appendix C, Table C-2. Although the maximum thallium concentration detected was indicative of potential noncarcinogenic human health risks, the thallium results are suspect and will not be used to drive further action. No other chemicals were detected in excess of their action levels. No further action is recommended at subzone 1.

6.4 SUBZONE 2 (FORMER BUILDING 136)

The subsections below describe subzone 2, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 2 surface soil.

6.4.1 Subzone Description

Debris, lead, metals, solvents, and oils were considered potential soil contaminants at subzone 2 from building operations including the Plate and Mold Shop and the demolished Building 136 buried on-site. Four surface soil samples were collected from the former location of Building 136. All of the analytical results can be found in Appendix D.

6.4.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in the former location of Building 136 for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 6-3. Figure 6-3 shows the location of analytes that exceeded action levels and indicate possible surface soil contamination.

Two inorganics, arsenic and thallium, exceeded their surface soil action levels. The arsenic exceedance (4.5 mg/kg) was in a single sample (SS-02) collected from the eastern corner of subzone 2. Arsenic was detected at one other surface soil sample location, but not in excess of its action level. Thallium was detected at all four sample locations, but was an exceedance only at SS-02 (6.2 mg/kg). Three SVOCs also were detected in excess of their screening values. Benzo(a)pyrene was detected in excess of its 100 µg/kg screening value at SS-02 (988 µg/kg) and SS-01 (225 µg/kg). Benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene were both detected at SS-02 in excess of their action levels. SVOCs detected at concentrations below their screening criteria included acenaphthylene, anthracene, benzo(a)anthracene, benzo(g,h,i)perylene, fluoranthene, fluorene, and pyrene. VOCs detected included acetone, methylene chloride, and toluene – none above their action levels. Several inorganics were detected below their action levels including aluminum, antimony, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, vanadium, and zinc.

6.4.3 Conclusions and Recommendations

Potential contaminants in soil from building operations at the Plate and Mold Shop and demolished Building 136 buried on-site included debris, lead, metals, solvents, and oils. Arsenic, thallium, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were detected in excess of their action levels. Their maximum detected concentrations were used in the estimated risk process as described in Section 1.8.2.2. Calculations and estimates can be found in Appendix C, Table C-2. The detected concentrations of benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene were not indicative of significant carcinogenic human health risk. Thallium results are suspect and will not be used to drive further action. However, the detected arsenic concentration was indicative of potential carcinogenic human health risks. Further action is recommended at subzone 2.

6.5 SUBZONE 3 (BUILDINGS 102 AND 104)

The subsections below describe subzone 3, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 3 surface soil.

6.5.1 Subzone Description

Acids, solvents, and fuel from building operations were considered to be potential contaminants at Buildings 102 and 104. During the DQO Process, five soil sample locations were placed in subzone 3. However, due to the identification of a concrete pad in the area as a former hazardous waste storage area, an additional sample location was placed in the subzone. The additional sample was located next to the concrete pad. Six surface soil samples were collected from the area around Buildings 102 and 104. All of the analytical results can be found in Appendix D.

6.5.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in the vicinity of Buildings 102 and 104 for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 6-4. Figure 6-4 shows the location of analytes that exceeded action levels and indicate possible surface soil contamination.

Two SVOCs, benzo(a)pyrene and indeno(1,2,3-cd)pyrene, were detected in excess of their action levels, 100 µg/kg and 1,400 µg/kg, respectively. Benzo(a)pyrene was detected in excess of its action level at three sample locations (SS-01, 308 µg/kg; SS-04, 517 µg/kg; SS-06, 190 µg/kg). Indeno(1,2,3-cd)pyrene also was detected at SS-01 (1,650 µg/kg) in excess of its screening criteria. SVOCs detected below their screening values including 1,2,4-trichlorobenzene, 2-methylnaphthalene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene. Inorganics that were detected below the action levels included aluminum, barium, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, thallium, tin, vanadium, and zinc. VOCs detected below their action levels including 2-butanone, 2-hexanone, acetone, methylene chloride, tetrachloroethene, and toluene.

6.5.3 Conclusions and Recommendations

Acids, solvents, and fuel were considered potential contaminants in surface soil at subzone 3. Chemicals detected in excess of their action levels were analyzed further in the estimated risk process as described in Section 1.8.2.2. Calculations and estimates can be found in Appendix C, Table C-2. Concentrations of benzo(a)pyrene and indeno(1,2,3-cd)pyrene were indicative of potential carcinogenic human health risks. Therefore, further action is recommended at subzone 3.

6.6 SUBZONE 4 (TRANSFORMER SITE NEAR BUILDING 675)

The subsections below describe subzone 4, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 4 surface soil.

6.6.1 Subzone Description

PCBs were considered to be potential contaminants in soil at the former transformer site near Building 675. Four surface soil samples were collected for analysis. All of the analytical results can be found in Appendix D.

6.6.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in the vicinity of the former transformer site for SVOCs, PCBs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 6-5. Figure 6-5 shows the location of analytes that exceeded action levels and indicate possible surface soil contamination.

A single SVOC, benzo(a)pyrene, was detected slightly in excess of its 100 µg/kg action level at a single sample location (SS-04, 110 µg/kg). SVOCs detected below their screening criteria included 1,2,4-trichlorobenzene, fluoranthene, and pyrene. Thallium was detected at all four sample locations, but was in excess of its 5.5 mg/kg action level at only two locations. Inorganics that were detected below their action levels included aluminum, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, silver, vanadium, and zinc. No PCBs were detected in excess of their action

levels at the former transformer site near Building 675. A single PCB, aroclor-1260, was detected at two sample locations below its action level.

6.6.3 Conclusions and Recommendations

PCBs from the former transformer site were considered to be potential contaminants subzone 4. However, no PCBs were detected in excess of their action levels in subzone 4. Thallium and benzo(a)pyrene were detected in excess of their action levels. The maximum detections of thallium and benzo(a)pyrene were used in the estimated risk process as described in Section 1.8.2.2. Calculations and estimates can be found in Appendix C, Table C-2. The maximum detected concentration of thallium was indicative of significant noncarcinogenic human health risks. However, thallium results from this study are suspect as described in Section 1.8.2.1 and will not be used to drive further action. The detection of benzo(a)pyrene was not indicative of significant carcinogenic human health risks. Therefore, no further action is recommended for the former transformer site near Building 675.

6.7 SUBZONE 5 (FORMER BUILDING SITES NORTH END OF PARCEL E)

The subsections below describe subzone 5, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 5 surface soil.

6.7.1 Subzone Description

Metals, solvents, and fuels from former building operations and demolition debris were considered potential surface soil contaminants at subzone 5. Four surface soil samples were collected from the north end of Parcel E. All of the analytical results can be found in Appendix D.

6.7.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in the northern portion of Parcel E – former building sites – for VOCs, SVOC, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals that detected in the surface soil samples are listed in Table 6-6. Figure 6-6 shows the location of analytes that exceeded action levels and indicate possible surface soil contamination.

A single SVOC, benzo(a)pyrene, was detected slightly in excess of its 100 µg/kg action level at a single sample location (SS-02, 105 µg/kg). SVOCs detected below their screening values included 1,2,4-trichlorobenzene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene. Inorganics that were detected below their action levels included aluminum, arsenic, barium, cadmium, chromium, iron, lead, manganese, mercury, nickel, thallium, tin, vanadium, and zinc. No VOCs were detected in excess of their action levels. 2-butanone, acetone, methylene chloride, and toluene were the only VOCs detected in surface soil at subzone 5.

6.7.3 Conclusions and Recommendations

Metals, solvents, and fuels from former building operations and their demolition debris were considered potential surface soil contaminants at subzone 5. Chemicals detected in excess of their action levels were analyzed further in the estimated risk process as described in Section 1.8.2.2. Calculations and estimates can be found in Appendix C, Table C-2. The concentration of benzo(a)pyrene was not indicative of significant carcinogenic human health risks. Therefore, no further action is recommended.

6.8 SUBZONE 9 (BUILDING 103)

The subsections below describe subzone 9, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 9 surface soil.

6.8.1 Subzone Description

Fuel, oils, and PCBs were considered potential contaminants in surface soil at Building 103. These contaminants may have entered the soil during Building 103's use as a Power Plant. Four surface soil samples were collected from the vicinity of Building 103. Sample SS-01 was resampled during a second sampling effort and the resample was labeled SS-01(R). All of the analytical results can be found in Appendix D.

6.8.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in the vicinity Building 103 for VOCs, SVOCs, PCBs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of

action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 6-7. Figure 6-7 shows the location of analytes that exceeded action levels and indicate possible surface soil contamination.

No inorganics were detected in excess of their action levels. Inorganics detected below their screening criteria included aluminum, antimony, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, silver, thallium, tin, vanadium, and zinc. A number of SVOCs were detected in excess of their action levels in SS-01 but not at SS-01(R). Benzo(a)anthracene (40,100 µg/kg), benzo(a)pyrene (31,800 µg/kg), benzo(b)fluoranthene (48,900 µg/kg), benzo(k)fluoranthene (20,900 µg/kg), and indeno(1,2,3-cd)pyrene (15,600 µg/kg) were all detected in excess of their action levels in soil sample SS-01. Other SVOCs detected below of their action levels included 1,2,4-trichlorobenzene, acenaphthene, anthracene, benzo(g,h,i)perylene, carbazole, chrysene, fluoranthene, fluorene, phenanthrene, and pyrene. VOCs detected below their screening criteria included 2-butanone, 2-hexanone, 4-methyl-2-pentanone, acetone, methylene chloride, and toluene. A single PCB, aroclor-1254, was detected in excess of its 900 µg/kg action level at SS-01(R) (1,820 µg/kg) and SS-02(R) (2,160 µg/kg). There were no other PCBs detected.

6.8.3 Conclusions and Recommendations

Fuel, oils, and PCBs were considered potential contaminants in surface soil at Building 103. Several SVOCs and a single PCB (Aroclor-1254) were detected in excess of their action levels. Their maximum detected concentrations were used in the estimated risk process as described in Section 1.8.2.2. Calculations and estimates can be found in Appendix C, Table C-2. Benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene were detected in excess of their action levels and at concentrations indicative of potential carcinogenic human health risks. The detected concentration of aroclor-1254 also was indicative of potential carcinogenic human health risks. Therefore, due to the nature of contamination at subzone 9, further action is recommended.

6.9 PARCEL E CONCLUSIONS AND RECOMMENDATIONS

Fuels, oils, metals, solvents, PCBs, and acids were considered to be potential soil contaminants at Parcel E during the DQO Process.

Thallium exceeded its action level at subzones 1, 2, and 4. However, thallium will not be used to drive further action as addressed in Section 1.8.2.1. Benzo(a)pyrene was detected in excess of its action level at subzones 4 and 5. However, these detections were not at concentrations indicative of human health risks. Therefore, there does not appear to be significant soil contamination at subzones 1, 4, or 5, and no

further action is recommended. Further action is recommended at subzone 2 where a detected concentration of arsenic was indicative of potential human health risks. An Interim Removal Action (IRA) is recommended at subzone 2 to remove potentially contaminated soil.

Further action is recommended at the remaining soil subzones (i.e., 3 and 9) due to possible contamination indicated by chemicals detected in excess of their action levels and at levels which could represent human health risks. 2-hexanone was detected in subzones 3 and 9, but not at levels indicative of human health risks. However, detections of benzo(a)pyrene and indeno(1,2,3-cd)pyrene were indicative of potential human health risks at subzones 3 and 9. Subzone 9 (Building 103) had detections of aroclor-1254, benzo(a)anthracene, benzo(b)fluoranthene, and benzo(k)fluoranthene which were indicative of potential carcinogenic risks. Due to the nature of contaminants detected in subzones 3 and 9 further action is recommended. A Supplemental SI should be performed at subzones 3 and 9. This Supplemental SI at Buildings 102, 103, and 104 should focus on confirming the suspected presence of contamination under the footprints of the buildings.

TABLE 6-1

PARAMETER GROUPS AND MEDIA OF INTEREST AT TRUMAN ANNEX BUILDINGS 102, 103, AND 104 (PARCEL E) NAS KEY WEST

Subzone	Building/Area	Medium	Number of Locations	Parameter Group				
				VOCs	SVOCs	Inorganics	PCBs	Pesticides
Subzone 1	Former Building Sites South End of Parcel E	SO	4	X	X	X		
Subzone 2	Former Building 136	SO	4	X	X	X		
Subzone 3	Buildings 102, 103, and 104	SO	6	X	X	X		
Subzone 4	Transformer Site near Building 675	SO	4		X	X	X	
Subzone 5	Former Building Sites North End of Parcel E	SO	4	X	X	X		
Subzone 9	Building 103	SO	4[a]	X	X	X	X	

Notes:
a Two of the samples in subzone 9 were resampled.

SO = Surface soil.

Subzones 6, 8, 10, and 11 were eliminated from sampling during the DQO Process.

TABLE 6-2

CHEMICALS DETECTED IN PARCEL E SUBZONE 1 SURFACE SOIL
NAS KEY WEST

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
E01-SS-04	Aluminum	784	
E01-SS-03	Aluminum	439	
E01-SS-02	Aluminum	386	
E01-SS-02	Barium	16.7	J
E01-SS-03	Barium	15.4	J
E01-SS-01	Barium	7.9	J
E01-SS-04	Barium	7.4	J
E01-SS-03	Cobalt	0.27	
E01-SS-02	Copper	20.1	
E01-SS-03	Copper	13	
E01-SS-04	Copper	1.9	
E01-SS-01	Copper	1.4	
E01-SS-03	Iron	889	
E01-SS-02	Iron	609	
E01-SS-04	Iron	561	
E01-SS-01	Iron	70.6	
E01-SS-03	Lead	51.2	
E01-SS-02	Lead	47.9	
E01-SS-04	Lead	3.3	
E01-SS-01	Lead	2.4	
E01-SS-03	Manganese	11.3	
E01-SS-02	Manganese	9.4	
E01-SS-04	Manganese	6.2	
E01-SS-01	Manganese	1.8	
E01-SS-03	Mercury	0.38	
E01-SS-02	Mercury	0.18	
E01-SS-02	Thallium	6.3	
E01-SS-04	Thallium	6.2	
E01-SS-01	Thallium	5.6	
E01-SS-03	Thallium	5.6	
E01-SS-04	Vanadium	5.5	
E01-SS-03	Vanadium	2.6	
E01-SS-02	Vanadium	2.5	
E01-SS-01	Vanadium	0.96	
E01-SS-02	Zinc	108	
E01-SS-03	Zinc	60.8	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
E01-SS-03	Benzo(a)pyrene	86.2	
E01-SS-01	Benzo(a)pyrene	31.3	J
E01-SS-03	Benzo(b)fluoranthene	92.8	
E01-SS-01	Benzo(b)fluoranthene	44.1	
E01-SS-03	Benzo(g,h,i)perylene	76.2	
E01-SS-01	Benzo(g,h,i)perylene	16.4	J
E01-SS-02	Bis(2-ethylhexyl)phthalate	952	
E01-SS-02	Fluoranthene	125	J
E01-SS-03	Fluoranthene	75.4	
E01-SS-01	Fluoranthene	27.4	J
E01-SS-03	Indeno(1,2,3-cd)pyrene	170	
E01-SS-01	Indeno(1,2,3-cd)pyrene	82.1	
E01-SS-02	Pyrene	208	J
E01-SS-03	Pyrene	80.3	
E01-SS-01	Pyrene	25.3	J
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
E01-SS-01	Acetone	31.7	J
E01-SS-04	Acetone	29.4	J

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 6-3

CHEMICALS DETECTED IN PARCEL E SUBZONE 2 SURFACE SOIL
NAS KEY WEST
PAGE 1 OF 2

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
E02-SS-02	Aluminum	2,740	
E02-SS-01	Aluminum	654	
E02-SS-03	Aluminum	329	
E02-SS-04	Aluminum	325	
E02-SS-02	Antimony	2.1	
E02-SS-04	Antimony	1.2	
E02-SS-02	Arsenic	4.5	
E02-SS-04	Arsenic	2.2	
E02-SS-02	Barium	86.8	J
E02-SS-01	Barium	25.9	J
E02-SS-04	Barium	18.9	J
E02-SS-03	Barium	11.2	J
E02-SS-02	Beryllium	0.15	
E02-SS-02	Cadmium	0.55	
E02-SS-02	Chromium	16.4	
E02-SS-04	Chromium	4.7	
E02-SS-02	Cobalt	1.4	
E02-SS-04	Cobalt	0.3	
E02-SS-02	Copper	50.2	
E02-SS-04	Copper	20	
E02-SS-01	Copper	11.7	
E02-SS-03	Copper	11.3	
E02-SS-02	Iron	7,970	
E02-SS-04	Iron	2,030	
E02-SS-01	Iron	1,270	
E02-SS-03	Iron	552	
E02-SS-02	Lead	225	
E02-SS-01	Lead	36.7	
E02-SS-04	Lead	30.1	
E02-SS-03	Lead	20.7	
E02-SS-02	Manganese	75.9	
E02-SS-01	Manganese	22.2	
E02-SS-04	Manganese	21.9	
E02-SS-03	Manganese	14.5	
E02-SS-02	Mercury	0.38	
E02-SS-01	Mercury	0.22	
E02-SS-03	Mercury	0.18	
E02-SS-04	Mercury	0.13	
E02-SS-02	Nickel	14.9	
E02-SS-02	Thallium	6.2	
E02-SS-03	Thallium	5.4	
E02-SS-04	Thallium	4.8	
E02-SS-01	Thallium	4.4	
E02-SS-02	Vanadium	9.1	
E02-SS-01	Vanadium	3.4	
E02-SS-03	Vanadium	2.9	
E02-SS-04	Vanadium	2.6	
E02-SS-02	Zinc	314	
E02-SS-01	Zinc	57	
E02-SS-04	Zinc	52.8	
E02-SS-03	Zinc	34.7	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
E02-SS-02	Acenaphthylene	25.4	J
E02-SS-02	Anthracene	190	J
E02-SS-01	Anthracene	35.1	J
E02-SS-02	Benzo(a)anthracene	84.8	J
E02-SS-02	Benzo(a)pyrene	988	
E02-SS-01	Benzo(a)pyrene	225	
E02-SS-04	Benzo(a)pyrene	59.7	J
E02-SS-02	Benzo(b)fluoranthene	1,510	
E02-SS-01	Benzo(b)fluoranthene	322	

TABLE 6-3

CHEMICALS DETECTED IN PARCEL E SUBZONE 2 SURFACE SOIL
NAS KEY WEST
PAGE 2 OF 2

Location	Parameter	Result	Qual(*)
E02-SS-03	Benzo(b)fluoranthene	93.6	J
E02-SS-04	Benzo(b)fluoranthene	70.1	J
E02-SS-02	Benzo(g,h,i)perylene	711	
E02-SS-01	Benzo(g,h,i)perylene	188	
E02-SS-04	Benzo(g,h,i)perylene	43.8	J
E02-SS-02	Fluoranthene	2,220	
E02-SS-01	Fluoranthene	423	
E02-SS-03	Fluoranthene	127	J
E02-SS-04	Fluoranthene	101	J
E02-SS-02	Fluorene	36.5	J
E02-SS-02	Indeno(1,2,3-cd)pyrene	1,470	
E02-SS-01	Indeno(1,2,3-cd)pyrene	446	
E02-SS-02	Pyrene	2,060	
E02-SS-01	Pyrene	420	
E02-SS-03	Pyrene	139	J
E02-SS-04	Pyrene	109	J
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
E02-SS-01	Acetone	20.2	J
E02-SS-02	Acetone	17.8	J
E02-SS-04	Acetone	16.4	J
E02-SS-02	Methylene chloride	15.8	
E02-SS-04	Methylene chloride	11.2	
E02-SS-01	Methylene chloride	9.7	
E02-SS-03	Methylene chloride	8.4	
E02-SS-03	Toluene	0.2	J

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 6-4

CHEMICALS DETECTED IN PARCEL E SUBZONE 3 SURFACE SOIL
NAS KEY WEST
PAGE 1 OF 2

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
E03-SS-03	Aluminum	1,425	J
E03-SS-01	Aluminum	809	
E03-SS-05	Aluminum	615	
E03-SS-04	Aluminum	470	
E03-SS-02	Aluminum	234	J
E03-SS-06	Aluminum	1,640	
E03-SS-03	Barium	19.9	
E03-SS-04	Barium	16.8	
E03-SS-01	Barium	16.2	J
E03-SS-05	Barium	12.1	
E03-SS-02	Barium	11	
E03-SS-06	Barium	33	
E03-SS-04	Cadmium	5	
E03-SS-03	Cadmium	0.34	
E03-SS-06	Cadmium	1.1	
E03-SS-03	Chromium	8.3	
E03-SS-04	Chromium	7	
E03-SS-05	Chromium	3.7	
E03-SS-02	Chromium	3	
E03-SS-06	Chromium	21	
E03-SS-01	Copper	12.5	
E03-SS-06	Copper	136	
E03-SS-03	Iron	3,655	J
E03-SS-01	Iron	2,250	
E03-SS-04	Iron	1,320	
E03-SS-05	Iron	616	
E03-SS-02	Iron	357	J
E03-SS-06	Iron	3,800	
E03-SS-03	Lead	113.5	
E03-SS-01	Lead	101	
E03-SS-04	Lead	57.2	
E03-SS-05	Lead	56.6	
E03-SS-02	Lead	22.9	
E03-SS-06	Lead	130	

Location	Parameter	Result	Qual(*)
E03-SS-03	Manganese	22.7	
E03-SS-01	Manganese	20.9	
E03-SS-04	Manganese	13.8	
E03-SS-05	Manganese	6.6	
E03-SS-02	Manganese	4	
E03-SS-06	Manganese	44.3	
E03-SS-01	Mercury	0.34	
E03-SS-03	Mercury	0.25	
E03-SS-04	Mercury	0.16	
E03-SS-02	Mercury	0.12	
E03-SS-05	Mercury	0.08	
E03-SS-03	Nickel	4.2	
E03-SS-04	Nickel	3.2	
E03-SS-05	Nickel	2.8	
E03-SS-02	Nickel	1.6	
E03-SS-06	Nickel	12.8	
E03-SS-02	Thallium	4.6	
E03-SS-01	Thallium	4.1	
E03-SS-03	Thallium	3.65	
E03-SS-04	Thallium	3.6	
E03-SS-05	Thallium	3.2	
E03-SS-04	Tin	7.4	
E03-SS-05	Tin	2.7	
E03-SS-03	Tin	2.3	
E03-SS-02	Tin	1.5	
E03-SS-03	Vanadium	17.2	
E03-SS-04	Vanadium	5.2	
E03-SS-01	Vanadium	4.6	
E03-SS-05	Vanadium	3.9	
E03-SS-02	Vanadium	3.1	
E03-SS-06	Vanadium	71.2	
E03-SS-03	Zinc	104.9	
E03-SS-04	Zinc	64.5	
E03-SS-01	Zinc	41.7	
E03-SS-05	Zinc	20.3	

TABLE 6-4

CHEMICALS DETECTED IN PARCEL E SUBZONE 3 SURFACE SOIL
NAS KEY WEST
PAGE 2 OF 2

Location	Parameter	Result	Qual(*)
E03-SS-02	Zinc	10.7	
E03-SS-06	Zinc	336	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
E03-SS-02	1,2,4-trichlorobenzene	3.7	J
E03-SS-04	2-methylnaphthalene	1,760	
E03-SS-04	Anthracene	283	
E03-SS-01	Anthracene	95.8	J
E03-SS-04	Benzo(a)anthracene	403	
E03-SS-06	Benzo(a)anthracene	184	J
E03-SS-04	Benzo(a)pyrene	517	
E03-SS-01	Benzo(a)pyrene	308	J
E03-SS-06	Benzo(a)pyrene	190	J
E03-SS-02	Benzo(a)pyrene	19	J
E03-SS-05	Benzo(a)pyrene	18	J
E03-SS-04	Benzo(b)fluoranthene	732	
E03-SS-01	Benzo(b)fluoranthene	365	J
E03-SS-05	Benzo(b)fluoranthene	22.7	J
E03-SS-02	Benzo(b)fluoranthene	20.1	J
E03-SS-04	Benzo(g,h,i)perylene	400	
E03-SS-01	Benzo(g,h,i)perylene	266	J
E03-SS-02	Benzo(g,h,i)perylene	14.4	J
E03-SS-05	Benzo(g,h,i)perylene	14	J
E03-SS-06	Benzo(g,h,i)perylene	281	J
E03-SS-02	Benzo(k)fluoranthene	12.1	J
E03-SS-04	Chrysene	288	
E03-SS-06	Chrysene	213	J
E03-SS-04	Fluoranthene	1,550	
E03-SS-01	Fluoranthene	834	
E03-SS-03	Fluoranthene	426.9	J
E03-SS-05	Fluoranthene	22.9	J
E03-SS-02	Fluoranthene	18.3	J
E03-SS-06	Fluoranthene	360	J
E03-SS-01	Indeno(1,2,3-cd)pyrene	1,650	
E03-SS-04	Indeno(1,2,3-cd)pyrene	554	
E03-SS-05	Indeno(1,2,3-cd)pyrene	93.7	
E03-SS-02	Indeno(1,2,3-cd)pyrene	88.2	
E03-SS-06	Indeno(1,2,3-cd)pyrene	191	J
E03-SS-04	Phenanthrene	1,840	
E03-SS-06	Phenanthrene	134	J
E03-SS-04	Pyrene	1,030	
E03-SS-01	Pyrene	828	
E03-SS-03	Pyrene	427.6	J
E03-SS-05	Pyrene	24.2	J
E03-SS-02	Pyrene	21.2	J
E03-SS-06	Pyrene	299	J
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
E03-SS-06	2-butanone	11.3	
E03-SS-04	2-hexanone	21.3	
E03-SS-04	Acetone	20.6	J
E03-SS-01	Acetone	14.9	J
E03-SS-04	Methylene chloride	17	
E03-SS-05	Methylene chloride	13.6	
E03-SS-02	Methylene chloride	12.8	
E03-SS-01	Methylene chloride	8.4	
E03-SS-03	Methylene chloride	6.5	
E03-SS-02	Tetrachloroethene	4	
E03-SS-05	Toluene	0.6	J
E03-SS-06	Toluene	12.1	

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 6-5

CHEMICALS DETECTED IN PARCEL E SUBZONE 4 SURFACE SOIL
NAS KEY WEST
PAGE 1 OF 2

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
E04-SS-01	Aluminum	441	
E04-SS-03	Aluminum	365	
E04-SS-04	Aluminum	312	
E04-SS-02	Aluminum	204	
E04-SS-01	Barium	27.6	
E04-SS-04	Barium	16	
E04-SS-03	Barium	13.2	
E04-SS-02	Barium	11.6	
E04-SS-01	Cadmium	0.92	
E04-SS-04	Cadmium	0.34	
E04-SS-03	Cadmium	0.23	
E04-SS-01	Chromium	4.7	
E04-SS-04	Chromium	4.3	
E04-SS-03	Chromium	4.3	
E04-SS-02	Chromium	3.1	
E04-SS-01	Cobalt	0.49	
E04-SS-03	Cobalt	0.38	
E04-SS-01	Copper	30.2	
E04-SS-04	Copper	23.5	
E04-SS-03	Copper	11.8	
E04-SS-02	Copper	5.1	
E04-SS-03	Iron	1,690	
E04-SS-01	Iron	989	
E04-SS-04	Iron	572	
E04-SS-02	Iron	563	
E04-SS-01	Lead	132	
E04-SS-03	Lead	65.9	
E04-SS-04	Lead	59.3	
E04-SS-02	Lead	41	
E04-SS-03	Manganese	14.3	
E04-SS-01	Manganese	10.5	
E04-SS-02	Manganese	7	
E04-SS-04	Manganese	6.8	
E04-SS-04	Mercury	0.41	
E04-SS-01	Mercury	0.31	
E04-SS-01	Nickel	2	
E04-SS-04	Nickel	1.5	
E04-SS-03	Nickel	1.4	
E04-SS-02	Nickel	1.1	
E04-SS-04	Silver	0.81	
E04-SS-02	Silver	0.79	
E04-SS-01	Silver	0.65	
E04-SS-03	Silver	0.58	
E04-SS-04	Thallium	6.1	
E04-SS-02	Thallium	6	
E04-SS-03	Thallium	4.8	
E04-SS-01	Thallium	4.8	
E04-SS-01	Vanadium	6.4	
E04-SS-04	Vanadium	3.9	
E04-SS-03	Vanadium	3.6	
E04-SS-02	Vanadium	2	
E04-SS-01	Zinc	206	
E04-SS-04	Zinc	95.9	
E04-SS-03	Zinc	39.8	
E04-SS-02	Zinc	22.6	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
E04-SS-02	1,2,4-trichlorobenzene	5.4	J
E04-SS-04	Benzo(a)pyrene	110	J
E04-SS-04	Fluoranthene	150	J
E04-SS-02	Fluoranthene	11.2	J

TABLE 6-5

CHEMICALS DETECTED IN PARCEL E SUBZONE 4 SURFACE SOIL
NAS KEY WEST
PAGE 2 OF 2

Location	Parameter	Result	Qual(*)
E04-SS-04	Pyrene	151	J
E04-SS-02	Pyrene	11.4	J
POLYCHLORINATED BIPHENYLS (µg/kg)			
E04-SS-01	Aroclor-1260	26.6	J
E04-SS-03	Aroclor-1260	19.6	J

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:

J – The associated value is an estimated quantity.

TABLE 6-6

CHEMICALS DETECTED IN PARCEL E SUBZONE 5 SURFACE SOIL
NAS KEY WEST
PAGE 1 OF 2

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
E05-SS-02	Aluminum	419	J
E05-SS-04	Aluminum	416.5	J
E05-SS-03	Aluminum	400	J
E05-SS-01	Aluminum	229	J
E05-SS-04	Arsenic	1.175	
E05-SS-02	Barium	17.8	
E05-SS-03	Barium	15.3	
E05-SS-04	Barium	14.8	
E05-SS-01	Barium	12.2	
E05-SS-02	Cadmium	0.27	
E05-SS-03	Chromium	4.9	
E05-SS-02	Chromium	4.1	
E05-SS-04	Chromium	3.3	
E05-SS-01	Chromium	2.3	
E05-SS-03	Iron	967	J
E05-SS-04	Iron	765.5	J
E05-SS-02	Iron	677	J
E05-SS-01	Iron	272	J
E05-SS-04	Lead	59.45	
E05-SS-03	Lead	53.1	
E05-SS-01	Lead	53	
E05-SS-02	Lead	49.1	
E05-SS-03	Manganese	9	
E05-SS-02	Manganese	8.8	
E05-SS-04	Manganese	7.9	
E05-SS-01	Manganese	3.7	
E05-SS-02	Mercury	0.43	
E05-SS-04	Mercury	0.24	
E05-SS-03	Mercury	0.09	
E05-SS-01	Mercury	0.04	
E05-SS-02	Nickel	2.2	
E05-SS-03	Nickel	1.6	
E05-SS-04	Nickel	1.25	
E05-SS-01	Nickel	0.73	
E05-SS-02	Thallium	4.2	
E05-SS-04	Thallium	4.05	
E05-SS-01	Thallium	3.2	
E05-SS-03	Thallium	2.5	
E05-SS-02	Tin	4	
E05-SS-03	Tin	2.9	
E05-SS-04	Tin	2.05	
E05-SS-02	Vanadium	3.2	
E05-SS-04	Vanadium	2.75	
E05-SS-03	Vanadium	2.5	
E05-SS-01	Vanadium	1.6	
E05-SS-02	Zinc	53.9	
E05-SS-04	Zinc	47.25	
E05-SS-03	Zinc	38.5	
E05-SS-01	Zinc	15	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
E05-SS-01	1,2,4-trichlorobenzene	4.8	J
E05-SS-02	1,2,4-trichlorobenzene	3.6	J
E05-SS-04	1,2,4-trichlorobenzene	3.4	J
E05-SS-02	Acenaphthylene	6.8	J
E05-SS-04	Acenaphthylene	6.1	J
E05-SS-04	Anthracene	11.325	J
E05-SS-02	Anthracene	5.8	J
E05-SS-02	Benzo(a)anthracene	9.2	J
E05-SS-02	Benzo(a)pyrene	105	
E05-SS-04	Benzo(a)pyrene	43.75	J
E05-SS-02	Benzo(b)fluoranthene	159	

TABLE 6-6

CHEMICALS DETECTED IN PARCEL E SUBZONE 5 SURFACE SOIL
NAS KEY WEST
PAGE 2 OF 2

Location	Parameter	Result	Qual(*)
E05-SS-04	Benzo(b)fluoranthene	69.85	
E05-SS-03	Benzo(b)fluoranthene	20.2	J
E05-SS-02	Benzo(g,h,i)perylene	67.7	
E05-SS-04	Benzo(g,h,i)perylene	34.65	J
E05-SS-03	Benzo(g,h,i)perylene	10.6	J
E05-SS-04	Benzo(k)fluoranthene	28.55	
E05-SS-02	Fluoranthene	186	
E05-SS-04	Fluoranthene	54.2	J
E05-SS-03	Fluoranthene	16.5	J
E05-SS-02	Indeno(1,2,3-cd)pyrene	140	
E05-SS-04	Indeno(1,2,3-cd)pyrene	98.95	
E05-SS-02	Pyrene	241	
E05-SS-04	Pyrene	67.15	
E05-SS-03	Pyrene	21.7	J
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
E05-SS-03	2-butanone	3.7	J
E05-SS-03	Acetone	120	J
E05-SS-04	Acetone	63.65	J
E05-SS-01	Methylene chloride	75.5	
E05-SS-04	Methylene chloride	19.85	
E05-SS-03	Methylene chloride	18.2	
E05-SS-02	Methylene chloride	11.5	
E05-SS-04	Toluene	0.495	J

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 6-7

CHEMICALS DETECTED IN PARCEL E SUBZONE 9 SURFACE SOIL
NAS KEY WEST
PAGE 1 OF 2

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
E09-SS-01	Aluminum	1,670	
E09-SS-02	Aluminum	430	
E09-SS-03	Aluminum	283	J
E09-SS-04	Aluminum	226	J
E09-SS-01R	Aluminum	910	
E09-SS-02R	Aluminum	350	
E09-SS-02	Antimony	1.4	
E09-SS-02	Barium	28.2	
E09-SS-01	Barium	15.3	
E09-SS-03	Barium	13	
E09-SS-04	Barium	10.6	
E09-SS-02R	Barium	25.8	
E09-SS-02	Cadmium	1.2	
E09-SS-01	Cadmium	0.22	
E09-SS-02R	Cadmium	0.7	
E09-SS-02	Chromium	26.3	
E09-SS-01	Chromium	6.6	
E09-SS-03	Chromium	3.3	
E09-SS-04	Chromium	2.7	
E09-SS-01R	Chromium	8.3	
E09-SS-02R	Chromium	22.6	
E09-SS-02	Cobalt	0.89	
E09-SS-02	Copper	96.3	
E09-SS-01R	Copper	113	
E09-SS-02R	Copper	50.1	
E09-SS-02	Iron	2,520	
E09-SS-01	Iron	1,320	
E09-SS-03	Iron	543	J
E09-SS-04	Iron	417	J
E09-SS-01R	Iron	2,250	
E09-SS-02R	Iron	4,100	
E09-SS-02	Lead	118	
E09-SS-01	Lead	37.1	
E09-SS-03	Lead	33.5	
E09-SS-04	Lead	26.1	
E09-SS-01R	Lead	127	
E09-SS-02R	Lead	78.8	
E09-SS-02	Manganese	15.1	
E09-SS-01	Manganese	13.9	
E09-SS-03	Manganese	7.2	
E09-SS-04	Manganese	5.4	
E09-SS-01R	Manganese	24.3	
E09-SS-02R	Manganese	48.9	
E09-SS-04	Mercury	0.75	
E09-SS-02	Mercury	0.44	
E09-SS-01	Mercury	0.08	
E09-SS-03	Mercury	0.05	
E09-SS-02	Nickel	6.1	
E09-SS-01	Nickel	3.1	
E09-SS-03	Nickel	0.98	
E09-SS-04	Nickel	0.87	
E09-SS-01R	Nickel	7.2	
E09-SS-02R	Nickel	5	
E09-SS-02	Silver	0.83	
E09-SS-01R	Silver	2.6	
E09-SS-03	Thallium	4.3	
E09-SS-04	Thallium	4.3	

TABLE 6-7

CHEMICALS DETECTED IN PARCEL E SUBZONE 9 SURFACE SOIL
NAS KEY WEST
PAGE 2 OF 2

Location	Parameter	Result	Qual(*)
E09-SS-01	Thallium	3.8	
E09-SS-02	Thallium	3.4	
E09-SS-01	Tin	3.7	
E09-SS-03	Tin	3.1	
E09-SS-01R	Tin	6.7	
E09-SS-04	Tin	2.9	
E09-SS-01	Vanadium	9.5	
E09-SS-02	Vanadium	9.1	
E09-SS-04	Vanadium	2.5	
E09-SS-01R	Vanadium	9.2	
E09-SS-02	Zinc	321	
E09-SS-01	Zinc	33.9	
E09-SS-01R	Zinc	129	
E09-SS-03	Zinc	21.1	
E09-SS-04	Zinc	16.8	
E09-SS-02R	Zinc	175	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
E09-SS-04	1,2,4-trichlorobenzene	3.9	J
E09-SS-01	Acenaphthene	805	J
E09-SS-01	Anthracene	3,900	
E09-SS-01	Benzo(a)anthracene	40,100	
E09-SS-01	Benzo(a)pyrene	31,800	
E09-SS-04	Benzo(a)pyrene	21.6	J
E09-SS-01	Benzo(b)fluoranthene	48,900	
E09-SS-04	Benzo(b)fluoranthene	30.3	J
E09-SS-01	Benzo(g,h,i)perylene	10,900	
E09-SS-04	Benzo(g,h,i)perylene	19.4	J
E09-SS-01	Benzo(k)fluoranthene	20,900	
E09-SS-01	Carbazole	2,340	
E09-SS-01	Chrysene	39,700	
E09-SS-01	Fluoranthene	54,700	
E09-SS-04	Fluoranthene	27.5	J
E09-SS-01	Fluorene	450	J
E09-SS-01	Indeno(1,2,3-cd)pyrene	15,600	
E09-SS-04	Indeno(1,2,3-cd)pyrene	95.4	
E09-SS-01	Phenanthrene	8,970	
E09-SS-01	Pyrene	44,800	
E09-SS-04	Pyrene	31.2	J
E09-SS-03	Pyrene	4.9	J
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
E09-SS-02	2-butanone	96.5	J
E09-SS-02	2-hexanone	13	J
E09-SS-02	4-methyl-2-pentanone	28.8	J
E09-SS-02	Acetone	304	J
E09-SS-01	Acetone	107	J
E09-SS-04	Methylene chloride	23.4	
E09-SS-03	Methylene chloride	20.6	
E09-SS-02	Methylene chloride	7	J
E09-SS-01	Methylene chloride	4.3	
E09-SS-01	Toluene	1.8	
E09-SS-01R	Toluene	13.3	
POLYCHLORINATED BIPHENYLS (µg/kg)			
E09-SS-01R	Aroclor-1254	1,820	
E09-SS-02R	Aroclor-1254	2,160	J

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

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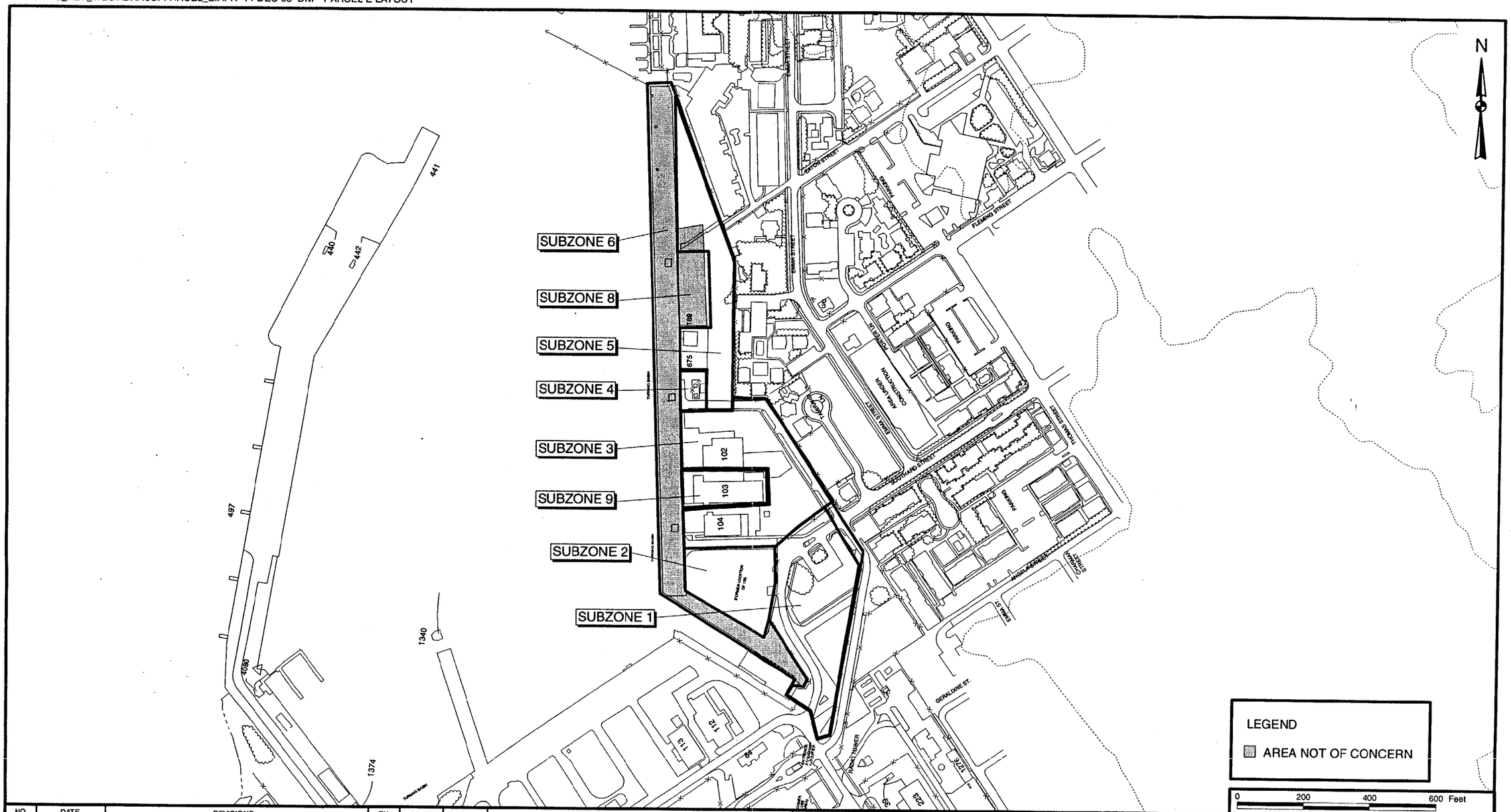

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 6-1. SUBZONE AND PARCEL BOUNDARIES
BUILDINGS 102, 103, AND 104 - BRAC PARCEL E
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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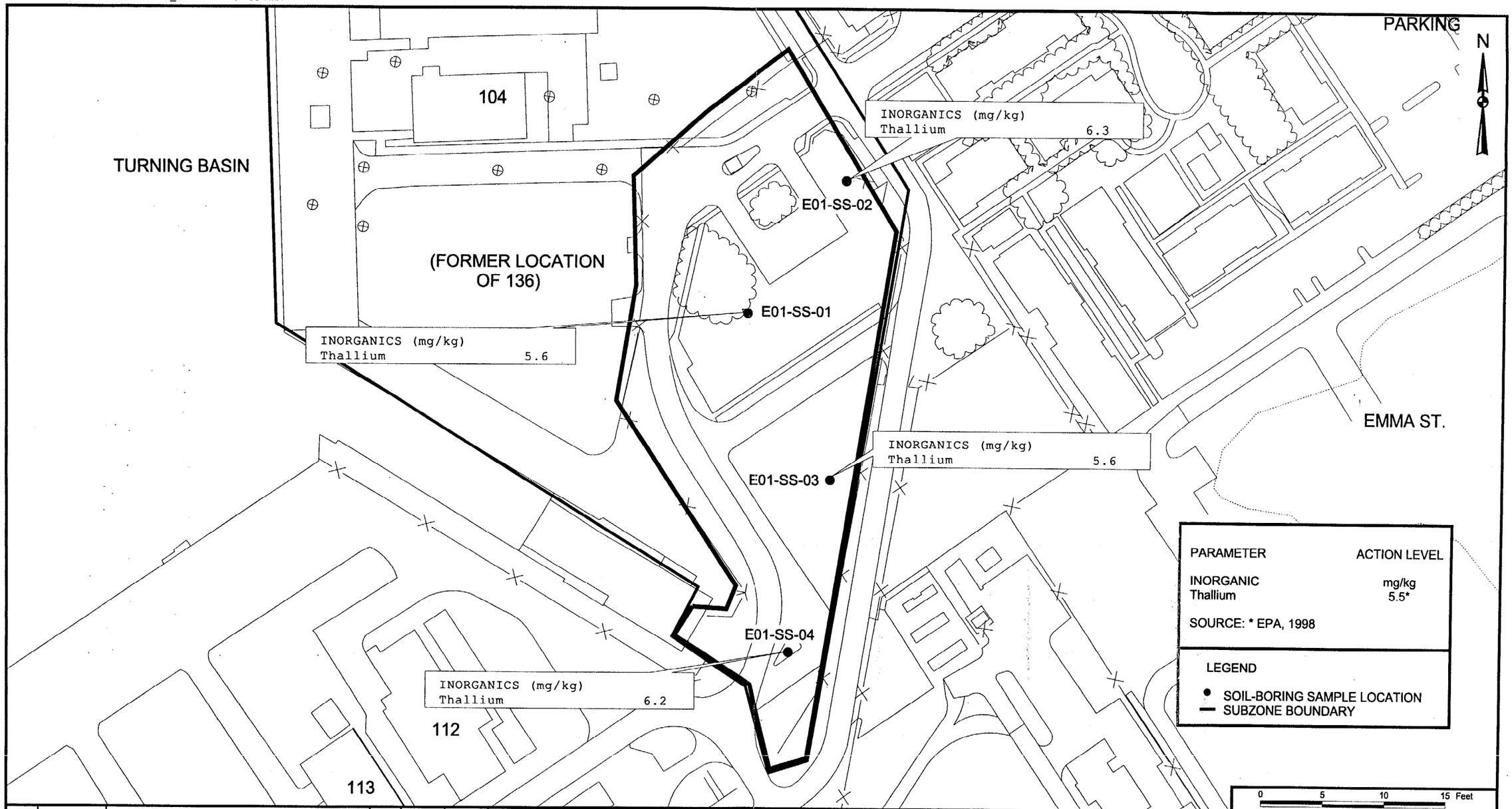

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SCALE APPROXIMATE SCALE AS NOTED	

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 6-2. SUBZONE 1 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
BUILDINGS 102, 103, AND 104 - BRAC PARCEL E
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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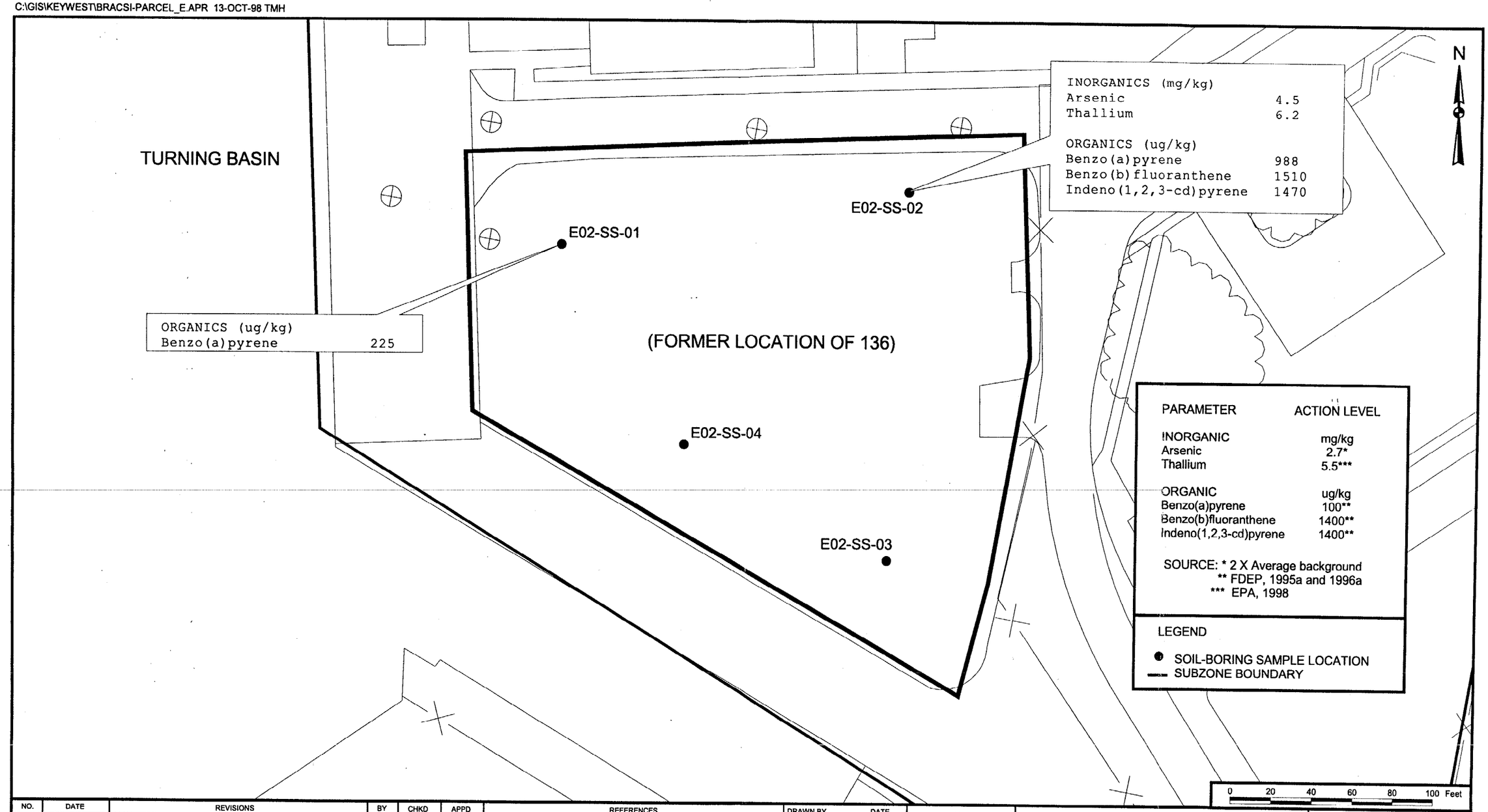

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SCALE: APPROXIMATE SCALE AS NOTED

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 6-3. SUBZONE 2 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
BUILDINGS 102, 103, AND 104 - BRAC PARCEL E
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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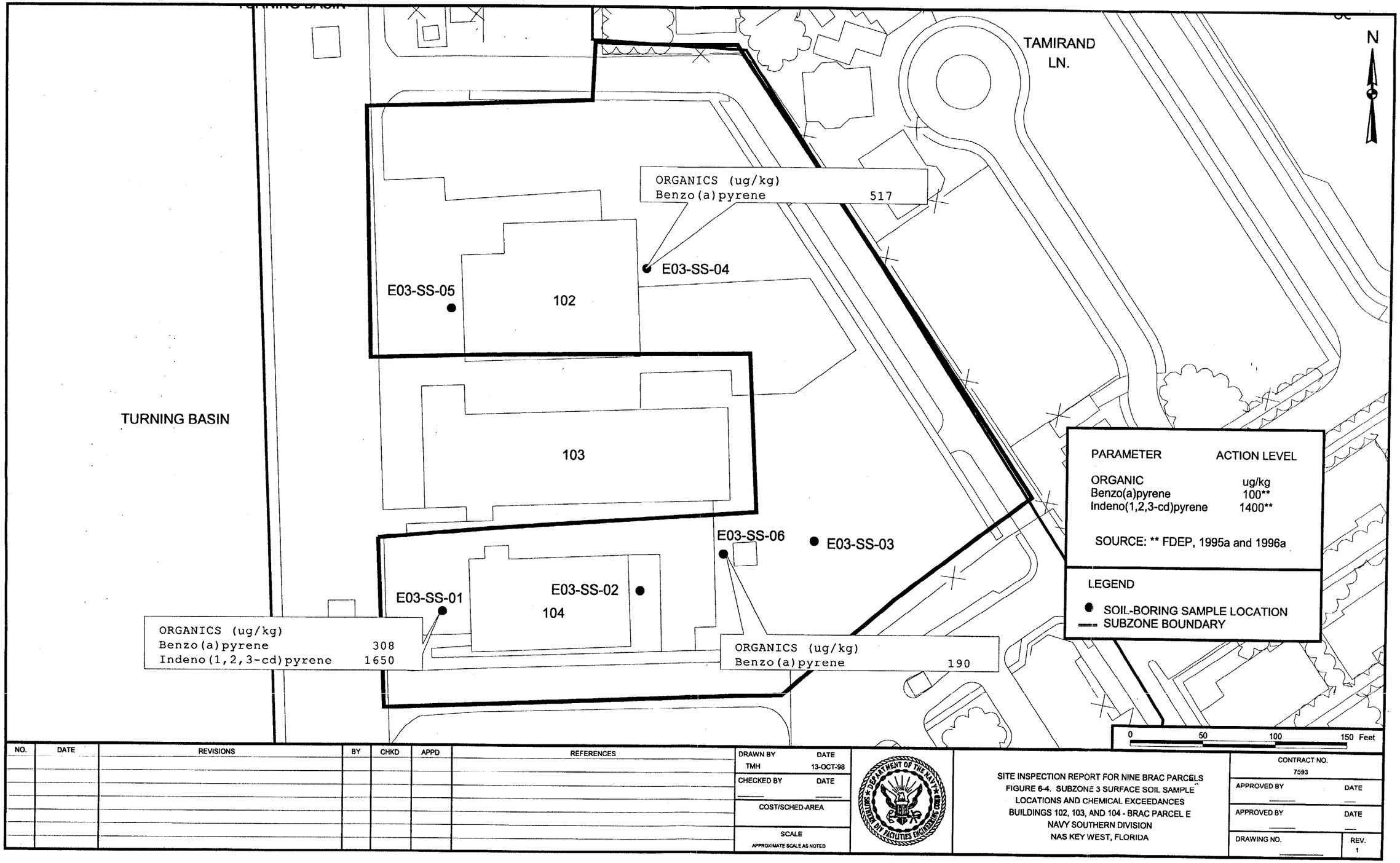

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 6-4. SUBZONE 3 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
BUILDINGS 102, 103, AND 104 - BRAC PARCEL E
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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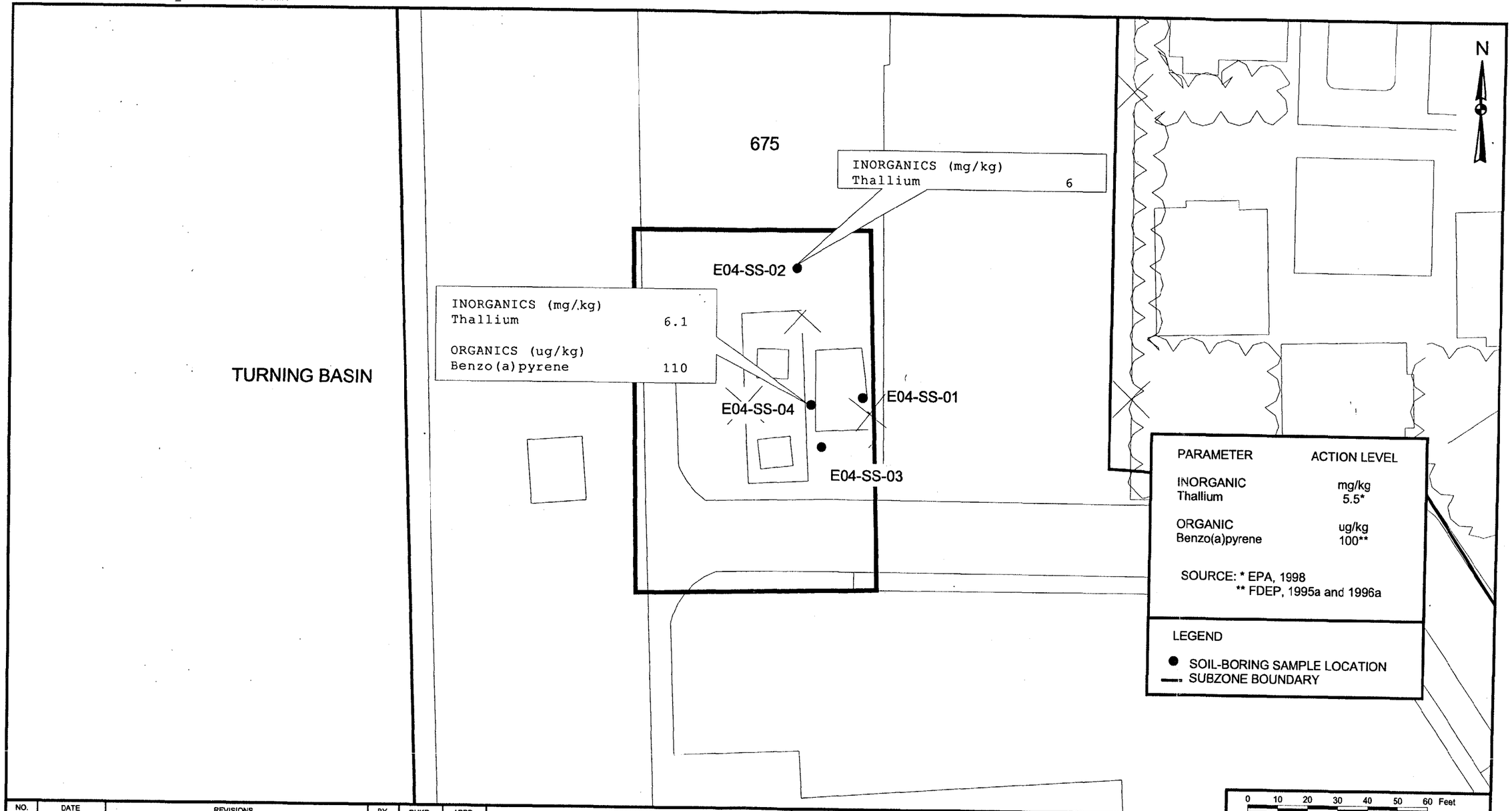

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 6-5. SUBZONE 4 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
BUILDINGS 102, 103, AND 104 - BRAC PARCEL E
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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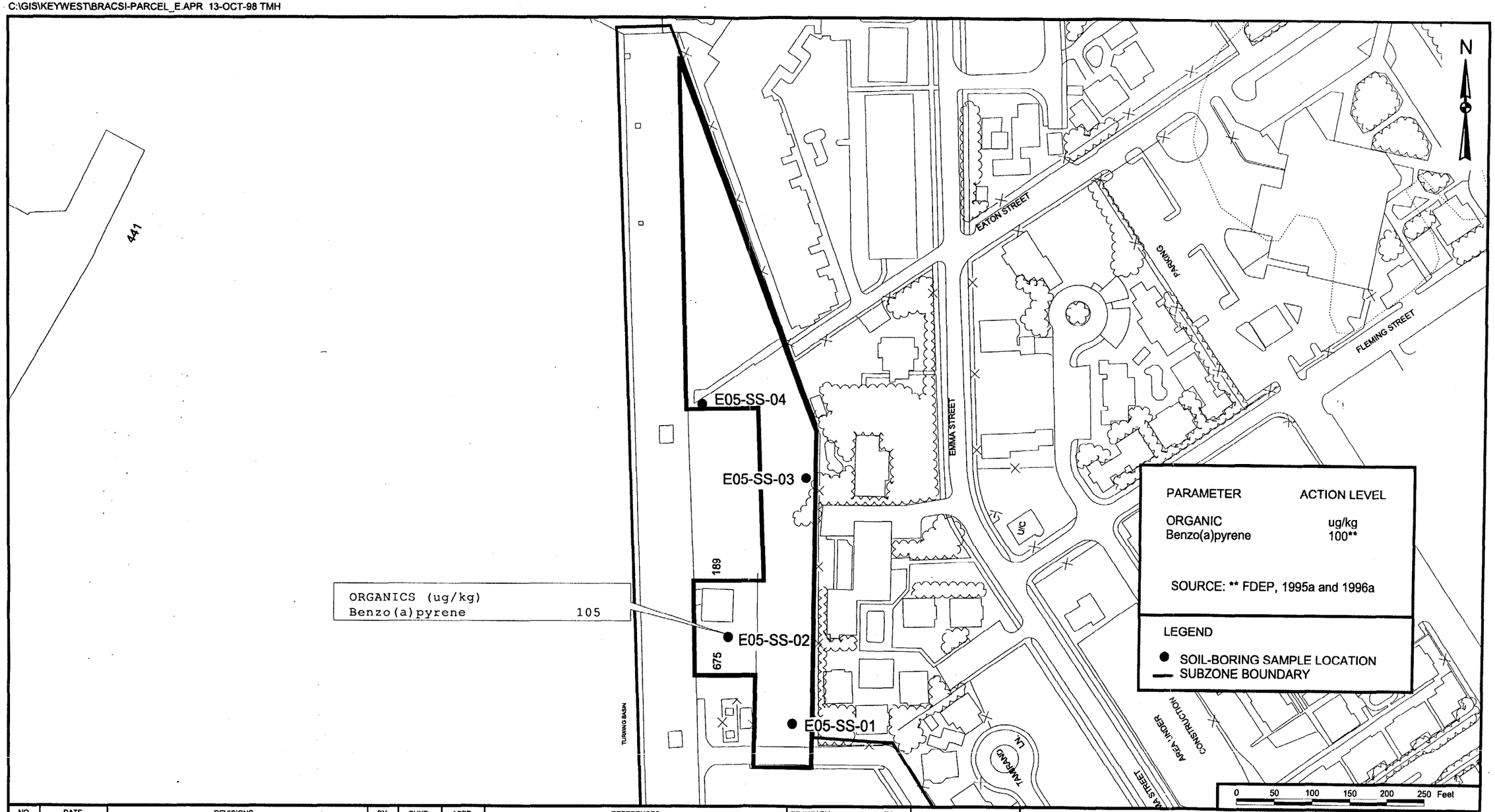

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 6-6. SUBZONE 5 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
BUILDINGS 102, 103, AND 104 - BRAC PARCEL E
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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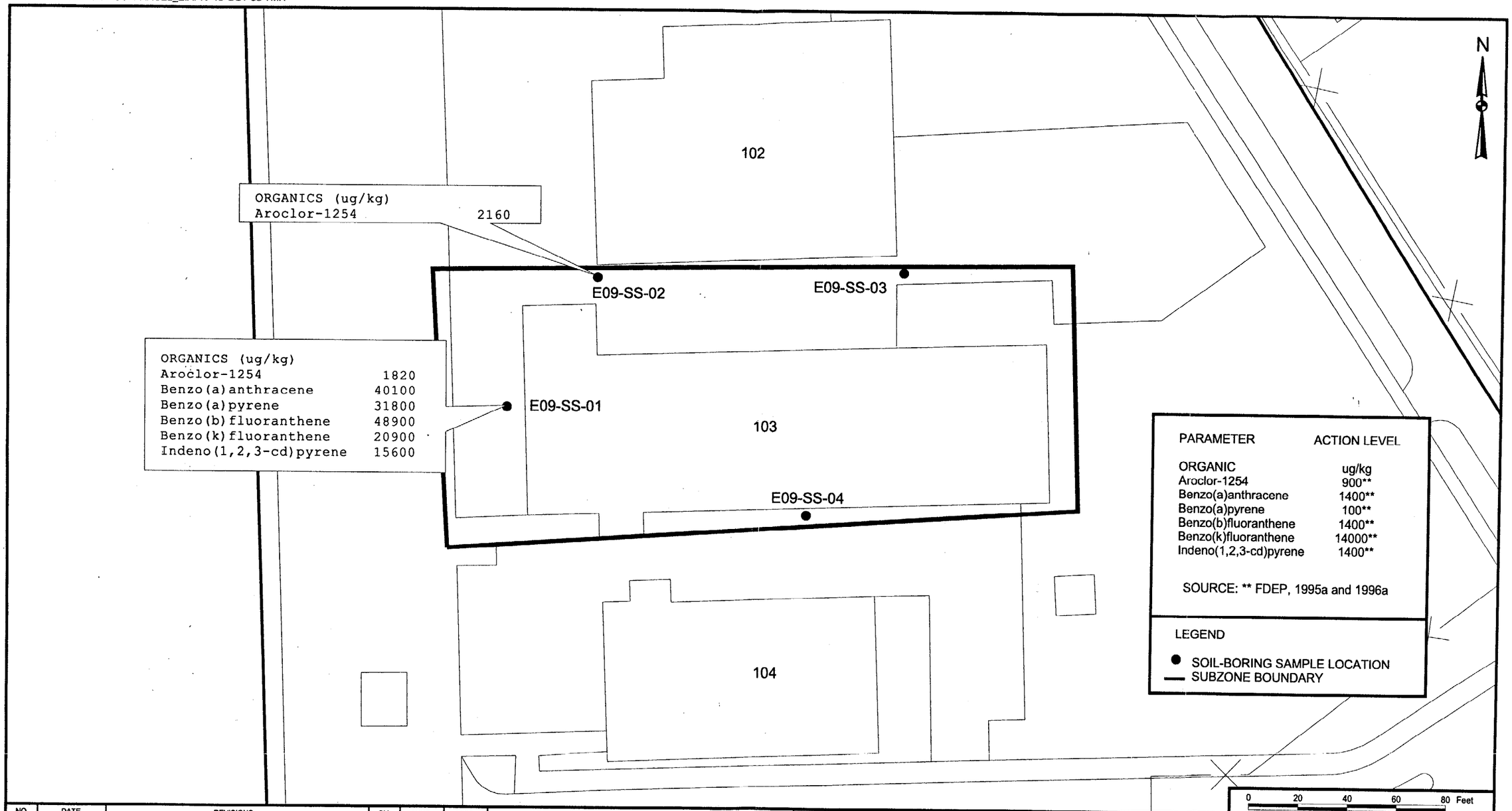

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 6-7. SUBZONE 9 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
BUILDINGS 102, 103, AND 104 - BRAC PARCEL E
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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7.0 TRUMAN ANNEX BUILDING 223 (PARCEL F)

7.1 PARCEL DESCRIPTION

Building 223 (Equipment Repair Shop) (Figure 7-1) is currently used as storage for Port Services. Little is known about previous activities in the building; however, the name implies that naval support equipment was repaired at the building. A closed hazardous waste storage area is south of Building 223. Building 1287 is a closed galley that operated during the 1960s. Adjacent to Building 1287 was a motor pool that operated during the 1950s.

7.2 INVESTIGATION HISTORY

This section describes previous and current investigations for the Truman Annex Building 223 Parcel.

7.2.1 Previous Investigations

Existing documents include the USN-NFEC NAS Key West Predraft EBS Truman Annex; Excess Property (USN-NFEC, 1996a); the USN-NFEC NAS Key West Closure Report on Building 1276 (USN-NFEC, 1995); and the USN-NFEC NAS Key West Closure Report on Building 1287 (USN-NFEC, 1996b).

7.2.2 Current Investigation

The DQO Process evaluated six subzones for Parcel F. Subzones 2, 4, 5, and 6 were eliminated from further evaluation. Two subzones required sampling and analysis under the BRAC SI. The environmental medium of each subzone and the parameter groups selected for analysis at each subzone, are presented in Table 7-1. Subzone 1 (Former Lube Area) and subzone 3 (Building 223 Equipment Repair Shop) were identified as soil subzones. Four sample locations were placed within each subzone as shown on Figures 7-2 through 7-3, respectively. Analytical results for samples collected at Parcel F were compared to an industrial set of action levels (see Section 1.8.2.1).

Although the BRAC SI Workplan (B&R Environmental, 1998a) describes five groundwater subzones at Truman Annex, one at each Parcel (i.e., C, D, E, F, and K), the DQO Process considered the groundwater at Truman Annex as a single unit in the decision-making process. Discussion of sampling and analytical results for groundwater at Truman Annex (including Parcels C, D, E, F, and K) are included in Section 4.6. The location of four permanent monitoring wells and of a single previously existing monitoring well at Truman Annex are shown in Figure 4-5.

7.3 SUBZONE 1 (FORMER LUBE AREA)

The subsections below describe subzone 1, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 1 surface soil.

7.3.1 Subzone Description

Fuels, used oils, solvents, and metals were considered to be potential surface soil contaminants at the former lube area from ASTs (east side) supporting former garage facilities in Parcel F. Four surface soil samples were collected at subzone 1 during the SI field effort. All of the analytical results can be found in Appendix D.

7.3.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in the vicinity of the former lube area for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 7-2. Figure 7-2 shows the location of analytes that exceeded action levels and indicate possible surface soil contamination.

Two inorganics, arsenic and thallium, exceeded their surface soil action levels. The arsenic exceedance (5.2 mg/kg) was in a single sample (SS-04). Arsenic was detected at one other surface soil sample location (SS-01). Thallium was detected at all four soil sample locations but was considered to be in excess at only two locations (SS-01 and SS-03). Inorganics detected below their action levels include aluminum, barium, chromium, cobalt, copper, iron, lead, manganese, vanadium, and zinc. No VOCs were detected at the former lube area. A single SVOC, 1,2,4-trichlorobenzene, was detected at a single sample location at a concentration below its screening value.

7.3.3 Conclusions and Recommendations

Fuels, used oils, solvents, and metals from operations were considered to be potential surface soil contaminants at the former lube area from ASTs (east side) supporting former garage facilities in Parcel F. Two inorganics, arsenic and thallium, were detected in excess of their action levels. The maximum detected concentration of arsenic was used in the estimated risk process as described in Section 1.8.2.2. Calculations and estimates can be found in Appendix C, Table C-3. The maximum

arsenic detection was indicative of potential carcinogenic human health risks, but not of noncarcinogenic risks. The thallium exceedance is suspect and will not be used to drive further action. However, due to the arsenic contamination at subzone 1, further action is recommended.

7.4 SUBZONE 3 (BUILDING 223 EQUIPMENT REPAIR SHOP)

The subsections below describe subzone 3, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 3 surface soil.

7.4.1 Subzone Description

Metals, fuels, and solvents were considered potential sources of contamination at subzone 3 from Building 223 which was used as an equipment repair shop and a plumbing shop, and from a neighboring hazardous waste storage area. Four surface soil samples were collected in the vicinity of the equipment repair shop. All of the analytical results can be found in Appendix D.

7.4.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in the vicinity of Building 223 for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 7-3. Figure 7-3 shows the location of analytes that exceeded action levels and indicate possible surface soil contamination.

One inorganic, arsenic, exceeded its 2.7 mg/kg surface soil action level at two sample locations (SS-03, 3.2 mg/kg; SS-04, 16.8 mg/kg). Inorganics detected at concentrations below their action levels include aluminum, antimony, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, silver, thallium, vanadium, and zinc. No VOCs or SVOCs were detected in excess of their action levels. Acetone, methylene chloride, and toluene were the only VOCs detected at subzone 3. SVOCs detected below their screening criteria, included 1,2,4-trichlorobenzene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene.

7.4.3 Conclusions and Recommendations

Metals, fuels, and solvents from use of Building 223 as an equipment repair shop, and plumbing shop, and from a neighboring hazardous waste storage area were considered potential sources of contamination at Building 223. A single inorganic, arsenic, was detected in excess of its 3.7 mg/kg action level. The maximum detected concentration of arsenic was used in the estimated risk process as described in Section 1.8.2.2. Calculations and estimates can be found in Appendix C, Table C-3. The maximum detected concentration of arsenic was indicative of potential carcinogenic and noncarcinogenic human health risks. Therefore, further action is recommended.

7.5 PARCEL F CONCLUSIONS AND RECOMMENDATIONS

Fuels, oils, solvents, and metals were considered to be potential contaminants in soil at Parcel F during the DQO Process. An overview of the DQO Process is found in Section 3.0 of the BRAC SI Workplan, and subzone-specific criteria are found in Appendix B of the BRAC SI Workplan. Arsenic was detected in excess of its action level in both soil subzones. Both detections were indicative of potential carcinogenic human health risks and one of the exceedances was indicative of potential noncarcinogenic human health risks. Thallium was indicative of potential human health risks in subzone 1 but will not be used to drive further action. Due to the nature of potential human health risks in subzones 1 and 3, further action is recommended. An interim remedial action is recommended for subzones 1 and 3 to remove contaminated soil.

TABLE 7-1

PARAMETER GROUPS AND MEDIA OF INTEREST AT TRUMAN ANNEX BUILDING 223 (PARCEL F) NAS KEY WEST

				Parameter Group				
Subzone	Building/Area	Medium	Number of Locations	VOCs	SVOCs	Inorganics	PCBs	Pesticides
Subzone 1	Former Lube Area	SO	4	X	X	X		
Subzone 3	Building 223 Equipment Repair Shop	SO	4	X	X	X		

SO = Surface soil.

Subzones 2, 4, 5, and 6 were eliminated from sampling during the DQO Process.

TABLE 7-2

CHEMICALS DETECTED IN PARCEL F SUBZONE 1 SURFACE SOIL
NAS KEY WEST

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
F01-SS-04	Aluminum	2,000	
F01-SS-02	Aluminum	513	
F01-SS-01	Aluminum	497	
F01-SS-03	Aluminum	320	
F01-SS-04	Arsenic	5.2	
F01-SS-01	Arsenic	2.5	
F01-SS-04	Barium	7.5	J
F01-SS-01	Barium	7.1	J
F01-SS-03	Barium	7	J
F01-SS-02	Barium	4.1	J
F01-SS-04	Chromium	6.7	
F01-SS-01	Cobalt	0.4	
F01-SS-01	Copper	3.2	
F01-SS-02	Copper	2	
F01-SS-04	Copper	1.8	
F01-SS-03	Copper	1.7	
F01-SS-02	Iron	1,770	
F01-SS-04	Iron	1,140	
F01-SS-01	Iron	439	
F01-SS-03	Iron	238	
F01-SS-02	Lead	14.4	
F01-SS-04	Lead	2.3	
F01-SS-01	Lead	2.1	
F01-SS-02	Manganese	13.1	
F01-SS-04	Manganese	6.3	
F01-SS-01	Manganese	5.9	
F01-SS-03	Manganese	3.2	
F01-SS-03	Thallium	7.7	
F01-SS-01	Thallium	7.4	
F01-SS-04	Thallium	5.4	
F01-SS-02	Thallium	4.1	
F01-SS-04	Vanadium	5.9	
F01-SS-01	Vanadium	2.9	
F01-SS-03	Vanadium	2.6	
F01-SS-02	Vanadium	1.5	
F01-SS-02	Zinc	17.4	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
F01-SS-01	1,2,4-trichlorobenzene	4.6	J

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 7-3

CHEMICALS DETECTED IN PARCEL F SUBZONE 3 SURFACE SOIL
NAS KEY WEST
PAGE 1 OF 2

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
F03-SS-01	Aluminum	792	
F03-SS-04	Aluminum	693	
F03-SS-02	Aluminum	476	
F03-SS-03	Aluminum	363	
F03-SS-01	Antimony	1.6	
F03-SS-04	Arsenic	16.8	
F03-SS-03	Arsenic	3.2	
F03-SS-01	Barium	25.6	
F03-SS-02	Barium	25.2	
F03-SS-03	Barium	16.6	
F03-SS-04	Barium	14.5	
F03-SS-01	Cadmium	0.62	
F03-SS-03	Cadmium	0.3	
F03-SS-04	Chromium	12.3	
F03-SS-01	Chromium	7.8	
F03-SS-03	Chromium	5.1	
F03-SS-02	Chromium	4.4	
F03-SS-03	Cobalt	0.53	
F03-SS-04	Cobalt	0.47	
F03-SS-01	Cobalt	0.35	
F03-SS-01	Copper	64.4	
F03-SS-03	Copper	38.8	
F03-SS-04	Copper	22.1	
F03-SS-02	Copper	10	
F03-SS-04	Iron	1,960	
F03-SS-01	Iron	1,620	
F03-SS-03	Iron	1,120	
F03-SS-02	Iron	493	

Location	Parameter	Result	Qual(*)
F03-SS-01	Lead	153	
F03-SS-02	Lead	64.6	
F03-SS-03	Lead	40.2	
F03-SS-04	Lead	29.4	
F03-SS-03	Manganese	55.8	
F03-SS-01	Manganese	24.1	
F03-SS-04	Manganese	22.3	
F03-SS-02	Manganese	7.5	
F03-SS-04	Nickel	2.9	
F03-SS-01	Nickel	2.5	
F03-SS-03	Nickel	2.5	
F03-SS-02	Nickel	1.2	
F03-SS-02	Silver	0.63	
F03-SS-01	Silver	0.61	
F03-SS-03	Silver	0.6	
F03-SS-04	Silver	0.59	
F03-SS-03	Thallium	5.4	
F03-SS-01	Thallium	5.2	
F03-SS-02	Thallium	5.1	
F03-SS-04	Thallium	4.3	
F03-SS-04	Vanadium	5.6	
F03-SS-01	Vanadium	3.5	
F03-SS-03	Vanadium	2.4	
F03-SS-02	Vanadium	2	
F03-SS-01	Zinc	84.6	
F03-SS-03	Zinc	67.4	
F03-SS-02	Zinc	36.6	
F03-SS-04	Zinc	25.5	

TABLE 7-3

CHEMICALS DETECTED IN PARCEL F SUBZONE 3 SURFACE SOIL
NAS KEY WEST
PAGE 2 OF 2

Location	Parameter	Result	Qual(*)
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
F03-SS-01	1,2,4-trichlorobenzene	3.6	J
F03-SS-01	Benzo(a)pyrene	44.4	
F03-SS-04	Benzo(b)fluoranthene	81.9	
F03-SS-01	Benzo(b)fluoranthene	79.3	
F03-SS-01	Benzo(g,h,i)perylene	40	
F03-SS-01	Fluoranthene	56.6	
F03-SS-04	Fluoranthene	41.1	J
F03-SS-03	Fluoranthene	13.6	J
F03-SS-01	Indeno(1,2,3-cd)pyrene	108	
F03-SS-01	Pyrene	52.4	
F03-SS-04	Pyrene	51.2	J
F03-SS-03	Pyrene	13.3	J
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
F03-SS-04	Acetone	805	
F03-SS-02	Acetone	19.5	
F03-SS-02	Methylene chloride	5.6	
F03-SS-04	Methylene chloride	2.7	
F03-SS-03	Toluene	0.35	J
F03-SS-01	Toluene	0.34	J

Shading indicates a concentration in excess of the selected screening value.

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

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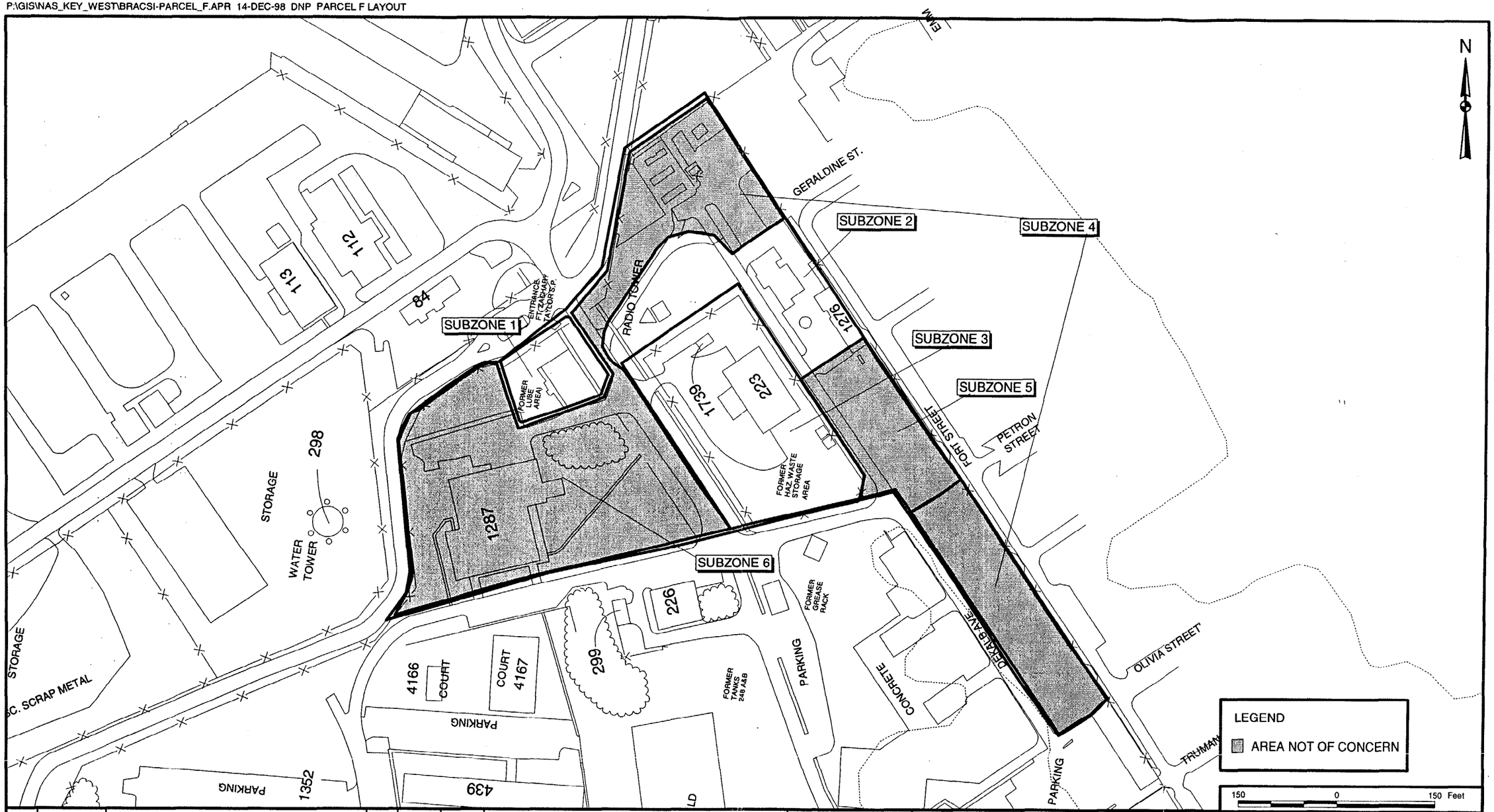

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 7-1. SUBZONE AND PARCEL BOUNDARIES
BUILDING 233 - BRAC PARCEL F
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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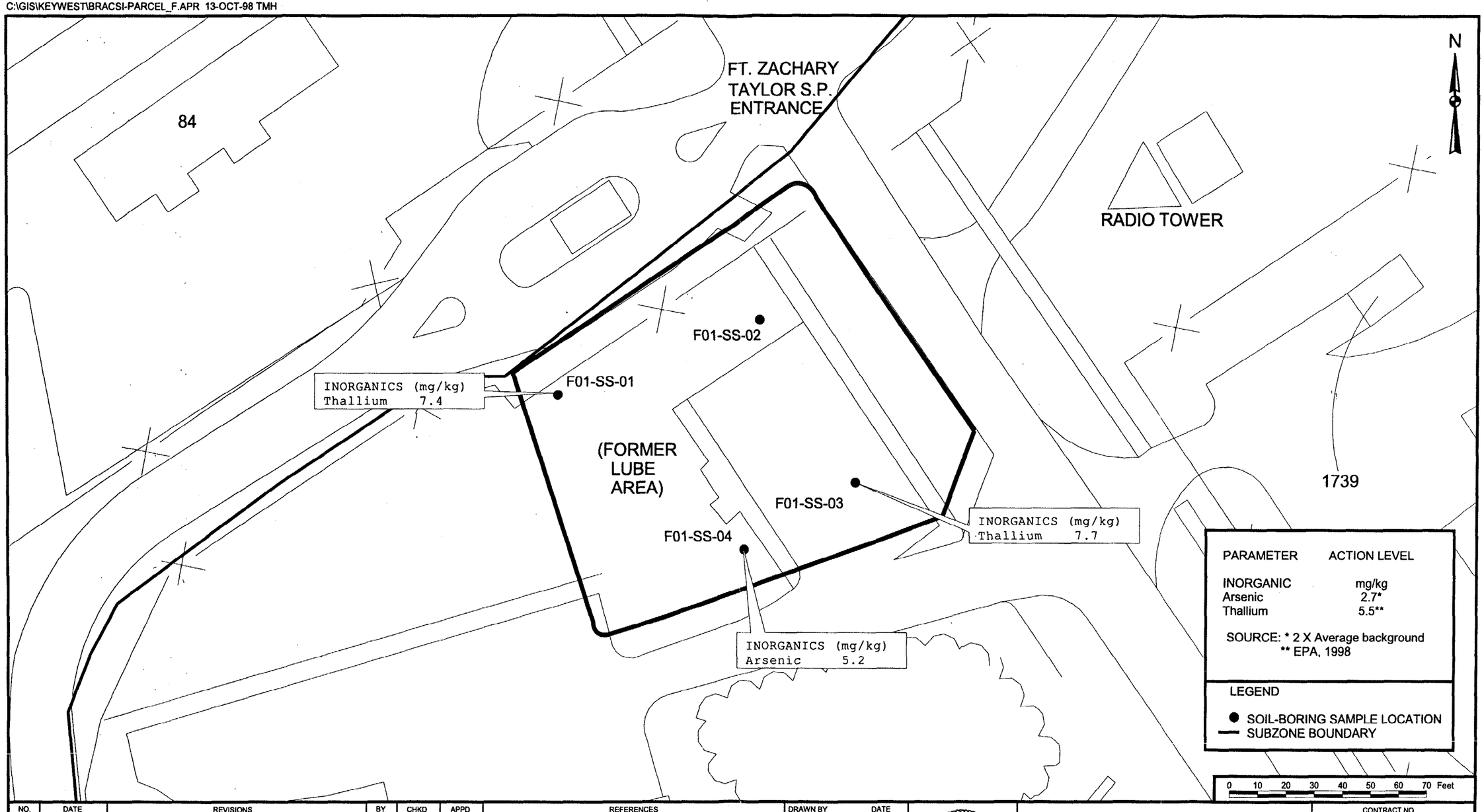

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 7-2. SUBZONE 1 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
BUILDING 233 - BRAC PARCEL F
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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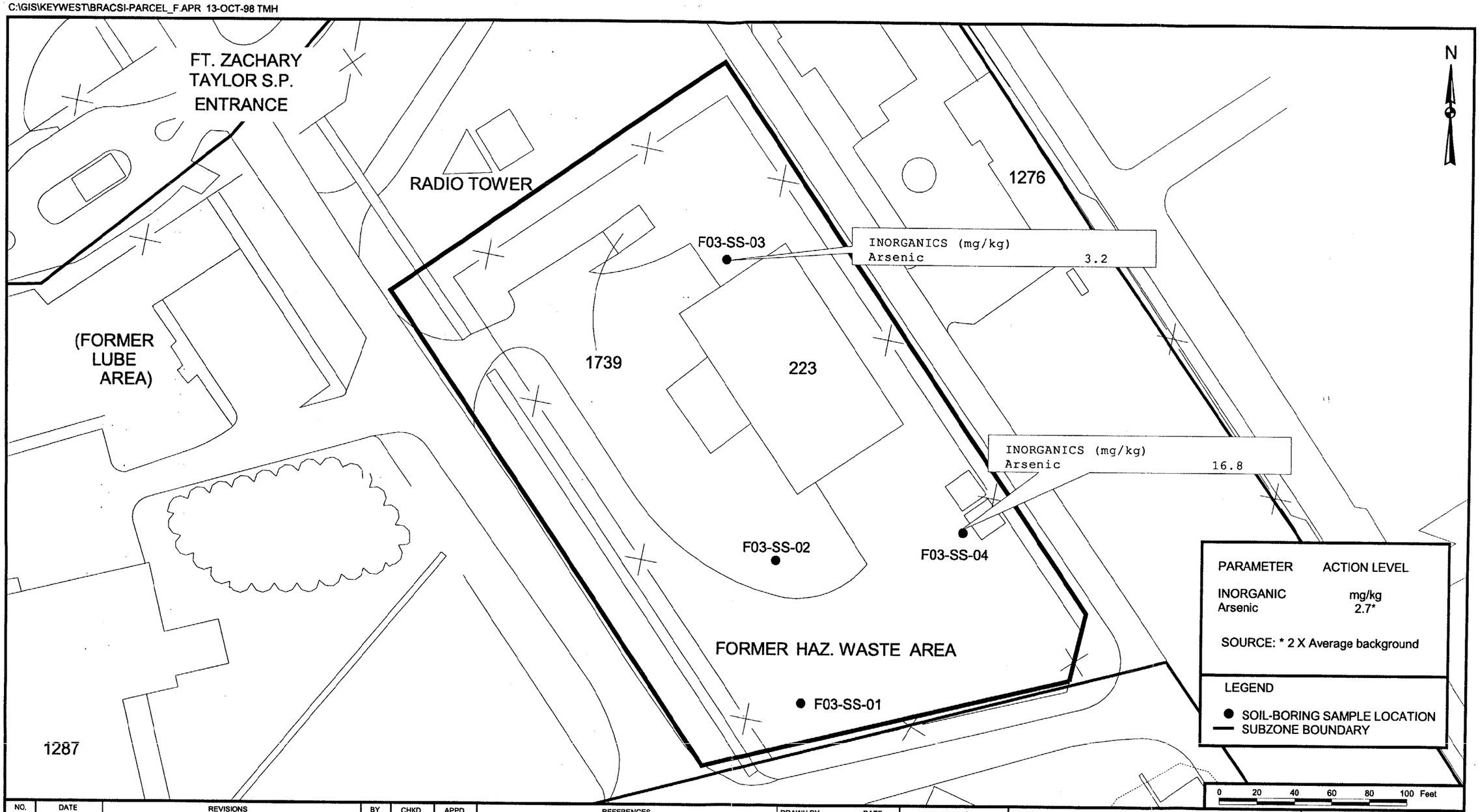

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SITE INSPECTION REPORT FOR NINE BRAC PARCELS.
FIGURE 7-3. SUBZONE 3 SURFACE SOIL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
BUILDING 233 - BRAC PARCEL F
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

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8.0 TRUMBO POINT PIERS D-1 AND D-3 (PARCEL H)

8.1 PARCEL DESCRIPTION

Trumbo Point Piers D1 and D3 (Figure 8-1) are two of three original harbor terminal piers constructed in 1914 by the Florida East Coast Railroad Company. The piers were used by the railroad and P.O. Steamship Company as part of an overseas railroad freight car ferry system. The piers were abandoned in 1935 after severe hurricane damage. Some time later Pier D3 was used as an oil dock by Orange State Oil Company. In August 1942, Pier D1 was purchased by the Navy from Trumbo Point Properties, Inc. Pier D3 was purchased from Orange State Oil Company in December 1942. The Navy used the property in support of various ship and craft operations until the late 1980s. A chain link fence has been installed along the length of Pier D1. The USCG uses the north side of the pier and the Naval Air Warfare Center uses the south side (including all buildings and structures). The Navy does not use Pier D3, but the USCG uses a fenced portion of the pier, including Building 45.

8.2 INVESTIGATION HISTORY

This section describes previous and current investigations for the Trumbo Piers D-1 and D-3 Parcel.

8.2.1 Previous Investigations

Existing documents include the USN-NPWC Lead and Asbestos Survey of Trumbo Point Pier (USN-NPWC, 1995c); the USN-SUPSHIP Predraft EBS Realignment Parcels (USN-SUPSHIP, 1996), and the USN-NFEC Preliminary CAR for Trumbo Point Fuel Farm (USN-NFEC, 1994b). No groundwater analytical data exist.

Based on the 1995 inspection performed by the NPWC, both LBP and ACBMs are present in Pier D1 buildings. Pier D3 appears to contain numerous areas of LBP, but no ACBMs are associated with current facilities, although it is likely that ACBMs have been used and handled there in the past.

The EBS (USN-SUPSHIP, 1996) documented a number of factors that are potentially helpful in characterizing the current physical condition of the site:

- Although the storage of hazardous or petroleum substances at the site in the past has been documented, no visible sheen or discoloration of surface water has been observed.

- No stains were observed on site soils, although numerous small stains that appear to be paint- or petroleum-related were noted throughout the site facilities.

- Two oily water flow-through process tanks are located at the northern corner of Pier D1. The tanks are not used by the present tenant.

- Pier D3 contains two USTs -- a 550-gallon waste-oil tank and a 250-gallon oily-waste tank. Both tanks have been abandoned. The fueling operations and associated piping have also been abandoned.

- The presence of PCBs is not suspected at Piers D1 or D3. Transformers at Pier D3 have been identified as non-PCB.

- Although pesticides are commonly used for mosquito and pest control throughout NAS Key West, there is no evidence of pesticide misuse at the site.

8.2.2 Current Investigation

The DQO Process evaluated six subzones for Trumbo Point Piers D-1 and D-3. Subzones 1, 2, 3, 4, and 5 were eliminated from further evaluation. One subzone within Parcel H required sampling and analysis under the BRAC SI. The parameter groups selected for analysis at this groundwater subzone are presented in Table 8-1. Four existing groundwater monitoring wells were used as the BRAC SI sample locations in subzone 6 as shown in Figure 8-2. Analytical results for samples collected at Parcel H were compared to an industrial set of action levels (see Section 1.8.2.1).

8.3 SUBZONE 6 (GROUNDWATER)

The subsections below describe subzone 6, present the contaminants detected, compare the detected concentrations with selected screening values, and provide conclusions on the SI findings for subzone 6 groundwater.

8.3.1 Subzone Description

Solvents and metals were considered potential groundwater contaminants at Parcel H, especially at the east end of Pier D-1 from potential leaks at an oil-water separator, and from past use of Piers D-1 and D-3. Four groundwater samples were collected from permanent groundwater monitoring wells at the east end of Pier D-1. All of the analytical results can be found in Appendix D.

8.3.2 Site Investigation Findings

Contamination was investigated by analyzing groundwater in monitoring wells at Parcel H for VOCs and inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the groundwater sample are listed in Table 8-2. Figure 8-2 shows the location of analytes that exceeded action levels and indicated possible groundwater contamination.

No chemicals were detected in excess of the screening criteria. 2-hexanone was the only VOC detected. Iron, lead, tin, vanadium, and zinc were the inorganics detected at concentrations below their action levels.

Monitoring well MW-42 was not sampled at the time the other samples were taken due to the presence of free-product. The NAS Key West Partnering Team subsequently decided to sample MW-42 during May 1998. No chemicals were detected in excess of action levels. Inorganics detected below action levels include aluminum, barium, chromium, copper, iron, lead, manganese, nickel, tin, vanadium, and zinc. No VOCs or SVOCs were detected. Free product recovery activities were then conducted at MW-42. The monitoring well was visited weekly for 4 weeks from July 22, 1998 to August 12, 1998. The product thickness was measured at each visit and an attempt was made to recover product at each visit. Each time, the product thickness was too thin to measure. Product recovery attempts resulted in the recovery of groundwater mixed with very small quantities of fuel (approximately 1 percent of the total).

Another groundwater sample was obtained from MW-42 in October 1998. No chemicals were detected in excess of action levels. Inorganics detected below action levels include chromium, iron, manganese, nickel, vanadium, and zinc. One SVOC, 2-methylnaphthalene, was detected below its action level.

8.3.3 Parcel H Conclusions and Recommendations

Solvents and metals were considered potential groundwater contaminants at subzone 6 during the DQO Process. An overview of the DQO Process is found in Section 3.0 of the BRAC SI Workplan, and subzone-specific criteria are found in Appendix B of the BRAC SI Workplan. No chemicals exceeded their action levels at subzone 6. Groundwater-to-surface-water migration of contaminants is possible at Trumbo Point, especially since groundwater at Key West is shallow. However, ecological receptors are not directly exposed to groundwater, and no groundwater thresholds have been developed based on ecological concerns. Therefore, groundwater concentrations of analytes that exceeded action levels and had no action levels were compared to surface-water screening values (where applicable) as a conservative scenario (e.g., no attenuation or dilution) in accordance with EPA Region 4 (EPA, 1995a)

and FDEP (FDEP, 1996b) requirements. 2-hexanone was detected in only one of the monitoring wells sampled at Parcel H. Its detected value was 48.8 µg/L. There are no EPA Region 4 nor FDEP ecological screening levels for this contaminant (EPA, 1995a; FDEP, 1996b). However, EPA Region 3 BTAG has established a screening level of 428,000 µg/L (EPA, 1995b) for 2-hexanone in fresh water (a value for saltwater was not available), which was established as the action level. Based on the infrequent detection of this contaminant, and the fact that its detected value was well below the available screening level, there is no evidence of ecological risks from 2-hexanone in groundwater at Parcel H.

Monitoring well MW-42 was sampled before and after free-product removal activities. No chemicals were detected in excess of action levels in either sample. Therefore, no further action is required at Parcel H.

TABLE 8-1

PARAMETER GROUPS AND MEDIA OF INTEREST AT TRUMBO POINT PIERS D-1 AND D-3 (PARCEL H) NAS KEY WEST

Subzone	Building/Area	Medium	Number of Locations	Parameter Group				
				VOCs	SVOCs	Inorganics	PCBs	Pesticides
Subzone 6	Groundwater	GW	4[a]	X		X		

Notes:
a One location was not sampled due to the presence of free product in the well.

GW = Groundwater.

Subzones 1, 2, 3, 4, and 5 were eliminated from sampling during the DQO Process.

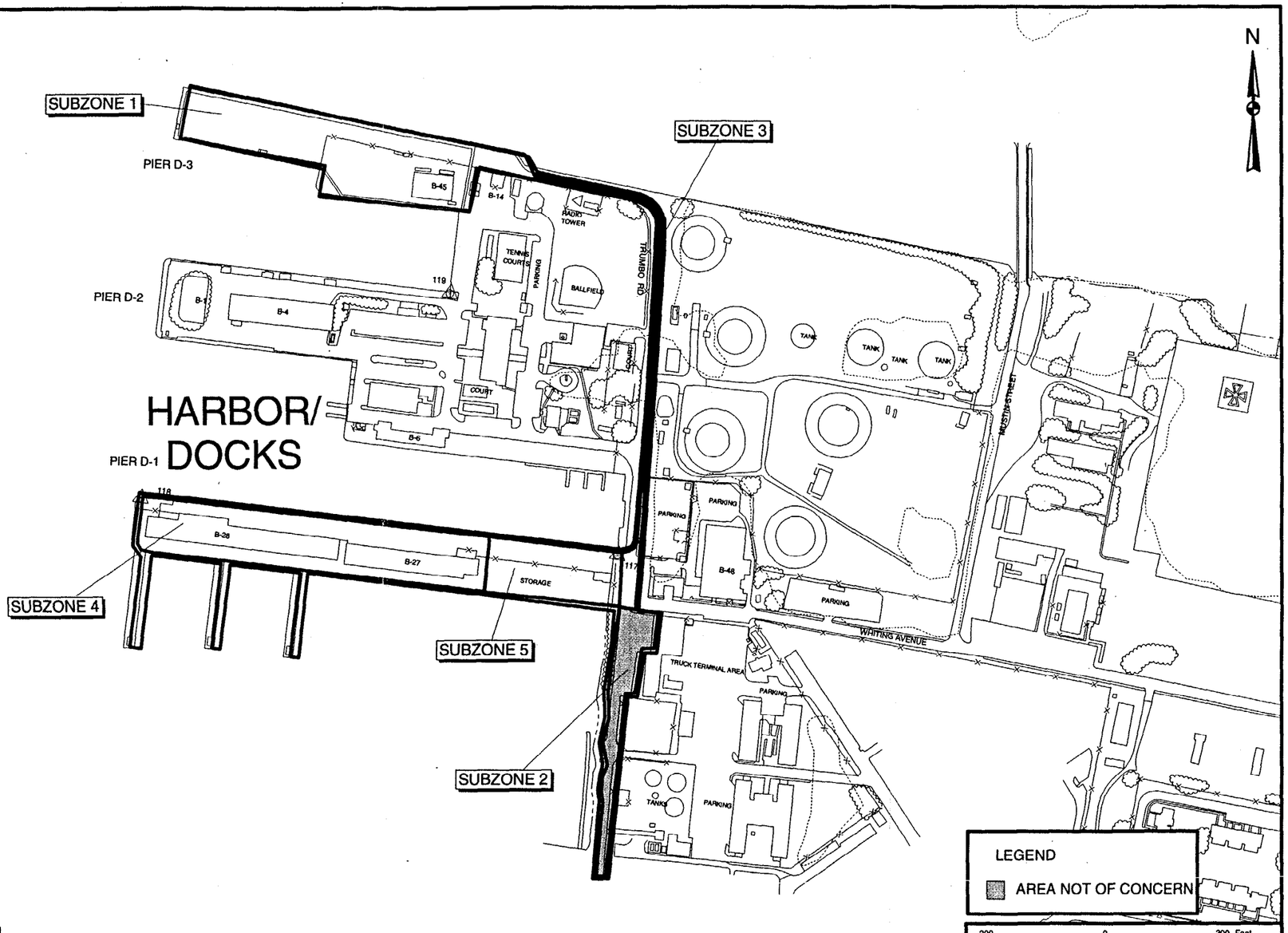
TABLE-8-2

CHEMICALS DETECTED IN PARCEL H SUBZONE 6 GROUNDWATER NAS KEY WEST

Location	Parameter	Result	Qual(*)
INORGANICS (µg/L)			
H06-MW-42[2]	Aluminum	645	
H06-MW-42[2]	Barium	15	
H06-MW-42[2]	Chromium	3.1	
H06-MW-42[1]	Chromium	2.1	
H06-MW-42[2]	Copper	5.9	
H06-MW-42[1]	Iron	486	
H06-MW-42[2]	Iron	1,010	
H06-MW-42[2]	Lead	1.5	
H06-MW-42[1]	Manganese	5.4	
H06-MW-42[2]	Manganese	5.4	
H06-MW-42[2]	Nickel	2	
H06-MW-42[1]	Nickel	3	
H06-MW-42[2]	Tin	25.8	
H06-MW-42[1]	Vanadium	3.7	
H06-MW-42[2]	Vanadium	6.9	
H06-MW-42[1]	Zinc	33.2	
H06-MW-42[2]	Zinc	37.4	
H06-MW-103	Iron	506	
H06-MW-13	Iron	280	
H06-MW-41	Iron	803	
H06-MW-103	Lead	4.8	
H06-MW-13	Lead	13.45	
H06-MW-41	Lead	4.4	
H06-MW-13	Tin	44.9	
H06-MW-41	Vanadium	86.2	
H06-MW-103	Zinc	48.5	
H06-MW-13	Zinc	58.4	
H06-MW-41	Zinc	49.0	
VOLATILE ORGANIC COMPOUNDS (µg/L)			
H06-MW-41	2-hexanone	48.8	
H06-MW-42[1]	2-methylnaphthalene	8.3	J

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.
[1] Sample Collected 10/15/98
[2] Sample Collected 5/15/98

P:\GIS\NAS_KEY_WEST\BRACSI-PARCEL_H.APR 14-DEC-98 DNP PARCEL H LAYOUT



NOTE: SUBZONE 6 (GROUNDWATER) INCLUDES ALL OF PARCEL H

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY	DATE
TMH	15-OCT-98
CHECKED BY	DATE
COST/SCHED-AREA	
SCALE	
APPROXIMATE SCALE AS NOTED	

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 8-1. SUBZONE AND PARCEL BOUNDARIES
TRUMBO POINT PIERS D-1 AND D-3 - BRAC PARCEL H
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

CONTRACT NO.	
7593	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	REV.
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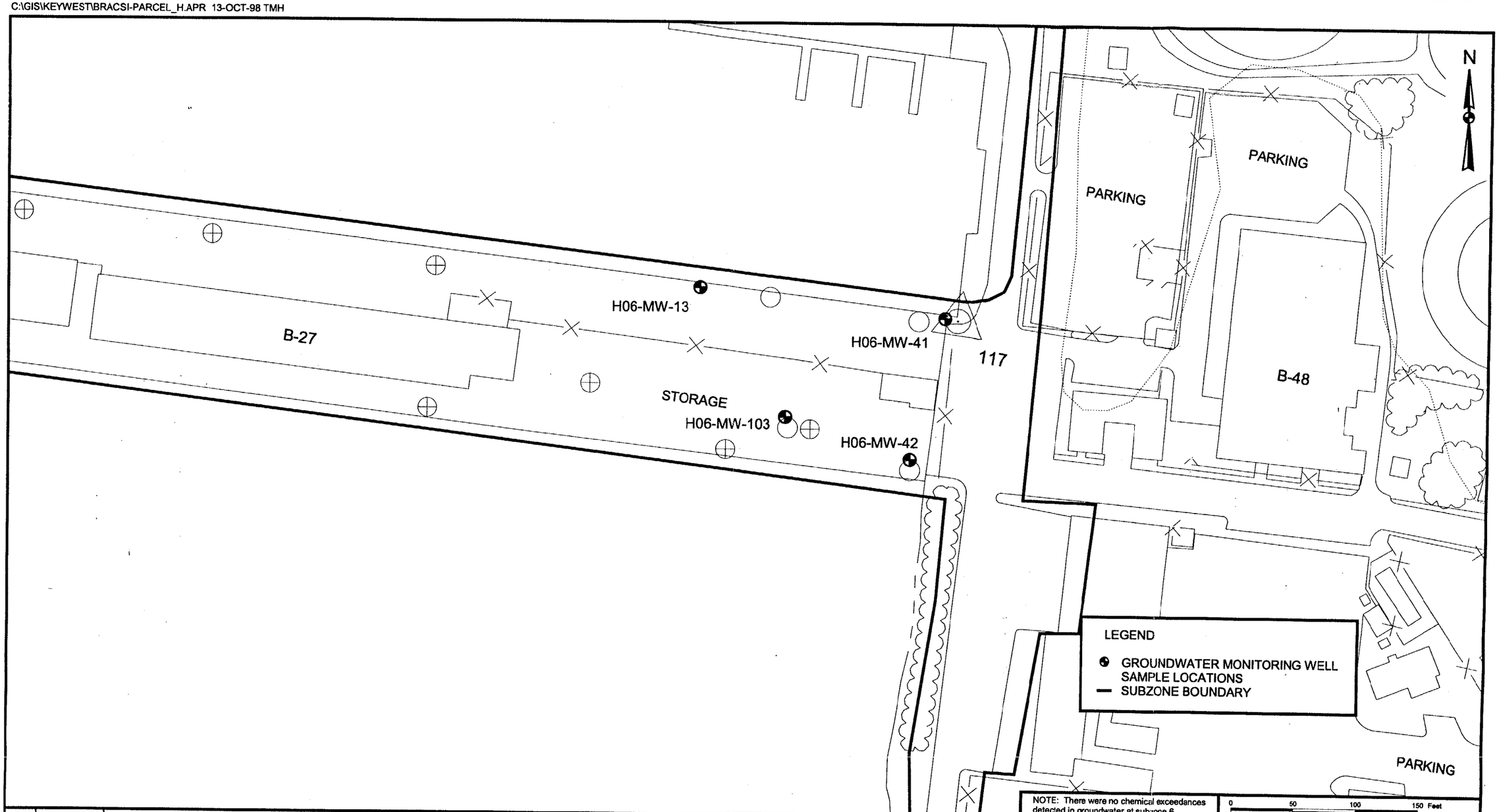

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY TMH — DATE 13-OCT-98
CHECKED BY ____ — DATE ____
COST/SCHED-AREA
SCALE: APPROXIMATE SCALE AS NOTED

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 8-2. SUBZONE 6 GROUNDWATER MONITORING WELL SAMPLE LOCATIONS AND CHEMICAL EXCEEDANCES
TRUMBO POINT PIERS D-1 AND D-3 - BRAC PARCEL H
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

CONTRACT NO. 7593
APPROVED BY ____ DATE ____
APPROVED BY ____ DATE ____
DRAWING NO. ____ REV. 1

9.0 WATERFRONT MAINTENANCE FACILITIES (PARCEL K)

9.1 PARCEL DESCRIPTION

Parcel K (Figure 9-1) includes Buildings 84, 112, 113, and 149. Building 113 is a Special Forces Operations Center (former Paint and Oil Storage). Building 149 is the NAS Key West Port Operations (Port Ops) Building (former Gear and Spare Parts Storage). Port Ops provides and maintains boats (less than 60 feet) to support naval activities for NAS Key West. The building also includes an active hazardous waste storage area. Building 84 is vacant, but it most recently was a Naval Convenience Store and formerly was a Transportation Pool. Building 112 is currently a Public Works Warehouse and formerly was used as a Submarine Spare Parts Building. Former buildings in the Parcel that have been razed include:

- 111 - Paint Shop/former Marine Railway Utilities (pre 1951)
- 137 - Outside Machine Shop/former Fitting Out Shop (pre 1951)
- 138 - Central Tool Room/former Galvanizing Shop (pre 1951)
- 139 - Pipe and Copper Shop
- 140 - Boiler Shop
- 141 - Foundry
- 143 - Lumber Shed
- 144 - Public Work Warehouse
- 145 - Patrol Craft (PC) Boat Shop
- 146 - Experimental Lab
- 150 - Echo Repeater Shop/former Paint Shop (pre 1951)
- 153 - Rigger's Shop/former Cafeteria Annex (pre 1951)

9.2 INVESTIGATION HISTORY

This section describes previous and current investigations for the Waterfront Maintenance Facilities Parcel.

9.2.1 Previous Investigations

Existing documents include the USN-NFEC NAS Key West Draft EBS Truman Annex Outer Mole Pier 8/ Buildings 149, 1374, 4080 (USN-NFEC, 1997); the USN-NFEC NAS Key West Predraft EBS Truman

Annex; Excess Property (USN-NFEC, 1996a); and the USN-NPWC Lead and Asbestos Survey of Truman Pier (USN-NFWC, 1996). No soil or groundwater analytical data exist.

9.2.2 Current Investigation

The DQO Process evaluated six subzones for Parcel K. Subzones 4, 6, and 7 were eliminated from further evaluation. Three subzones within Parcel K required sampling and analysis under the BRAC SI. The environmental medium of each subzone and the parameter groups selected for analysis at each subzone, are presented in Table 9-1. Subzone 1 (Building 149 Port Operations and Hazardous Waste Storage Area), subzone 2 (Remainder Public Works Maintenance Facilities), and subzone 3 (Building 84) were identified as soil subzones, and the four sample locations in each subzone are shown on Figures 9-2 through 9-4. Analytical results for samples collected at Parcel K were compared to an industrial set of action levels (see Section 1.8.2.1).

Although the BRAC SI Workplan (B&R Environmental, 1998a) describes five groundwater subzones at Truman Annex, one at each Parcel (i.e., C, D, E, F, and K), the DQO Process considered the groundwater at Truman Annex as a single unit in the decision-making process. Discussion of sampling and analytical results for groundwater at Truman Annex (including Parcels C, D, E, F, and K) are included in Section 4.6. The location of four permanent monitoring wells and of a single previously existing monitoring well at Truman Annex are shown in Figure 4-5.

9.3 SUBZONE 1 (BUILDING 149 PORT OPERATIONS AND HAZARDOUS WASTE STORAGE AREA)

The subsections below describe subzone 1, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 1 surface soil.

9.3.1 Subzone Description

Metals, solvents, fuels, acids, and used oils from hazardous waste storage area activities and handling of hazardous materials in Building 149 were considered potential sources of contamination in surface soil at Building 149. Four surface soil samples were collected from the vicinity of Building 149 during the SI field effort. All of the analytical results can be found in Appendix D.

9.3.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in the vicinity Building 149 for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels were

selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 9-2. Figure 9-2 shows the sample locations of all surface soil samples collected at subzone 1.

No chemicals were detected in excess of their action levels in surface soil samples in the vicinity of Building 149. Methylene chloride was the only VOC detected in surface soil samples from subzone 1. SVOCs detected at concentrations less than their screening criteria included benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene. Inorganics detected below their action levels include aluminum, arsenic, barium, chromium, copper, iron, lead, manganese, mercury, thallium, vanadium, and zinc.

9.3.3 Conclusions and Recommendations

Metals, solvents, fuels, acids, and used oils from hazardous waste storage area and Building 149 were potential sources of contamination in surface soil at Building 149. However, no chemicals were detected in excess of screening criteria. Therefore, there does not appear to be significant contamination in surface soil at Building 149 and no further action is recommended.

9.4 SUBZONE 2 (REMAINDER PUBLIC WORKS MAINTENANCE FACILITIES)

The subsections below describe subzone 2, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 2 surface soil.

9.4.1 Subzone Description

Metals, solvents, fuels, and acids were considered potential sources of contaminants from former building uses, former fuel lines, and demolition debris in the remainder public works maintenance facilities. Four surface soil samples were collected in subzone 2. All of the analytical results can be found in Appendix D.

9.4.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil in the remainder public works maintenance facilities area for VOCs, SVOCs, and inorganics. The results of these analyses were compared with action levels selected from a variety of sources including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research

institutions. The selection of action levels is discussed in Section 1.8.2.1. Chemicals detected in the surface soil samples are listed in Table 9-3. Figure 9-3 shows the sample locations of all surface soil samples collected at subzone 2.

No chemicals were detected in excess of their action levels in surface soil samples in the vicinity of the Remainder Public Works Maintenance Facilities. Acetone and methylene chloride were the only VOCs detected in surface soil samples form subzone 2. SVOCs detected at concentrations less than their screening criteria included 2-chlorophenol, anthracene, benzo(b)fluoranthene, fluoranthene, phenanthrene, and pyrene. Inorganics detected below their action levels include aluminum, barium, chromium, copper, iron, lead, manganese, mercury, thallium, vanadium, and zinc.

9.4.3 Conclusions and Recommendations

Metals, solvents, fuels, and acids from former building uses, former fuel lines, and demolition debris were considered potential sources of contamination in surface soil at the Remainder Public Works Maintenance Facilities. No chemicals were detected in excess of their action levels. Therefore, there does not appear to be significant contamination in the surface soil in subzone 2 and no further action is recommended.

9.5 SUBZONE 3 (BUILDING 84)

The subsections below describe subzone 3, present the contaminants detected, compare the detected concentrations with selected soil screening values, and provide conclusions on the SI findings for subzone 3 surface soil.

9.5.1 Subzone Description

Metals were considered potential contaminants from Building 84's use as a transportation pool. Four surface soil samples were collected in subzone 3. All of the analytical results can be found in Appendix D.

9.5.2 Site Investigation Findings

Contamination was investigated by analyzing samples from surface soil at Building 84 area for inorganics. The results of these analyses were compared with action levels selected from a variety of sources, including background levels as discussed in Section 1.8.1.1 and ARARs and SALs from various state and Federal agencies and research institutions. The selection of action levels is discussed in Section 1.8.2.1.

Chemicals detected in the surface soil samples are listed in Table 9-4. Figure 9-4 shows the sample locations of all surface soil samples collected at subzone 3.

Several inorganics were detected in surface soil at subzone 3, but none in excess of their action levels. These included aluminum, antimony, arsenic, barium, chromium, copper, iron, lead, manganese, mercury, vanadium, and zinc.

9.5.3 Conclusions and Recommendations

Metals as a result of Building 84's use as a transportation pool were considered to be potential sources of contamination in surface soil. However, no chemicals were detected in excess of action levels. Therefore, there does not appear to be significant contamination in the surface soil in subzone 3 and no further action is recommended.

9.6 PARCEL K CONCLUSIONS AND RECOMMENDATIONS

Fuels, oils, metals, solvents, and acids were considered potential contaminants in soil at the Waterfront Maintenance Facilities during the DQO Process. However, no chemicals were detected in excess of their action levels. Therefore, there does not appear to be significant soil contamination at the Waterfront Maintenance Facilities and no further action is recommended.

TABLE 9-1

**PARAMETER GROUPS AND MEDIA OF INTEREST AT THE WATERFRONT MAINTENANCE FACILITIES (PARCEL K)
NAS KEY WEST**

Subzone	Building/Area	Medium	Number of Locations	Parameter Group				
				VOCs	SVOCs	Inorganics	PCBs	Pesticides
Subzone 1	Building 149 Port Operations and Hazardous Waste Storage Area	SO	4	X	X	X		
Subzone 2	Remainder Public Works Maintenance Facilities	SO	4	X	X	X		
Subzone 3	Building 84	SO	4			X		

SO = Surface soil

Subzones 4, 6, and 7 were eliminated from sampling during the DQO Process.

TABLE 9-2

CHEMICALS DETECTED IN PARCEL K SUBZONE 1 SURFACE SOIL
NAS KEY WEST

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
K01-SS-03	Aluminum	1,010	J
K01-SS-02	Aluminum	447	J
K01-SS-04	Aluminum	339	J
K01-SS-01	Aluminum	314	
K01-SS-04	Arsenic	1.4	
K01-SS-03	Barium	18.8	
K01-SS-04	Barium	11.5	
K01-SS-01	Barium	10.9	
K01-SS-02	Barium	10.1	
K01-SS-03	Chromium	6	
K01-SS-02	Chromium	4.4	
K01-SS-04	Chromium	4	
K01-SS-04	Copper	52.3	J
K01-SS-03	Copper	25.5	J
K01-SS-03	Iron	1,030	
K01-SS-01	Iron	818	
K01-SS-04	Iron	788	
K01-SS-02	Iron	674	
K01-SS-03	Lead	42.4	J
K01-SS-04	Lead	19.7	J
K01-SS-02	Lead	17.6	J
K01-SS-01	Lead	11.4	
K01-SS-03	Manganese	18.5	
K01-SS-01	Manganese	10.5	
K01-SS-02	Manganese	6.7	
K01-SS-04	Manganese	5.9	
K01-SS-03	Mercury	0.28	J
K01-SS-02	Mercury	0.23	J
K01-SS-01	Mercury	0.21	
K01-SS-04	Mercury	0.18	J
K01-SS-01	Thallium	4.2	
K01-SS-02	Vanadium	5.1	
K01-SS-04	Vanadium	3.8	
K01-SS-03	Vanadium	2.6	
K01-SS-03	Zinc	60.9	J
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
K01-SS-04	Benzo(a)pyrene	187	
K01-SS-02	Benzo(a)pyrene	99.2	
K01-SS-04	Benzo(b)fluoranthene	830	
K01-SS-02	Benzo(b)fluoranthene	308	
K01-SS-04	Benzo(g,h,i)perylene	124	J
K01-SS-02	Benzo(g,h,i)perylene	88.1	
K01-SS-04	Chrysene	131	J
K01-SS-02	Chrysene	62	
K01-SS-04	Fluoranthene	176	
K01-SS-02	Fluoranthene	37.4	J
K01-SS-02	Indeno(1,2,3-cd)pyrene	94.9	
K01-SS-04	Pyrene	149	J
K01-SS-02	Pyrene	36.5	J
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
K01-SS-02	Methylene chloride	10.8	
K01-SS-03	Methylene chloride	9.4	
K01-SS-04	Methylene chloride	7.6	

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 9-3

CHEMICALS DETECTED IN PARCEL K SUBZONE 2 SURFACE SOIL
NAS KEY WEST

Location	Parameter	Result	Qual(*)
INORGANICS (mg/kg)			
K02-SS-01	Aluminum	748	J
K02-SS-03	Aluminum	247	
K02-SS-02	Aluminum	227	J
K02-SS-04	Aluminum	118	
K02-SS-02	Barium	13.3	
K02-SS-03	Barium	11.7	
K02-SS-04	Barium	8.9	
K02-SS-01	Barium	8.1	
K02-SS-01	Chromium	3.4	
K02-SS-02	Chromium	3	
K02-SS-04	Copper	28.4	
K02-SS-03	Copper	11.5	
K02-SS-04	Iron	570	
K02-SS-01	Iron	544	
K02-SS-03	Iron	489	
K02-SS-02	Iron	437	
K02-SS-04	Lead	38	
K02-SS-02	Lead	30.1	J
K02-SS-03	Lead	19.3	
K02-SS-01	Lead	9.2	J
K02-SS-02	Manganese	6.8	
K02-SS-01	Manganese	6	
K02-SS-03	Manganese	5.7	
K02-SS-04	Manganese	3.7	
K02-SS-04	Mercury	0.34	
K02-SS-02	Mercury	0.15	J
K02-SS-03	Thallium	4.9	
K02-SS-04	Thallium	4.4	
K02-SS-03	Vanadium	2.5	
K02-SS-01	Vanadium	2.2	
K02-SS-02	Vanadium	1.8	
K02-SS-04	Zinc	24.3	
K02-SS-03	Zinc	22.8	
SEMIVOLATILE ORGANIC COMPOUNDS (µg/kg)			
K02-SS-04	2-chlorophenol	189	
K02-SS-02	Anthracene	947	J
K02-SS-01	Benzo(b)fluoranthene	116	
K02-SS-02	Fluoranthene	4,470	
K02-SS-02	Phenanthrene	2,160	
K02-SS-02	Pyrene	3,340	
K02-SS-04	Pyrene	151	
K02-SS-03	Pyrene	80.3	J
VOLATILE ORGANIC COMPOUNDS (µg/kg)			
K02-SS-03	Acetone	8.5	
K02-SS-04	Acetone	4.6	J
K02-SS-02	Methylene chloride	8.2	
K02-SS-01	Methylene chloride	1.8	

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

TABLE 9-4

CHEMICALS DETECTED IN PARCEL K SUBZONE 3 SURFACE SOIL
NAS KEY WEST

Location	Parameter	Result	Qual (*)
INORGANICS (mg/kg)			
K03-SS-04	Aluminum	417	J
K03-SS-02	Aluminum	276	J
K03-SS-01	Aluminum	210	J
K03-SS-03	Aluminum	204	J
K03-SS-02	Antimony	4	
K03-SS-04	Antimony	3.6	
K03-SS-04	Arsenic	3.2	
K03-SS-04	Barium	11	
K03-SS-02	Barium	9.7	
K03-SS-01	Barium	5.2	
K03-SS-03	Barium	4.4	
K03-SS-04	Chromium	8.1	
K03-SS-02	Chromium	6.8	
K03-SS-01	Chromium	2.8	
K03-SS-03	Chromium	2.4	
K03-SS-02	Copper	67	J
K03-SS-04	Copper	61.9	J
K03-SS-04	Iron	5,930	
K03-SS-02	Iron	530	
K03-SS-01	Iron	234	
K03-SS-03	Iron	162	
K03-SS-02	Lead	49.8	J
K03-SS-04	Lead	48.9	J
K03-SS-01	Lead	5.6	J
K03-SS-03	Lead	0.88	J
K03-SS-04	Manganese	29.4	
K03-SS-02	Manganese	7.2	
K03-SS-01	Manganese	4.9	
K03-SS-04	Mercury	2.6	J
K03-SS-02	Mercury	1.8	J
K03-SS-01	Mercury	0.12	J
K03-SS-04	Vanadium	5.8	
K03-SS-02	Vanadium	2.2	
K03-SS-03	Vanadium	1.4	
K03-SS-01	Vanadium	1.3	
K03-SS-04	Zinc	215	J
K03-SS-02	Zinc	66.1	J

* Qualifier (Qual.) Codes:
J – The associated value is an estimated quantity.

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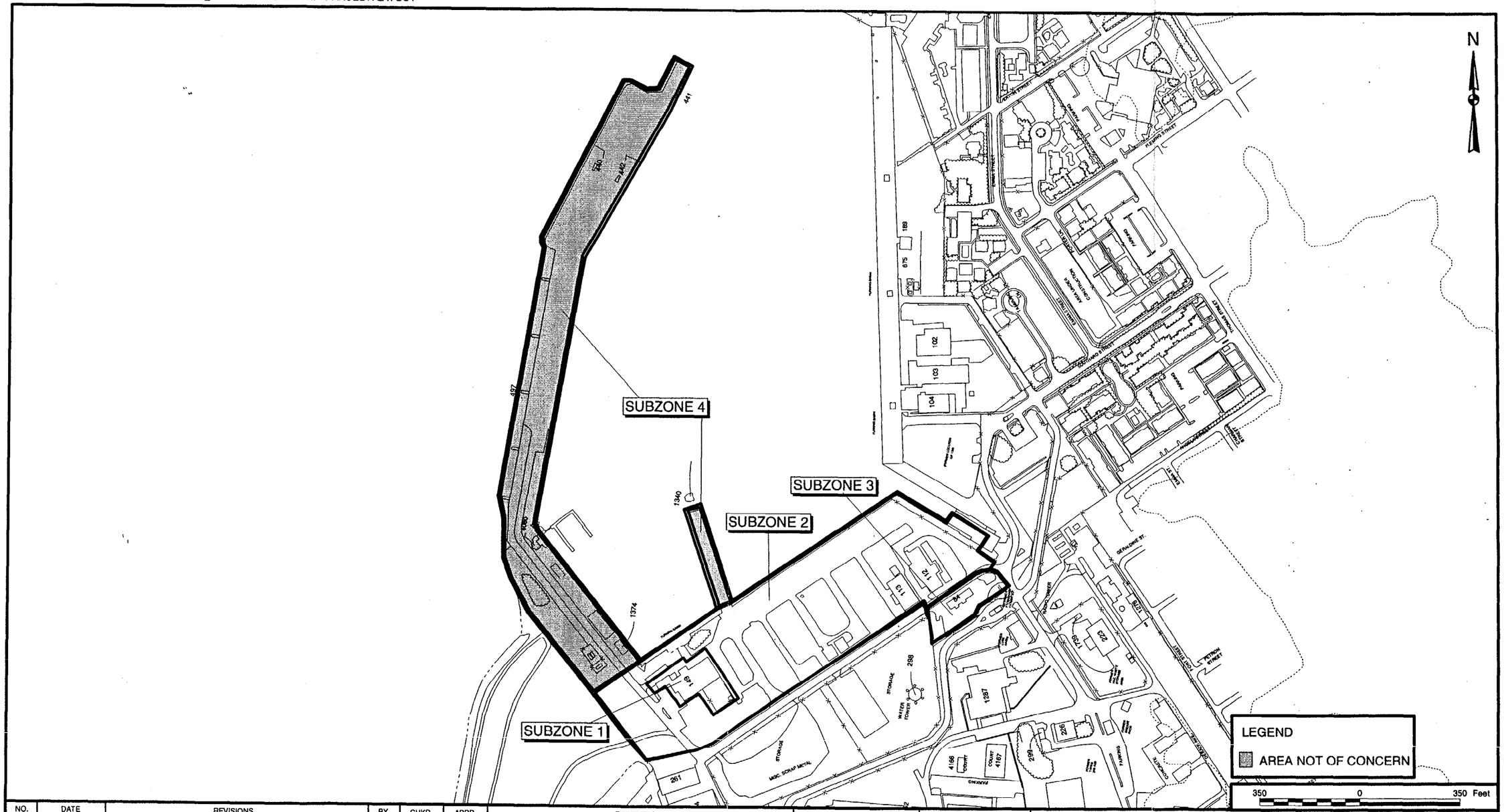
P:\GIS\NAS_KEY_WEST\BRACSI-PARCEL_K.APR 14-DEC-98 DNP PARCEL K LAYOUT



NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

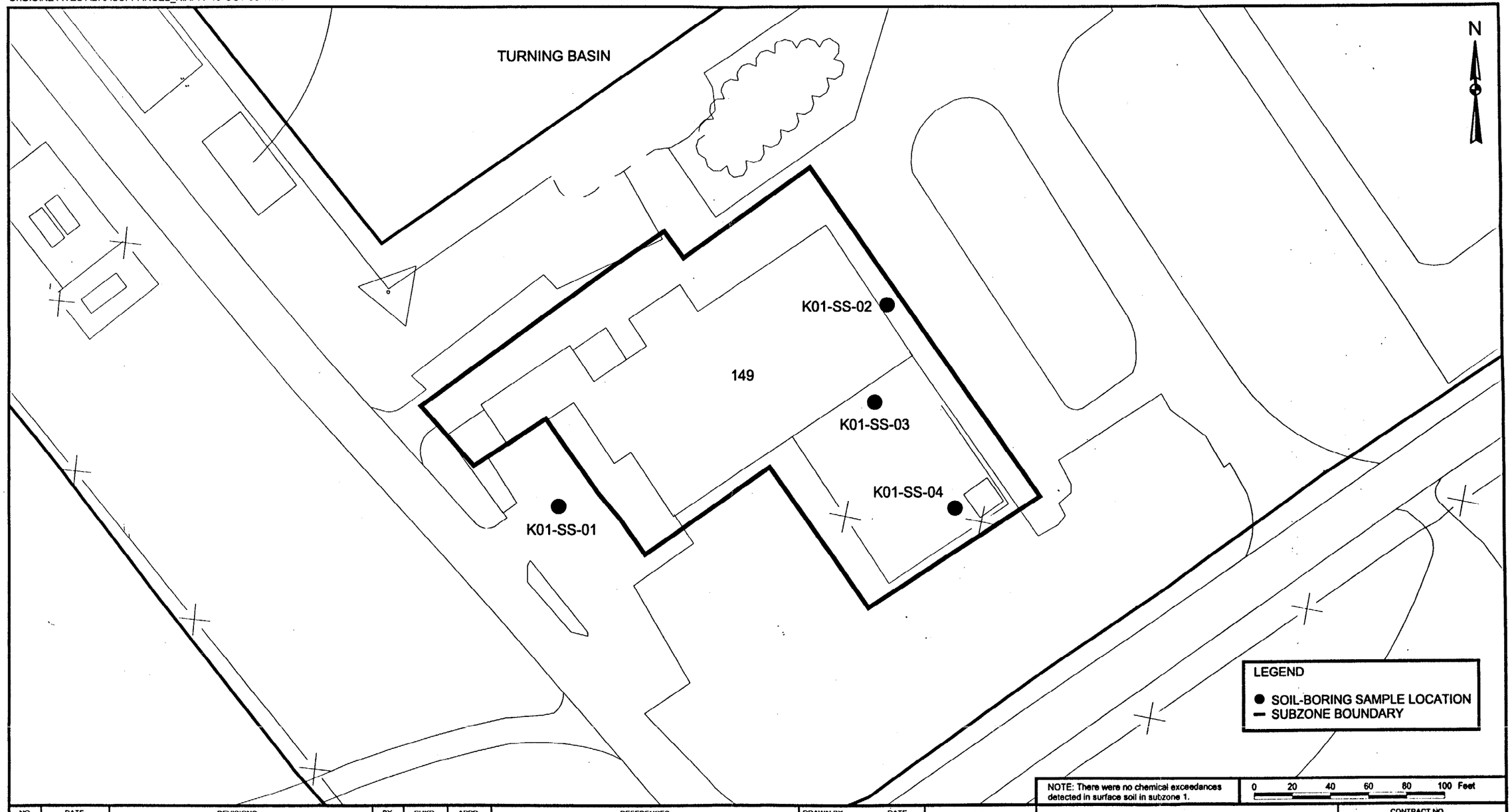
DRAWN BY	DATE
TMH	15-OCT-98
CHECKED BY	DATE
COST/SCHED-AREA	
SCALE	
APPROXIMATE SCALE AS NOTED	

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 9-1. SUBZONE AND PARCEL BOUNDARIES
WATERFRONT MAINTENANCE FACILITIES - BRAC PARCEL K
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

CONTRACT NO.	7593
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	REV. 1

0120 CB82

C:\GIS\KEYWEST\BRACSI-PARCEL_K.APR 13-OCT-98 TMH



NOTE: There were no chemical exceedances detected in surface soil in subzone 1.

0 20 40 60 80 100 Feet

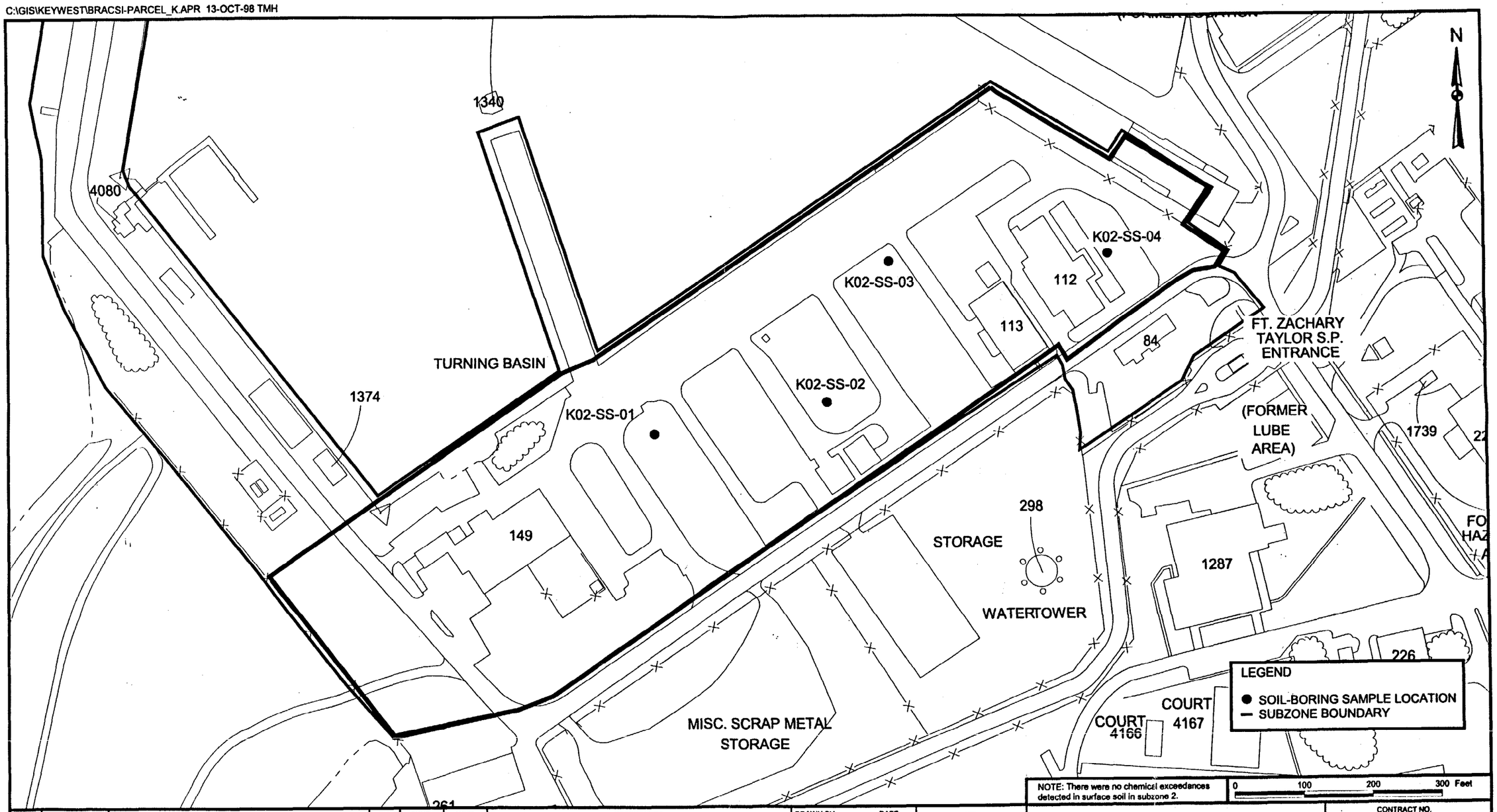
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY	DATE
TMH	13-OCT-98
CHECKED BY	DATE
COST/SCHED-AREA	
SCALE	
APPROXIMATE SCALE AS NOTED	

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 9-2. SUBZONE 1 SURFACE SOIL
SAMPLE LOCATIONS
WATERFRONT MAINTENANCE FACILITIES – BRAC PARCEL K
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

CONTRACT NO.	7593
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	REV. 1

C:\GIS\KEYWEST\BRACSI-PARCEL_K.APR 13-OCT-98 TMH



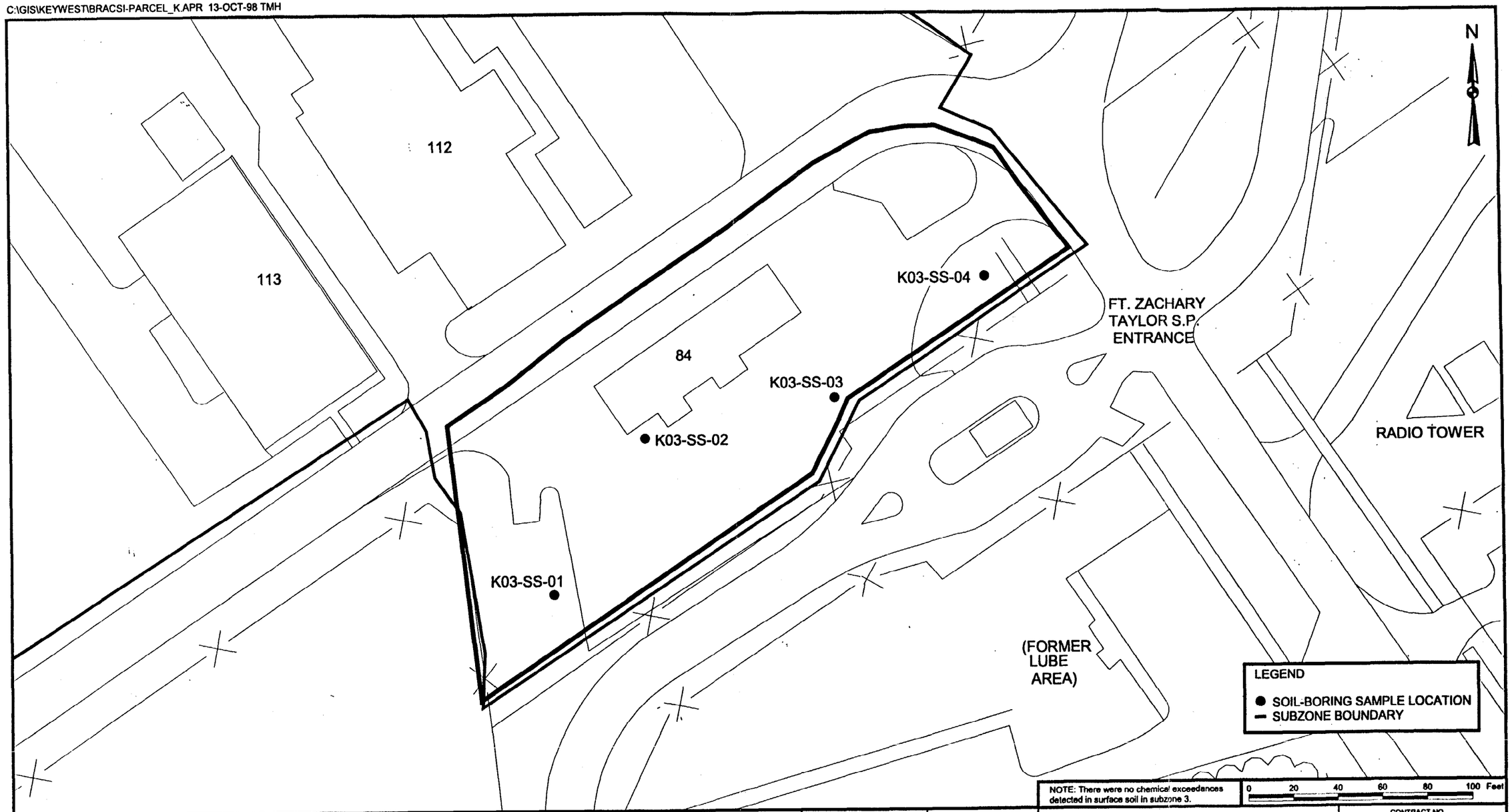
NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY	DATE
TMH	13-OCT-98
CHECKED BY	DATE
COST/SCHED-AREA	
SCALE	
APPROXIMATE SCALE AS NOTED	

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 9-3. SUBZONE 2 SURFACE SOIL
SAMPLE LOCATIONS
WATERFRONT MAINTENANCE FACILITIES – BRAC PARCEL K
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

CONTRACT NO.	7593
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	REV. 1

C:\GIS\KEYWEST\BRACSI-PARCEL_K.APR 13-OCT-98 TMH



NOTE: There were no chemical exceedances detected in surface soil in subzone 3.

NO.	DATE	REVISIONS	BY	CHKD	APPD	REFERENCES

DRAWN BY TMH	DATE 13-OCT-98
CHECKED BY	DATE
COST/SCHED-AREA	
SCALE APPROXIMATE SCALE AS NOTED	

SITE INSPECTION REPORT FOR NINE BRAC PARCELS
FIGURE 9-4. SUBZONE 3 SURFACE SOIL
SAMPLE LOCATIONS
WATERFRONT MAINTENANCE FACILITIES – BRAC PARCEL K
NAVY SOUTHERN DIVISION
NAS KEY WEST, FLORIDA

CONTRACT NO. 7593	
APPROVED BY	DATE
APPROVED BY	DATE
DRAWING NO.	REV. 1

REFERENCES

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APPENDIX A

RESPONSE TO COMMENTS ON
THE SITE INSPECTION REPORT FOR NINE BRAC PARCELS
NAVAL AIR STATION
KEY WEST, FLORIDA

APPENDIX A. RESPONSE TO COMMENTS

RESPONSE TO COMMENTS FROM JORGE CASPARY, FDEP

1. **General Comment:** It is interesting to note that thallium and no other inorganic constituent has been detected in soil samples for the majority of the sites described in the referenced document. I recommend that the laboratory data for inorganic constituents be properly reviewed for quality assurance and quality control protocols. I also recommend that the Navy considers resampling soil at some sites via auger drilling.

   Response: J. Samchuck (TtNUS – Pittsburgh Office Validation Group) revisited several packages from the SI data set and verified that the data reported for thallium is correct. He performed a re-validation for inorganic data and concluded that there is nothing in the data set that would indicate that the results for thallium were inaccurate. However, due to the consistency of the detection levels and frequency that thallium was detected (70.4%), it appears to be a systematic equipment error from the lab. During Supplemental SI field investigations, thallium was not detected in BRAC Parcels where it was detected during the SI. The NAS Key West Partnering Team agreed during its October 1998 meeting that the thallium detections reported during the SI are suspect and will not be used to drive further action.

2. **General Comment:** FDEP concurred with all subzone recommendations.

   Response: Comment noted.

RESPONSE TO COMMENTS FROM M. BERRY, U.S. EPA REGION 4

1. **Comment:** Parcel A, subzones 5, 6, 10 and 11 are recommended for No Further Action (NFA). Subzones 4 and 9 are recommended for further action. EPA concurs with these recommendations.

   Response: Comment noted.

2. **Comment:** Parcel A, subzone 1 was recommended for further action based on a single hit of dibenzo(a,h)anthracene. Subzone 1 is where telephone poles made of treated lumber were formerly stored. Since the finding probably resulted from the telephone poles, the NAS Key West Partnering Team has agreed that no further action is warranted.

   Response: Concur. This issue was discussed at the July 1998 NAS Key West Partnering Team meeting as noted. Changes will be made to the applicable text in Section 2 of the report to incorporate this change.

3. **Comment:** Parcel A, subzone 7 is recommended for further action based solely on the presence of thallium. As agreed to in the July 1998 NAS Key West Partnering Team Meeting, this decision should be deferred until we have a better idea of the source of the thallium.

   Response: Further action for Parcel A, subzone 7 was driven by the detection of thallium. See response to general comment from FDEP. No further action is needed for this subzone. Text for this subzone will be reworded accordingly.

4. **Comment:** Parcel B, subzones 1 and 3 are recommended for NFA. EPA concurs with these recommendations.

   Response: Comment noted.

5. **Comment:** Parcel C, subzones 1, 3 and 4 are recommended for further action. EPA concurs with these recommendations.

   Response: Comment noted.

6. **Comment:** The draft SI Report recommends an RI for the groundwater at Truman Annex. Because the only issue is the phenanthrene hit in K05-MW1, the NAS Key West Partnering Team has decided to explore other avenues of addressing this potential problem.

   Response: Since the delivery of Revision 0, it has been determined that benzene was also detected in excess of its action level at K05-MW-01. Section 4.7 (Parcel C and Truman Annex

Groundwater) will be reworded to remove the RI and incorporate a recommendation for additional activities as determined by the NAS Key West Partnering Team.

7. **Comment:** Parcel D, subzones 1 and 2 are recommended for NFA. EPA concurs with these recommendations.

   Response: Comment noted.

8. **Comment:** Parcel E, subzone 5 is recommended for NFA. Parcel E, subzones 2, 3 and 9 are recommended for further action. EPA concurs with these recommendations.

   Response: Comment noted.

9. **Comment:** Parcel E, subzones 1 and 4 is recommended for further action based solely on the presence of thallium. As agreed to in the July 1998 NAS Key West Partnering Team meeting, this decision should be deferred until we have a better idea of the source of the thallium.

   Response: See Comment 4 and response.

10. **Comment:** Parcel F, subzones 1 and 3 are recommended for further action. EPA concurs with these recommendations.

    Response: Comment noted.

11. **Comment:** Parcel H, subzone 6 is currently undergoing free product removal from MW-42. MW-42 has also been sampled for chlorinated solvents. A decision for further action will await results from these two activities.

    Response: Concur. MW-42 was sampled on May 15, 1998. Aluminum, iron, and zinc were the only chemicals detected in groundwater at MW-42 (645 µg/L, 1,010 µg/L, and 37.4 µg/L, respectively). All detections were well below the applicable screening criteria (37,000 µg/L, 11,000 µg/L, and 1,100 µg/L, respectively). 2-hexanone was considered as an exceedance in subzone 6 at Parcel H (MW-41, 48.8 µg/L) in Revision 0 of the SI Report. However, at the July 1998 Partnering Team meeting, an action level of 4.28E5 µg/kg was approved for 2-hexanone. During its October 1998 meeting, the NAS Key West Partnering Team decided to resample MW-42. This groundwater resample was obtained on October 15, 1998, which again detected no chemicals above action levels. The NAS Key West Partnering Team concurred that no further action is required for the Parcel H groundwater (Parcel H, subzone 6).

12. **Comment:** Parcel K, subzones 1, 2 and 3 are recommended for NFA. EPA concurs with these recommendations.

Response: Comment noted.

APPENDIX B

FIELD DOCUMENTATION

TABLE OF CONTENTS

SECTION

PART 1 – WORKPLAN AMENDMENTS AND DEVIATIONS

The SI field effort for the BRAC properties at NAS Key West, Florida was conducted November, 1997 to March, 1998 in accordance with the SI Workplan for Ten BRAC Properties Naval Air Station Key West, Florida (B&R Environmental, 1998a). In several instances, the SI Workplan required changes based on existing field condition/technical decisions in order to meet project objectives. These deviations from the workplan are described below.

1. Use of polyethylene tubing

Polyethylene tubing was used to sample permanent wells at Truman Annex during groundwater screening sample collection. Teflon tubing that meet the cleaning specifications was not received in time to sample these wells.

2. MW-26 was resampled

MW-26 was resampled after Teflon tubing meeting the cleaning specifications was received. Analytical results from the resample [MW-26(R)] were used as the basis for discussion in SI results and conclusions.

3. Coring/logging not necessary on all groundwater screening samples

Coring/logging was not performed on all groundwater screening samples. It was performed on a sufficient number of samples in a given area to adequately establish the depth to the water table and the local lithology. Coring itself does not slow the Direct Push Technology (DPT) process, however it does create the need for additional decontamination, which requires additional time.

4. Sample E07-GS-01 was removed and replaced with F07-GS-10

Concrete was encountered at 2 feet while the DPT rig was pushing sample E07-GS-01. This sample location was moved across park road into Parcel F in order to maintain groundwater screening coverage. The new sample location was named F07-GS-10.

5. Samples E07-GS-06, 07, and 08 were renamed E07-MW-27, 26, and 22, respectively

Existing wells were located at the originally intended site of the screening samples. The wells were sampled rather than have the DPT rig push new holes and install temporary wells at these locations. Sample names were changed to correctly identify the wells sampled.

6. VOCs and SVOCs were added to the soil samples in Truman Annex DRMO Waste Storage Area (Parcel C) subzone 4

Hydraulic fluid stains were observed on the pavement at the site, establishing a possibility for contamination other than metals. Samples were analyzed for VOCs and SVOCs to determine if contamination exists.

7. Samples added to subzones 3 and 4 at Truman Annex DRMO Waste Storage Area (Parcel C)

While in the field, the NAS Key West Partnering Team decided to add four soil samples to subzones 3 and 4 based on the potential re-use of this site as a day-care center. Due to the increased possibility of soil contact based on this scenario additional sampling was considered necessary to ensure total coverage.

8. Storage areas for IDW

Aqueous IDW for all Truman Annex sites was stored at Building 223 based, where access to the drum by the public was restricted. The IDW generated at the interior sites was stored at Hawk Missile Site Building 6532. Every effort was made to segregate IDW by Parcel. However, many partially filled drums would have resulted from strict segregation. The contents of all drums were carefully documented. In addition, it was not practical to segregate DPT decon IDW by Parcel.

9. Hand auger Truman Annex Buildings 102, 103, and 104 (Parcel E) subzone 4 samples

Because of the proximity of active transformers at this location, caution seemed advisable to ensure the safety of the field team. The field crew did not use DPT to collect these soil samples. Hand auguring was employed as the sample method.

10. Hand augering a single soil sample in Hamaca Hawk Missile Site (Parcel A) subzone 7

Hand augering was used to collect one soil sample in subzone 7. The sample location was not accessible to the DPT rig.

11. Sample F07-GS-10 was not analyzed for inorganics

Due to a labeling error, the sample (F07-GS-10) could not be distinguished from an extra volume pulled from a different location. The temporary well screen was removed before the discovery of this error; therefore, another sample could not be collected.

12. Hamaca Hawk Missile Site (Parcel A) subzone 1 was divided

A significant portion of the original subzone 1 had standing water during the initial field visit. The portion of Parcel A subzone 1 inside the fence line was underwater and displayed mangrove growth, demonstrating that inundation is not infrequent or transitory. Therefore, that portion was included in subzone 9, the sediment subzone and four additional sediment samples were located there. Subzone 1 became only the portion outside of the fence and four soil samples were collected there.

13. Preservative rinsed out of VOC groundwater sample bottles

The VOC groundwater samples collected during February 1998, effervesced because of the interaction of $CaCO_3$ in the groundwater and the HCl preservative, creating a headspace within the sample bottles. On February 23, 1998, B&R Environmental field personnel discussed this with the laboratory who recommended that the sample bottles be rinsed with groundwater from the well to be sampled to remove the preservative prior to sample collection. Removing the preservatives decreased the holding time from 14 to 7 days. All permanent monitoring wells sampled after February 23, 1998, were treated in this manner.

PART 2 – FIELD DATA SHEETS

PARCEL A
HAMACA HAWK MISSILE SITE

SUBZONE 1
(GRYZNA-SZN1)
SURFACE SOIL

Brown & Root Environmental

900 Trail Ridge Road Aiken, SC 29803 (803) 649-7963 Fax: (803) 642-6454

SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A01-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	11 DEC 97
Sample Time:	1315
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: A01-SS-D7

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [X] NO [ ]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

SAMPLE LOCATIONS IN THIS SUBZONE RE-ARRANGED SLIGHTLY.

Observations/Notes:

UNDER GRAVEL/DIRT SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BJA Signature(s): _____

Brown & Root Environmental

900 Trail Ridge Road Aiken, SC 29803 (803) 649-7963 Fax: (803) 642-8454

SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A01-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	11 DEC 97
Sample Time:	1405
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

SAMPLES RE-ARRANGED

Observations/Notes:

UNDER GRAVEL / DIRT SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BJA Signature(s): _____

Brown & Root Environmental

900 Trail Ridge Road | Aiken, SC 29803 | (803) 649-7963 | Fax: (803) 642-8454

SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A01-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	11 DEC 97
Sample Time:	1415
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from the Location Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

SAMPLES RE-ARRANGED IN THIS SUBZONE --

Observations/Notes:

UNDER GRAVEL / DIRT SURFACE COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BA Signature(s): Brubaker Anderson

SUBZONE 4
(GRYZNA-SZN4)
SURFACE SOIL

Brown & Root Environmental

900 Trail Ridge Road Aiken, SC 29803 (803) 649-7963 Fax: (803) 642-8454

SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A04-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN4

Airbill No: _____ Laboratory: GEL

Sample Date:	12 DEC 97
Sample Time:	0850
Sample Depth (ft):	0 - 1' BGS
FID Reading:	0 ppm
Sample Color:	BROWN / BLACK ORGANIC AND WHITE / CREAM OOLITIC LIMESTONE
Sample Description:	ABOVE

Sample Method:
- ~~DPT~~
- [X] Hand Auger B.A.
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: _____ Signature(s): _____

Brown & Root Environmental

900 Trail Ridge Road Aiken, SC 29803 (803) 649-7963 Fax: (803) 642-8454

SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A04-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN4

Airbill No: _____ Laboratory: GEL

Sample Date:	12 DEC 97
Sample Time:	0905
Sample Depth (ft):	0 - 1' BGS
FID Reading:	5 ppm
Sample Color:	BROWN/BLACK ORGANIC AND WHITE/CREAM OOLITIC LIMESTONE
Sample Description:	ABOVE

Sample Method:
- [ ] DPT
- [x] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: _____ Signature(s): _____

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A04-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN4

Airbill No: _____ Laboratory: GEL

Sample Date:	11 DEC 97
Sample Time:	0930
Sample Depth (ft):	0 - 2' bgs
FID Reading:	0 ppm
Sample Color:	white to cream / brown
Sample Description:	oolitic limestone, weathered/crumed with rock fragments

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

zone A.

under grass surface cover.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BRR Signature(s): Barbara Anderson

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A04-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN4

Airbill No: _____ Laboratory: GEL

Sample Date:	12 DEC 97
Sample Time:	0855
Sample Depth (ft):	0 - 1' BLS
FID Reading:	2 ppm
Sample Color:	BROWN / BLACK ORGANIC AND WHITE / CREAM OOLITIC
Sample Description:	LIMESTONE

Sample Method:
- [ ] DPT
- [x] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS SURFACE COVER.

ANALYSES:

			Bottle Lot Number:
TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	_____
TCL SVOCs:	YES: [X]	NO [ ]	_____
TCL PESTs:	YES: [ ]	NO [X]	_____
TCL PCBs:	YES: [ ]	NO [X]	_____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	_____

Sampled By: _____ Signature(s): _____

SUBZONE 5
(GRYZNA-SZN5)
SURFACE SOIL

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A05-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN5

Airbill No: _____ Laboratory: GEL

Sample Date:	11 DEC 97
Sample Time:	1050
Sample Depth (ft):	0 - 2' BGS
FID Reading:	20 ppm
Sample Color:	WHITE TO CREAM AND BROWN
Sample Description:	OOLITIC LIMESTONE AND SILTY SANDS

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER ASPHALT.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BJK Signature(s): Barbara Anderson

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A05-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN5

Airbill No: _____ Laboratory: GEL

Sample Date:	11 DEC 97
Sample Time:	1105
Sample Depth (ft):	0-2' BGS
FID Reading:	2 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS

ANALYSES:

			Bottle Lot Number:
TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	_____
TCL SVOCs:	YES: [X]	NO [ ]	_____
TCL PESTs:	YES: [ ]	NO [X]	_____
TCL PCBs:	YES: [ ]	NO [X]	_____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	_____

Sampled By: BRK Signature(s): Barbara Sanders

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A05-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN5

Airbill No: _____ Laboratory: GEL

Sample Date:	11 DEC 97
Sample Time:	1625
Sample Depth (ft):	0-2' bgs
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE, WEATHERED WITH COARSE ROCK FRAGMENTS DRY

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: A05-SS-D8

MS/MSD: YES: [X] NO: [X] B.A.

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

~~0-6"~~

UNDER ASPHALT.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO: [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO: [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO: [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO: [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO: [ ]	Bottle Lot Number: _____

Sampled By: DMK Signature(s): Barbara Anderson

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A05-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN5

Airbill No: _____ Laboratory: GEL

Sample Date:	11 DEC 97
Sample Time:	0915
Sample Depth (ft):	0-2' BLS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE

Sample Method:
- [x] ~~SPT~~
- [ ] Hand Auger
- [ ] HSA

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: Not Applicable

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER ASPHALT.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BJA Signature(s): Barbara Bradley

SUBZONE 6
(GRYZNA-SZN6)
SURFACE SOIL

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A06-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN6

Airbill No: _____ Laboratory: GEL

Sample Date:	11 DEC 97
Sample Time:	0920
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ZONE A

UNDER ASPHALT

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BAR Signature(s): Barbara Anderson

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A06-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN6

Airbill No: _____ Laboratory: GEL

Sample Date:	11 DEC 97
Sample Time:	0925
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER ASPHALT

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BJA Signature(s): Bonnie Anderson

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A06-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN6

Airbill No: _____ Laboratory: GEL

Sample Date:	10 DEC 97
Sample Time:	1525
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE, DRY

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER ASPHALT SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BJK Signature(s): _____

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A06-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN6

Airbill No: _____ Laboratory: GEL

Sample Date:	11 DEC 97
Sample Time:	0935
Sample Depth (ft):	0-2' BLS
FID Reading:	6 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS

ANALYSES:

			Bottle Lot Number:
TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	
TCL SVOCs:	YES: [X]	NO [ ]	
TCL PESTs:	YES: [ ]	NO [X]	
TCL PCBs:	YES: [ ]	NO [X]	
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	

Sampled By: BOB Signature(s): Barbara Andrews

SUBZONE 7
(GRYZNA-SZN7)
SURFACE SOIL

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A07-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN7

Airbill No: _____ Laboratory: GEL

Sample Date:	12 DEC 97
Sample Time:	1038
Sample Depth (ft):	0 - 1' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	WEATHERED OOLITIC LIMESTONE

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER SOIL SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BMX Signature(s): Barbara Miller

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A07-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN7

Airbill No: _____ Laboratory: GEL

Sample Date:	12 DEC 97
Sample Time:	0927
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER SOIL SAMPLE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BJA Signature(s): Barbara Anderson

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A07-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN7

Airbill No: _____ Laboratory: GEL

Sample Date:	12-10-97
Sample Time:	14:25
Sample Depth (ft):	1' BLS.
FID Reading:	
Sample Color:	LT. TAN
Sample Description:	LT. TAN oolitic Limestone

Sample Method:
- [ ] DPT
- [ ] ~~Hand~~ Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes: SAMPLE LOCATION LOCATED ADJACENT TO TRANSFORMER PAD.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: TOM NICOSIA Signature(s): Tom Nicosia

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: A07-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN7

Airbill No: _____ Laboratory: GEL

Sample Date:	12 DEC 97
Sample Time:	0840
Sample Depth (ft):	0 - 1' BLS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM OOLITIC LIMESTONE
Sample Description:	W/ SOME TOPSOIL

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BOA Signature(s): Barbara Andrew

SUBZONE 10
(GRYZNA-SZN10)
SURFACE WATER

Brown & Root Environmental

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SURFACE WATER SAMPLE LOG SHEET

Sample Name A10-SW-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN10

Airbill No: _____ Laboratory ACCUTEST

Sample Method: Submerge bottles

Depth Sampled: Surface

Sample Date: 24 Feb 98

Sample Time: 1430

Duplicate ID: ~~Not Applicable~~ Not Applicable

Type of Sample
- [x] Low Concentration
- [ ] High Concentratio
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

38528588
38528588
Field Worklist

38528588
38528588
Field Worklist

38528555
38528555
Field Worklist

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ] NO [X]	Bottle Lot Number:	
TCL SVOCs:	YES: [X] NO [ ]	Bottle Lot Number:	
TCL PESTs:	YES: [ ] NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ] NO [X]	Bottle Lot Number:	
AL Metals + Tin (HNO3 Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	

Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Salinity
28.3	8.38	46.1	7.32	4	clear	3.0 ‰

Sampled By RD Signature(s): _____

Brown & Root Environmental

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SURFACE WATER SAMPLE LOG SHEET

Sample Name A10-SW-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN1

Airbill No: _____ Laboratory ACCUTEST

Sample Method: Submerg containers

Depth Sampled: Surface

Sample Date: 25Feb98

Sample Time: 1755

Duplicate ID: Not Applicable

Type of Sample
- [x] Low Concentration
- [ ] High Concentratio
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

32522555 Field Worklist

32522555 Field Worklist

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [X]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Salinity
24.4	8.19	37.1	7.09	18	clear -	.23 T
					In port, water has a green color.	

Sampled By RD Signature(s): Ryan C Ow

Brown & Root Environmental

900 Trail Ridge Road Aiken, SC 29803 (803) 649-7963 Fax: (803

SURFACE WATER SAMPLE LOG SHEET

Sample Name A10-SW-03 Project: NAS Key West BRAC SI Project Number: 7592

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZ

Airbill No: _____ Laboratory ACCUTEST

Sample Method: Submerge bottles.

Depth Sampled: Surface

Sample Date: 24 Feb 98

Sample Time: 13 45

Duplicate ID: [redacted]

Type of Sample
- [x] Low Concentration
- [ ] High Concentratio
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

SVOCs

38897108

Field Worklist

38897107

Field Worklist

metals

32925203

Field Worklist

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [X]	Bottle Lot Number:	
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:	
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:	

Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Salinity
26 °C	8.22	45.9	7.61	10	clear	2.99‰

Sampled By RD Signature(s): Ryan C Dwyer

Brown & Root Environmental

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SURFACE WATER SAMPLE LOG SHEET

Sample Name: A10-SW-04 | Project: NAS Key West BRAC SI | Project Number: 7593

Zone: A - Hawk Missile Site | Subzone: GRYZNA-SZN10

Airbill No: _____ | Laboratory: ACCUTEST

Sample Method: Submerge jars in water

Depth Sampled: Surface

Sample Date: 24 Feb 98

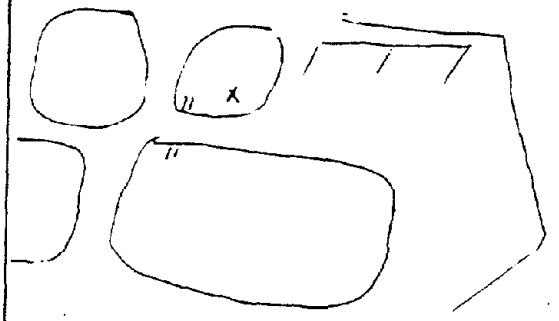
Sample Time: 1155

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)



Not collected exactly at location designated in WP because when RD attempted to get out to water on that side of pond, sank so deep almost couldn't get out.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Salinity
23.9	8.24	46.4	9.95	7		3.02 %

metals
328888:3
328888:3
Field Worklist

328888:2
328888:2
Field Worklist

SVOCs
38897108
38897108
Field Worklist

38897110
38897110
Field Worklist

Sampled By: RD | Signature(s): Ryan Cruz

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SURFACE WATER SAMPLE LOG SHEET

Sample Name A10-SW-05 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN10

Airbill No: _____ Laboratory ACCUTEST

Sample Method: Submerge container

Depth Sampled: Surface

Sample Date: 25-Feb-98

Sample Time: 1840

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentratio
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Chain of Custody
38522557
38522557
Field Worklist

38522554
38522554
Field Worklist

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ] NO [X]	Bottle Lot Number:	
TCL SVOCs:	YES: [X] NO [ ]	Bottle Lot Number:	
TCL PESTs:	YES: [ ] NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ] NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	

Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Salinity
24.4°C	8.16	33.1	6.58	120	somewhat cloudy - water appears	2.13%

Sampled By RD Signature(s): Dyana C Dixon

Brown & Root Environmental

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SURFACE WATER SAMPLE LOG SHEET

Sample Name A10-SW-06 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN1

Airbill No: _____ Laboratory ACCUTEST

Sample Method: Submerge Containers

Depth Sampled: Surface

Sample Date: 25 Feb 1998

Sample Time: 1640

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentratio
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Drum in center of pond adjacent to sample location.

SVOCs

30928898

Field Worklist

30928897

Field Worklist

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Salinity
25.1	8.34	42.4	5.5	13	clear w/ floaters	2.74%

Sampled By RD Signature(s): _____

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SURFACE WATER SAMPLE LOG SHEET

Sample Name A10-SW-07 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN10

Airbill No: _____ Laboratory ACCUTEST

Sample Method	submerge contained
Depth Sampled:	Surface
Sample Date	25 Feb 98
Sample Time:	1138

Duplicate ID: ~~Not Applicable~~ A10-SW-D1

Type of Sample
- [x] Low Concentration
- [ ] High Concentratio
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

collected from surface water beside drum located at edge of pond.

38928892 Field Worklist

38928888 38928888 Field Worklist

38928881 38928881 Field Worklist

38928885 38928885 Field Worklist

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Salinity
25.3°C	8.45	42.5	6.80	12	clear	2.75%

Sampled By RD Signature(s): Regina Clinton

SUBZONE 11
(GRYZNA-SZN11)
GROUNDWATER

Brown & Root Environmental

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: A11-GS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN11

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	
Stickup Height (ft): 0	
Casing Diameter (ID-inches): ½ "	
Static Water Level (ft below top of casing): 2.8	
One Casing Volume (gal):	
Start Purge (hrs.): 1530	
End Purge (hrs.): 1715	
Total Purge Time (min.): 105	
Total Amount Purged (gal): 4 GAL	
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	
Sample Date: 12/16/97	
Sample Time:	

Type of Screening Sample:
- [x] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO: [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X] NO: [ ]	Bottle Lot Number:	B717801
TCL SVOCs:	YES: [X] NO: [ ]	Bottle Lot Number:	H709901K
TCL PESTs:	YES: [ ] NO: [X]	Bottle Lot Number:	~~B717801~~
TCL PCBs:	YES: [ ] NO: [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X] NO: [ ]	Bottle Lot Number:	C726G01K

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	SAL
1530		23.9	7.06	42.5	6.93	999+	GREY	2.72
1545		24.7	7.19	42.7	6.87	999+	↓	1.57
1600		24.4	7.20	42.9	7.89	999+		2.77
1615		24.5	7.18	42.9	7.17	999+		2.78
1630		24.1	7.18	42.9	7.20	441	GREY (CLEARING)	2.77
1645		24.2	7.13	42.9	7.12	187	" "	2.78
1700		24.1	7.12	43.1	7.12	358	GREY	2.79
1715		24.6	7.13	43.2	6.97	220	GREY	2.79

Sampled By: P. HALVERSON Signature(s): P. Halverson

PROJECT: NAS KEY WEST BRAC SI	JOB NO.:	BORING NO.: A11-BG-3
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 8' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1150	DATE: 16 DEC
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1205	DATE: 16 DEC
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED, TIME: DATE:
CONDITIONS:		LOCATION OF BORING: UNDER GRASS SURFACE COVER EXPOSED REEF/ROCK AREAS OUT TE

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY	
0'-2'	SOIL		24	20	0		2	—	LT TAN/BROWN SILTY SANDS, MOIST
2'-4'			24	20	0		4		WHITE TO CREAM OOLITIC LIMESTONE DRY
4'-6'			24	20	2		6		WET @ 4' BGS
6'-8'			24	20	0		8	—	BORING TERMINATED @ 8' BGS

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: A11-GS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN11

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	7.66'
Stickup Height (ft):	.25"
Casing Diameter (ID-inches):	1/2"
Static Water Level (ft below top of casing):	4.12
One Casing Volume (gal):	
Start Purge (hrs.):	0755
End Purge (hrs.):	0845
Total Purge Time (min.):	50
Total Amount Purged (gal):	~1.5 gallons
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head)	
Depth Sampled:	~5 ft
Sample Date:	12-12-97
Sample Time:	0850

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Flow rate ≈ 100-150 ml/min
Dev. Fluid = 1.5 gal.
Purge Fluid ≈ 1.5 gal

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: BT17801 ; CONT #: APC1356
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: HT099101K ; CONT #: APC1436
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: CT26601K ; CONT #: BPC1426

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Scr
0757	6	25.2	7.07	47.6	6.99	35	cloudy clear	3.11
0806		24.9	7.32	46.4	7.18	3	clear	3.02
0812		24.9	7.36	46.1	7.24	<10	clear	3.00
0823		24.9	6.89	41.1	7.21	<10	clear	2.64
0822		25.0	7.16	41.5	7.20	<10	clear	2.69
0827		24.9	7.22	41.7	7.24	69	clear	2.68
0830		24.9	7.23	41.7	6.81	<10	clear	2.66
0839		24.9	7.23	41.5	7.26	<10	clear	2.66
0841		24.9	7.23	41.5	7.27	<10	clear	2.66
0845	~1.5 gal.	24.9	7.23	41.5	7.27	<10	clear	2.66

Recal Horiba + clean turbidity probe.

Sampled By: RD Signature(s): Rigna C Dixon

VOCs SVOCs metals

38897382 Field Worklist
38897409 Field Worklist
38897412 Field Worklist
38897881 Field Worklist
38897884 Field Worklist
38896994 Field Worklist

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BLAC ST'	JOB NO.:	BORING NO.: A11-GS-02
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 8' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1040	DATE: 11 D
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1050	DATE: 11 DEC 9
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: UNDER GRAVEL

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-1	SOIL		12	9	0		1	WHITE TO CREAM OOLITIC LIMESTONE, WEATHERED/CRUSHED, WITH COARSE ROCK FRAGMENTS, DRY
1-2			12	9	0		2	
2-3			12	9	0		3	
3-4			12	9	0		4	MOIST @ 3.5' BGS.
4-5			12	12	0		5	WET @ 4' BGS
5-6			12	12	0		6	
6-7			12	12	0		7	GRAY/WHITE SILTY SANDS AND LIME FRAGMENTS, WET
7-8			12	12	0		8	BROWN OOLITIC LIMESTONE, WET.
								BORING TERMINATED AT 8' BGS.

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: All-GS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: ZONE A - HAWK MISSILE SITE Subzone: GR/KNA-SCN11

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	7.65
Stickup Height (ft):	0.5
Casing Diameter (ID-inches):	0.20
Static Water Level (ft below top of casing):	2.66
One Casing Volume (gal):	
Start Purge (hrs.):	1420
End Purge (hrs.):	1635
Total Purge Time (min.):	135
Total Amount Purged (gal):	9
Purge Method:	peristaltic pump - low flow method
Sample Method:	peristaltic pump-low flow pumping of SVOCs + metals. Gravity flow for VOCs
Depth Sampled:	
Sample Date:	12-11-97
Sample Time:	1635

Type of Screening Sample:
- [x] SPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: ____

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [ ] NO [x]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Flow rate: 150 ml/min

ORIGINAL LOG SHEET MISSING - LOGSHEET RECREATED FROM LOG BOOK ENTRY - RCD 1/8/98

ANALYSES:

TCL VOCs (HCL Preservative):	YES [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES [x]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1420		27.0	7.33	1.14	9.40	999	cloudy
1440		26.7	7.49	1.07	9.36	999	cloudy
1500		26.8	7.49		9.32	396	clear
1515		26.7	7.48		9.32	298	
1535		26.9	7.49		9.53	187	
1553		26.8	7.53		9.13	132	
1630		26.5	7.59	1.11	9.23	51	
1635	9	Collect Sample					

Sal
0.05
0.04

Sampled By: TN Signature(s): _____

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BRAC 81	JOB NO.:	BORING NO.: A11-GS-03
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 8' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 0823	DATE: 11 DEC.
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 0835	DATE: 11 DEC.
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE A UNDER GRASS SURFACE COVER.

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCIES	INCIES DRIVEN	INCIES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-1	SOIL		12	9	0		1	—
1-2			12	9	0		2	
2-3			12	9	0		3	
3-4			12	9	0		4	
4-5			12	12	0		5	
5-6			12	12	0		6	
6-7			12	12	0		7	
7-8	↓		12	12	0		8	—

WHITE TO CREAM OOLITIC LIMESTONE, WEATHERED/CRUSHED WITH COARSE ROCK FRAGMENTS, DRY

WET @ 3.5' BGS.

BORING TERMINATED AT 8' BGS

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: A11-GS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN11

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	~~8.64~~ 7.64'
Stickup Height (ft):	~~2.55~~ 1.85'
Casing Diameter (ID-inches):	1/2"
Static Water Level (ft below top of casing):	~~4.78'~~ 3.78'
One Casing Volume (gal):	
Start Purge (hrs.):	16:10
End Purge (hrs.):	~~16~~ 17:50
Total Purge Time (min.):	100
Total Amount Purged (gal):	5.25
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	
Sample Date:	12-10-97
Sample Time:	17:55

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: A11-GS-D6

MS/MSD: YES: [X] NO [ ]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
16:20	0.5 gal	29.0	6.59	.734	8.28	86	slightly milky white
16:35	1.25 gal	28.7	6.97	.695	7.91	176	slightly cloudy
16:45	2.0 gal	28.6	6.98	.689	7.84	100	slightly cloudy
17:00	2.75 gal	28.5	6.98	.692	7.94	55	clear
17:10	~~2.5~~ 3.5 gal	28.4	6.98	.688	7.92	37	clear
17:22	4.0 gal	28.3	7.01	.686	7.98	24	clear
17:32	4.5 gal	28.4	7.02	.688	7.96	17	clear
17:42	5.0	28.4	7.00	.687	7.87	10	clear
17:50	5.25 gal	28.3	7.01	.689	7.96	7	clear

Sampled By: MR Signature(s): Matthey

ENVIRONMENTAL

SHEET 1 OF

PROJECT: NAS KEY WEST BRAC 81	JOB NO.:	BORING NO.: A11 - GS - 04
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 6.5' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1517	DATE: 10 DEC
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1525	DATE: 10 DEC 97
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED, TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE A - HANIC; WELL POINT UNDER ASPHALT. VERY LIMITED PUSH FROM 2 - 6.5

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6 INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
1/1	SOIL		12	12	0		1	
2/1			12	12	0		2	
3/1			12	12	0		3	
4/1			12	12	0		4	
5/1			12	12	2		5	
6/1	"		12	12	2		6	
							7	
							8	

WHITE TO CREAM OOLITIC LIMESTONE W/ COARSE ROCK FRAGMENTS (1/4" - 1/2" D
WEATHERED, DRY

MOIST @ 4' BGS

WET @ 5' BGS.

BORING TERMINATED AT 6.5' BGS.

NOTES: EDITED BY/DATE:

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: A11-GS-05 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN11

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	7.67'
Stickup Height (ft):	2.14'
Casing Diameter (ID-inches):	½"
Static Water Level (ft below top of casing):	3.87'
One Casing Volume (gal):	.041 gal.
Start Purge (hrs.):	15:00
End Purge (hrs.):	17:20
Total Purge Time (min.):	140
Total Amount Purged (gal):	3 gal.
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using penstaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	7.0' BTOC.
Sample Date:	12-10-97
Sample Time:	16:40

Type of Screening Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO: [x]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

NOTE: PURGING AT A RATE OF 100 ML/min or LESS.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [x]	NO: [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO: [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO: [x]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO: [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO: [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	5.46
1535	.25 gal	27.4	7.62	19.0	8.52	154	cloudy	1.13
1555	.50 gal.	27.0	7.78	18.6	8.45	8	clear	1.11
1600	1.0 gal	26.9	7.75	18.4	8.22	7	clear	1.10
1610	1.50 gal	26.9	7.76	18.2	8.25	135	cloudy	1.08
1620	2.00 gal.	26.7	7.78	18.1	8.26	62	clear	1.08
1630	2.50 gal	26.5	7.72	18.0	8.26	9	clear	1.07
1635	2.75 gal	26.5	7.76	18.0	8.11	4	clear	1.07
1638	3.00 gal	26.2	7.72	18.0	8.22	8	clear	1.07

Sampled By: TOM NICOTERA Signature(s): Tom Nicotera

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: A116S-05 Project: NAS Key West BRAC SI Project Number: 7593

Zone: ZONE A - HAWK MISSILE SITE Subzone: ERYNA-S

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	7.67'
Stickup Height (ft):	2.14'
Casing Diameter (ID-inches):	0.5 2D
Static Water Level (ft below top of casing):	3.87'
One Casing Volume (gal):	
Start Purge (hrs.):	15:00
End Purge (hrs.):	17:20
Total Purge Time (min.):	240
Total Amount Purged (gal):	3 gal.
Purge Method:	peristaltic pump, PE tubing, silicon on pump head
Sample Method:	Peristaltic pump, gravity flow for volatiles
Depth Sampled:	7 feet BTOC
Sample Date:	12-10-97
Sample Time:	16:40

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: NA

Type of Sample:
- [ ] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (HCL Preservative):	YES [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES [ ]	NO [ ]	Bottle Lot Number: _____
TCL PCBs:	YES [ ]	NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
15:35	.25 gal	27.4	7.62	19.0	8.52	154	cloudy
15:55	.50 gal	27.0	7.78	18.6	8.45	8	clear
16:00	1.6 gal	26.9	7.75	18.4	8.22	7	clear
16:10	1.5 gal	26.9	7.76	18.2	8.25	135	cloudy
16:20	2.0 gal	26.7	7.76	18.1	8.26	62	clear
16:30	2.60 gal	26.5	7.72	18.0	8.26	9	clear
16:35	2.75 gal	26.5	7.76	18.0	8.11	4	clear
16:38	3.0 gal	26.2	7.72	18.0	8.22	8	clear

Sampled By: Tom McCotter Signature(s): Tom McCotter

ENVIRONMENTAL

SHEET 1 OF _____

PROJECT: NAS KEY WEST BRAC 51	JOB NO.:	BORING NO.: A11-GS-03
	LOGGED BY: B ANDERSON	TOTAL DEPTH: 6' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1330	DATE: 10 DEC 97
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1415	DATE: 10 DEC 97
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING.	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE A UNDER GRAVEL SURFACE COVER.

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
1/2	SOIL		12	12	0		1	WHITE TO CREAM OOLITIC LIMESTONE AND WEATHERED/CRUSHED COARSE ROCK FRAGMENTS (1/4 - 3/4" DI
1/2	|		12	12	0			DRY.
1/2	|		12	4	0		2	LT BROWN OOLITIC LIMESTONE WEATHER CRUSHED AND COARSE ROCK FRAGME
1/2	|		12	4	0			DAMP
1/2	V		12	4	0		3	WHITE TO CREAM OOLITIC LIMESTONE, WEATHERED/CRUSHED W/ ROCK
							4	FRAGMENTS, WET
							5	BORING TERMINATED AT 4' BGS
							6	
								NOTE: GW SCREEN PUSHED TO 6' BGS
							7	
							8	

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: A11-GS-06 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN11

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	12.01'
Stickup Height (ft):	0.10'
Casing Diameter (ID-inches):	2"
Static Water Level (ft below top of casing):	5.91'
One Casing Volume (gal):	1.02
Start Purge (hrs.):	08:15
End Purge (hrs.):	09:50
Total Purge Time (min.):	95
Total Amount Purged (gal):	3.75
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	6.5'
Sample Date:	12-17-97
Sample Time:	

Type of Screening Sample:
- [ ] DPT Borehole
- [X] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Sample collected from existing permanent monitoring well.

08:22 = 150 mL/min
09:07 = 225 mL/min
09:30 = 150 mL/min

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
08:22	.25 gal	23.8	6.16	337	7.75	95	clear
08:33	1 gal	24.3	6.31	34.2	8.16	4	clear
08:53	1.75 gal	24.4	6.33	34.6	8.79	3	clear
09:07	2.25 gal	24.6	6.36	34.9	8.71	96	clear
09:24	3.00 gal	24.8	6.36	35.4	8.68	106	clear
09:32	3.25 gal	24.5	6.41	35.2	8.51	4	clear
09:40	3.5 gal	24.3	6.40	35.6	8.40	4	clear
09:48	3.75 gal	24.4	6.39	35.7	7.94	4	clear

Sampled By: MR Signature(s): _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: A11-GS-07 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN11

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	7.63
Stickup Height (ft):	.25
Casing Diameter (ID-inches):	½"
Static Water Level (ft below top of casing):	5.88'
One Casing Volume (gal):	
Start Purge (hrs.):	09:15
End Purge (hrs.):	11:21
Total Purge Time (min.):	126
Total Amount Purged (gal):	8.25
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	
Sample Date:	12-11-97
Sample Time:	11:25

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

250 mL/min 9:25

150 mL/min 10:35

100 mL/min 11:02

sampled @ 11:25 the water seems that it will not clear up any more

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
09:25	½ gallon	27.2	6.51	50.5	~~999~~ 7.74	999	milky white
09:40	1.25 gallon	27.5	6.73	53.2	7.94	999	milky grey
09:55	2.5 gal	27.5	6.72	53.0	8.16	183	slightly milky
10:10	3.25 gal	27.5	6.72	52.8	8.06	73	clear
10:25	4.00 gal	27.9	6.72	530	8.11	28	clear
10:35	5.00 gal	27.9	6.74	53.0	8.21	~~225~~ 144	cloudy (after a few min it turns to clear)
10:55	7.00 gal	28.1	6.73	52.8	8.21	20	clear
11:02	7.25 gal	28.0	6.69	52.6	8.27	20	clear
11:20	8.25 gal	28.1	6.73	52.7	8.18	24	clear

Sampled By: MR Signature(s): _____

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BRAC SI	JOB NO.:	BORING NO.: A11-GS-02
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 8' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1557	DATE: 10 DEC
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1608	DATE: 10 DEC
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED, TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE A UNDER GRAVEL SURFACE COVER - ASPHALT ROADWAY ~ 6' A

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	SOIL		12	9	0		1	
2-4			12	9	0		2	
4-6			12	9	0		3	
6-8			12	9	0		4	
8-10			12	12	0		5	
10-12			12	12	0		6	
12-14			12	12	0		7	
14-16	↓		12	12	0		8	

WHITE TO CREAM OOLITIC LIMESTONE, WEATHERED/CRUSHED WITH COARSE ROCK FRAGMENTS (1/4 - 1/2" DIA.)

DAMP B.A.

~~WET~~ @ 3' BGS

WET @ 4' BGS

GRAY WHITE SILTY CLAY AND LIMESTONE FRAGMENTS, WET

WHITE TO CREAM OOLITIC LIMESTONE, WET

BORING TERMINATED AT 8' BGS

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: A11-GS-08 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN11

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	7.46
Stickup Height (ft):	.40
Casing Diameter (ID-inches):	¼"
Static Water Level (ft below top of casing):	2.86'
One Casing Volume (gal):	
Start Purge (hrs.):	08:25
End Purge (hrs.):	09:50
Total Purge Time (min.):	
Total Amount Purged (gal):	3 gal
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	4' BTOC
Sample Date:	12-12-97
Sample Time:	09:30

Type of Screening Sample:
- [x] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	SAL.
0851	.25 gal	26.5	6.36	44.6	7.99	18	clear	2.91
0907	1.5 gal	27.1	7.01	45.0	7.77	8	clear	2.93
0918	2.5 gal	27.3	7.07	44.9	7.86	7	clear	2.93
0924	3 gal	27.0	7.05	44.7	7.92	6	clear	2.91

Sampled By: Tom Nicotera Signature(s): Tom Nicotera

ENVIRONMENTAL

SHEET 1 OF

PROJECT: NAS KEY WEST BRAC 81	JOB NO.:	BORING NO.: A11-GS-[illegible]
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 8' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1450	DATE: 11 DEC
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1505	DATE: 11 DEC
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: UNDER GRAVEL / DIRT

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-1	SOIL		12	10	6		1	WHITE TO CREAM OOLITIC LIMESTONE WEATHERED, WITH COARSE ROCK FRAGMENTS (1/4" DIA), DRY
1-2			12	10	0		2	
2-3			12	10	0		3	
3-4			12	10	0		4	DAMP AT 3.5' BGS
4-5			12	12	0		5	WET @ 4.0' BGS
5-6			12	12	0		6	
6-7			12	12	0		7	
7-8	V		12	12	0		8	
								BORING TERMINATED AT 8' BGS

NOTES: EDITED BY/DATE:

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: A11-GS-09 Project: NAS Key West BRAC SI Project Number: 7593
Zone: ZONE A - HAWK MISSILE SITE Subzone: GRVCNA-SCN11
Airbill No: _____ Laboratory: GEL

Total Depth (ft):	7.07
Stickup Height (ft):	0.3
Casing Diameter (ID-inches):	0.5
Static Water Level (ft below top of casing):	2.94
One Casing Volume (gal):	
Start Purge (hrs.):	0916
End Purge (hrs.):	1130
Total Purge Time (min.):	134
Total Amount Purged (gal):	8
Purge Method:	peristaltic pump - low flow method
Sample Method:	pump SVOCs + metals; slow/fast flow for VOCs.
Depth Sampled:	
Sample Date:	12-11-97
Sample Time:	1130

Type of Screening Sample:
- [X] GPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: —

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)
ORIGINAL LOG SHEET MISSING - LOG SHEET RECREATED FROM LOG BOOK ENTRY
RCD 1/8/98.
Flowrate ≈ 200 ml/min lowered to 100 ml/min @ 1100 - did not appreciably reduce turbidity.

ANALYSES:
- TCL VOCs (HCL Preservative): YES [X] NO [ ] Bottle Lot Number: _____
- TCL SVOCs: YES [X] NO [ ] Bottle Lot Number: _____
- TCL PESTs: YES [ ] NO [X] Bottle Lot Number: _____
- TCL PCBs: YES [ ] NO [X] Bottle Lot Number: _____
- TAL Metals + Tin (HNO3 Preservative): YES [X] NO [ ] Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Sal
0916		26.5	7.01	55.6	6.15	138	cloudy	3.65
0930		26.6	7.41	54.5	6.55	138	clear	3.62
0945		26.8	7.38	54.7	6.64	37		3.63
1000		27.0	7.43	54.6	6.70	49		3.63
1030		27.3	7.45	54.6	6.75	94		3.62
1050		27.8	7.43	54.5	7.11	133		3.61
1115		28.9	7.54	54.0	7.40	138	↓	3.57
1130	8	Collect Sample						

Sampled By: TN Signature(s): _____

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BRAC 51	JOB NO.:	BORING NO.: A11-GS-09
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 8' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1650	DATE: 10 DEC
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1657	DATE: 10 DEC 07
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE A - HAWK UNDER GRAVEL SURFACE COVER

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY	
0-1'	SOIL		12	9	0		1		WHITE TO CREAM OOLITIC LIMESTONE CRUSHED/WEATHERED WITH COARSE ROCK FRAGMENTS (1/4" - 1/2"
1-2'			12	12	0		2		
2-3'			12	12	0		3		
3-4'			12	12	0		4		MOIST TO DAMP @ 3' BGS
4-5'			12	12	0		5		WET AT 4' BGS
5-6'			12	12	0		6		
6-7'			12	12	0		7		
7-8'	↓		12	12	0		8		
									BORING TERMINATED AT 8' BGS.
							9		

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SAMPLE LOG SHEET

Sample Name A11-MW-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN1

Airbill No: _____ Laboratory ~~QE~~ Accutest

Total Depth (ft):	12.0'
Stickup Height (ft):	.18
Casing Diameter (ID-inches)	2"
Static Water Level (ft below top of casing):	2.10'
One Casing Volume (gal)	1.6
Start Purge (hrs.):	16:18
End Purge (hrs.):	15:40
Total Purge Time (min.)	
Total Amount Purged (gal)	
Purge Method: Penstaltic pump with teflon tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from teflon tubing, all other fractions pumped using penstaltic w/ teflon tubing (silicon in pump head).	
Depth Sampled	
Sample Date	2-25-98
Sample Time:	~~15:42~~ 17:42

Type of Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Wel
- [X] USA Permanent Well

Duplicate ID: Not Applicable

Type of Sample
- [X] Low Concentration
- [ ] High Concentratio
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs ~~(HCL Preservative)~~	YES: [X] NO [ ]	Bottle Lot Number:	Unpreserved
TCL SVOCs:	YES: [X] NO [ ]	Bottle Lot Number:	
TCL PESTs:	YES: [ ] NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ] NO [X]	Bottle Lot Number:	
AL Metals + Tin (HNO3 Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	SG
16:30	0.1	25.4	7.17	1.91	10.78	10	clear	0.08
~~16~~17:50	1.0	24.5	6.98	2.00	10.11	1	clear	0.09
~~17~~17:06	2.0	24.1	7.04	2.13	10.10	10	clear	0.10
~~17~~17:35	3.75	24.1	6.98	2.66	9.92	10	clear	0.14
~~17~~17:40	4.0	24.0	6.95	2.72	9.92	2	clear	0.13

Sampled By _____ Signature(s): _____

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GROUNDWATER SAMPLE LOG SHEET

Sample Name A11-MW-05 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN1

Airbill No: _____ Laboratory ~~CEL~~ Accutest

Total Depth (ft):	11.98'
Stickup Height (ft):	0.2'
Casing Diameter (ID-inches)	2"
Static Water Level (ft below top of casing):	4.72'
One Casing Volume (gal)	1.18 gal
Start Purge (hrs.):	11:15
End Purge (hrs.):	13:10
Total Purge Time (min.)	115
Total Amount Purged (gal)	5.0
Purge Method: Penstaltic pump with teflon tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from teflon tubing, all other fractions pumped using penstaltic w/ teflon tubing (silicon in pump head).	
Depth Sampled	5.0'
Sample Date	2-24-98
Sample Time:	13:12

Type of Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Wel
- [x] ~~HSA~~ Permanent Well

Duplicate ID: Not Applicable

Type of Sample
- [x] Low Concentration
- [ ] High Concentratio
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

purge rate of ~ 200 ml/min

ANALYSES:

TCL VOCs ~~(HCL Preservative)~~:	YES: [X] NO [ ]	Bottle Lot Number:	unpreserved
TCL SVOCs:	YES: [X] NO [ ]	Bottle Lot Number:	
TCL PESTs:	YES: [ ] NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ] NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	sal
11:20	0.1	24.3	7.14	14.9	7.78	128	slightly cloudy	0.87
11:31	0.75	25.0	7.24	15.5	8.28	112	clear	0.91
11:41	1.5	25.4	7.22	16.2	8.97	127	clear	0.95
11:50	2.0	25.5	7.08	14.5	8.23	23	clear	0.84
12:10	2.5	25.5	6.71	15.0	9.14	121	clear	0.88
12:17	2.75	25.4	7.14	15.8	9.38	117	clear	0.92
12:30	3.25	24.9	7.13	15.8	5.37	117	clear	0.92
12:43	3.75	24.7	7.20	16.4	8.95	118	clear	0.95
13:00	4.50	24.5	7.19	16.9	8.50	117	clear	0.98
13:10	5.00	24.2	7.17	17.1	8.37	118	clear	0.99

Sampled By MR Signature(s): _____

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GROUNDWATER SAMPLE LOG SHEET

Sample Name A11-MW-06 Project: NAS Key West BRAC SI Project Number: 7593

Zone: A - Hawk Missile Site Subzone: GRYZNA-SZN1

Airbill No: _____ Laboratory [redacted] Accutest

Total Depth (ft):	11.88'
Stickup Height (ft):	.16'
Casing Diameter (ID-inches)	2"
Static Water Level (ft below top of casing):	4.44'
One Casing Volume (gal)	1.18 gal
Start Purge (hrs.):	14:10
End Purge (hrs.):	15:31
Total Purge Time (min.)	81
Total Amount Purged (gal)	5.0
Purge Method	Peristaltic pump with teflon tubing (silicon tubing in pump head)
Sample Method	VOCs by gravity flow from teflon tubing, all other fractions pumped using peristaltic w/ teflon tubing (silicon in pump head).
Depth Sampled	5.0'
Sample Date	2-24-98
Sample Time:	15:35

Type of Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Wel
- [X] HSA Permanent Well

Duplicate ID: Not Applicable

Type of Sample
- [✓] Low Concentration
- [ ] High Concentratio
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES: unpreserved

TCL VOCs ~~(HCL Preservative)~~:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
AL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Sal
14:15	0.1	24.1	7.17	35.8	7.79	114	clear	2.24
14:35	1.25	23.6	7.27	35.8	7.69	114	clear	2.24
14:51	2.5	23.7	7.22	34.6	7.44	117	"	2.23
15:10	3.5	23.5	7.25	34.7	7.46	117	clear	2.22
15:22	4.1	23.5	7.24	34.6	7.48	10	clear	2.22
15:31	5.0	23.4	7.18	34.4	7.45	10	clear	2.17

Sampled By MR Signature(s): [signature]

PARCEL B
EAST MARTELLO BATTERY

SUBZONE 1
(GRYZNB-SZN1)
SURFACE SOIL

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: B01-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: B - East Martello Battery Subzone: GRYZNB-SZN1

Airbill No: _____ Laboratory: GEL RO

Sample Date:	17 DEC 97
Sample Time:	1515
Sample Depth (ft):	0 - 2' BLS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE

Sample Method:
- [ ] DPT
- [X] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

Underground surface cover.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BJK Signature(s): Barbara Sale

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: B01-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: B - East Martello Battery Subzone: GRYZNB-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	14 DEC 97
Sample Time:	0830
Sample Depth (ft):	0-6" bgs.
FID Reading:	0 ppm
Sample Color:	BROWN / BLACK AND GREEN
Sample Description:	SILTY, ORGANIC & SAND AND SOME LIMESTONE FRAGMENTS

Sample Method:
- [ ] DPT
- [X] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER PINE NEEDLE SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BSK Signature(s): _____

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: B01-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: B - East Martello Battery Subzone: GRYZNB-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	17 DEC 97
Sample Time:	1640
Sample Depth (ft):	~~0 - 2' bgs~~ B.A. 0 - 6" bgs
FID Reading:	0 ppm
Sample Color:	BROWN / BLACK / CREAM
Sample Description:	ORGANIC W/ SOME LIMESTONE FRAGMENTS.

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ABOVE CONCRETE PADS AT BATTERY ENTRANCE

SOIL IS 4" DEEP ON TOP.

CONCRETE PADS EXTENDS OVER ENTIRE ENTRANCEWAY — INTO THICK BRUSH.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BSS Signature(s): Barbara Smith

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: B01-SS-04 Project: NAS Key West BRAC SI Project Number 7593

Zone: B - East Martello Battery Subzone GRYZNB-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	17 DEC 97
Sample Time:	1410
Sample Depth (ft):	0 - 2' BGS
FID Reading:	6 ppm
Sample Color:	WHITE TO CLEAR
Sample Description:	OOLITIC LIMESTONE AND COARSE ROCK FRAGMENTS

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

Under asphalt/concrete surface cover.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: FOX Signature(s): Barbara Anderson

SUBZONE 3
(GRYZNB-SZN3)
GROUNDWATER

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: B03-GS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: B - East Martello Battery Subzone: GRYZNB-SZN3

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	7.66'
Stickup Height (ft):	0.18'
Casing Diameter (ID-inches):	~~0.5~~ 0.5"
Static Water Level (ft below top of casing):	3.75'
One Casing Volume (gal):	1
Start Purge (hrs.):	10:45
End Purge (hrs.):	11:06
Total Purge Time (min.):	21
Total Amount Purged (gal):	1.0
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	
Sample Date:	12-17-97
Sample Time:	11:06

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	
TCL SVOCs:	YES: [X] NO [ ]	Bottle Lot Number:	
TCL PESTs:	YES: [ ] NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ] NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
10:49	0.1	24.1	6.64	51.8	7.91	9	clear
10:55	0.5	24.1	6.35	523	7.57	1	clear
11:04	0.75	24.6	6.37	52.2	8.04	2	clear

Sampled By: MK Signature(s): Mark

PROJECT: NAS KEY WEST BLDG 51	JOB NO.:	BORING NO.: BOS-GS-3
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 8' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 0735	DATE: 17 D
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 0745	DATE: 17 Dec
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONT. CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: Under grass / gravel surface cover at road edge.

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY	
0-2	SOIL		24	18	0		2		WHITE TO CREAM OOLITIC LIMESTONE & SHELL FRAGMENTS, DRY
2-4			24	18	0		4		
4-6			24	18	0		6		WET @ 4' BGS, LOOSE MAT'L
6-8			24	18	0		8		
							10		BORING TERMINATED @ 8' BGS

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: B-63-65-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: B - East Mantella Battery Subzone: GRYZNB-SZN2

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	7.68
Stickup Height (ft):	.25
Casing Diameter (ID-inches):	1/2
Static Water Level (ft below top of casing):	4.53
One Casing Volume (gal):	0.032
Start Purge (hrs.):	16:15
End Purge (hrs.):	17:05
Total Purge Time (min.):	50
Total Amount Purged (gal):	2.5
Purge Method:	low flow peristolic pump
Sample Method:	low flow peristolic pump
Depth Sampled:	4
Sample Date:	12-16-97
Sample Time:	17:08

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID:

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

150 mL/min

ANALYSES:

TCL VOCs (HCL Preservative):	YES [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
16:21	~~2.5~~ .25	26.8	6.93	17.4	7.26	44	dark grey
16:25	.5	27.2	6.93	17.8	7.12	7	grey
16:31	.75 gal	27.5	6.91	17.9	7.01	~~35~~ 36	grey
16:41	1.25 gal	25.9	6.97	18.0	7.33	14	grey
16:55	2.0 gal	26.7	6.92	18.3	7.02	0	grey
17:00	2.25 gal	26.2	6.91	18.4	7.39	2	grey
17:05	2.5 gal	26.5	6.87	18.4	7.10	1	grey

Sampled By: MK Signature(s): _____

PROJECT: NAS KEY WEST BLDG 81	JOB NO.:	BORING NO.: BH-65
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 8' BGS

DRILLING CONTRACTOR:	GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME:	BILL LINDSEY	START. TIME: 1410	DATE: 16 D
DRILL RIG TYPE:	GEOPROBE	FINISH. TIME: 1420	DATE: 16 DEC
BORING METHOD:	DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER:	2" DIA.	DATE:	
SAMPLING METHOD:	CONT. CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME:	DATE:
CONDITIONS:		LOCATION OF BORING: UNDER WOOD CHIP PILE.	

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED				OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	SOIL		24	14				0		2	WOOD CHIPS WHITE TO CREAM OOLITIC LIMESTONE, DRY
2-4			24	16				0		4	GRAY/WHITE SILTY SAND, DAMP TO WET
4-6			24	24				0		6	WHITE TO CREAM OOLITIC LIMESTONE, WET
6-8	↓		24	20				0		8	BORING TERMINATED @ 8' BGS.
										10	NOTE: GROUNDWATER SCREEN PULLED FROM 7-8' BGS.

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: B03-GS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: B - East Martello Battery Subzone: GRYZNB-SZN3

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	7.12'
Stickup Height (ft):	.81'
Casing Diameter (ID-inches):	1/2
Static Water Level (ft below top of casing):	2.62
One Casing Volume (gal):	
Start Purge (hrs.):	1130
End Purge (hrs.):	1245
Total Purge Time (min.):	~~75 minutes~~ 60 min.
Total Amount Purged (gal):	3 GAL
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	
Sample Date:	12 | 17 | 97
Sample Time:	1245

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	B717801
TCL SVOCs:	YES: [X] NO [ ]	Bottle Lot Number:	H709901K
TCL PESTs:	YES: [ ] NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ] NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	C726601K

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	SAL
1130		23.5	6.53	18.5	7.79	122	CLEAR	1.10
1145		23.7	6.70	18.7	7.86	99	CLEAR	1.11
1200		24.0	6.69	18.9	7.93	81	CLEAR	1.13
		24.1	6.69	18.9	8.06	82-10	CLEAR	1.13

Sampled By: P. HALVERSON Signature(s): _____

PROJECT: NAS KEY WEST BLDG 51	JOB NO.:	BORING NO.: B03 GW-03
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 8' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 0435	DATE: 17. D.
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 0443	DATE: 17 DEC 03
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONT. CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: under pine needle and fine cover

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
1'	SOIL		24	18	0		2	CREAM/GRAY OOLITIC LIMESTONE & COARSE ROCK FRAGMENTS, DRY
2'			24	18	0		4	CREAM/GRAY SILTY SAND, DAMP TO WET
4'			24	18	0		6	WHITE TO CREAM OOLITIC LIMESTONE & SHELL FRAGMENTS, WET
6'	↓		24	18	0		8	BORING TERMINATED @ 8' BGS

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: B03-GS-04 Project: NAS Key West BRAC SI Project Number 7593

Zone: B - East Martello Battery Subzone: GRYZNB-SZN3

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	11.43
Stickup Height (ft):	2.10
Casing Diameter (ID-inches):	½
Static Water Level (ft below top of casing):	3.49
One Casing Volume (gal):	
Start Purge (hrs.):	930
End Purge (hrs.):	1050
Total Purge Time (min.):	30
Total Amount Purged (gal):	1 GALS
Purge Method:	Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)
Sample Method:	VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head)
Depth Sampled:	4.0
Sample Date:	12/18/97
Sample Time:	1015

Type of Screening Sample:
- ___ DPT Borehole
- ___ Existing Monitoring Well
- ___ HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- ✓ Low Concentration
- ___ High Concentration
- ✓ Grab
- ___ Composite
- ___ Grab-Composite

MS/MSD: YES: ☐ NO: ☒

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: ☒ NO: ☐	Bottle Lot Number:	B717801
TCL SVOCs:	YES: ☒ NO: ☐	Bottle Lot Number:	H709901K
TCL PESTs:	YES: ☐ NO: ☒	Bottle Lot Number:	
TCL PCBs:	YES: ☐ NO: ☒	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: ☒ NO: ☐	Bottle Lot Number:	C72660 1K

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	
0930		24.5	6.71	6.75	7.66	<10	GREY-CLEAR	SAL .36
0945		24.4	7.14	6.93	7.88	<10	CLEAR	.37
1060	1 GAL	24.4	7.12	6.59	7.62	<10	CLEAR	.35

Sampled By: P. HALVERSON Signature(s): P. Halverson

PROJECT: NAS KEY WEST BRAC 51	JOB NO.:	BORING NO.: B03-GS-[illegible]
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 10' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 0755	DATE: 10 D
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 0805	DATE: 12 DEC
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONT. CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: IN INNER GREEN ~~DITCH~~ D.A. / GRASS SURFACE COVER

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED				OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	SOIL		24	20				0		0	TOPSOIL
2-4	"		"	20				0		2	SLIGHT TAN SAND & COARSE ROCK FRAGMENTS, WHITE TO CREAM OOLITIC LIMESTONE COARSE ROCK FRAGMENTS, DRY
4-6	"		"	12				0		4	DAMP @ 3.5' BGS
6-8	"		"	12				0/1	SB	6	WET @ 4.0' BGS
										8	GRAY SILTY SAND, WET
											BORING TERMINATED @ 8' BGS
										10	
											WELL SCREEN PLACED TO 10' BGS.

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: B03-GS-05 Project: NAS Key West BRAC SI Project Number 7593

Zone: B - East Martello Battery Subzone: GRYZNB-SZN3

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	12.46
Stickup Height (ft):	2.85
Casing Diameter (ID-inches):	~~1.0~~ 1.0 RCD
Static Water Level (ft below top of casing):	~~2.85~~ 9.13 RCD
One Casing Volume (gal):	
Start Purge (hrs.):	1645
End Purge (hrs.):	1715
Total Purge Time (min.):	30
Total Amount Purged (gal):	1.5
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	3.28
Sample Date:	12/17/97
Sample Time:	1715

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: B03-GS-D8

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [X] NO [ ]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	B707801
TCL SVOCs:	YES: [X] NO [ ]	Bottle Lot Number:	H709901K
TCL PESTs:	YES: [ ] NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ] NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	C872660IK

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1645		24.9	6.70	5.06	8.07	< 10	CLEAR
1700		24.7	7.07	5.08	8.06	< 10	↓
1715	1.5	24.6	7.08	5.08	7.97	< 10	✓

Sampled By: P. HALVERSON Signature(s): _____

PROJECT: NAS KEY WEST BLDG 51	JOB NO.:	BORING NO.: B03-GS-05
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 10' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1355	DATE: 17 DEC
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1405	DATE: 17 DEC
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONT. CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING:

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED				OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY	
0-2	SOIL		24	18				0		2		WHITE TO CREAM OOLITIC LIMESTONE AND COARSE ROCK FRAGMENTS, DRY
2-4	"		"	18				0		4		
4-6	"		"	20				0		6		
6-8	"		"	20				1		8		WET @ 6' BGS.
8-10	"		"	20				0		10		
										12		BORING TERMINATED @ 10' BGS.

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: B03-GS-06 Project: NAS Key West BRAC SI Project Number: 7593

Zone: B - East Martello Battery Subzone: GRYZNB-SZN3

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	11.30
Stickup Height (ft):	-.91
Casing Diameter (ID-inches):	½"
Static Water Level (ft below top of casing):	7.0
One Casing Volume (gal):	0.037
Start Purge (hrs.):	13:55
End Purge (hrs.):	14:46
Total Purge Time (min.):	51
Total Amount Purged (gal):	1.75
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	
Sample Date:	12-17-97
Sample Time:	14 48

Type of Screening Sample:
- ___ DPT Borehole
- ___ Existing Monitoring Well
- ___ HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- ✓ Low Concentration
- ___ High Concentration
- ✓ Grab
- ___ Composite
- ___ Grab-Composite

MS/MSD: YES: ☐ NO: ☒

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: ☒	NO ☐	Bottle Lot Number: _____
TCL SVOCs:	YES: ☒	NO ☐	Bottle Lot Number: _____
TCL PESTs:	YES: ☐	NO ☒	Bottle Lot Number: _____
TCL PCBs:	YES: ☐	NO ☒	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: ☒	NO ☐	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
14:03	0.1	25.7	7.71	7.55	8.65	48	clear
14:14	0.5	25.5	7.24	7.39	8.16	9	clear
14:41	1.5	24.5	7.11	6.63	7.87	2	clear
14:46	1.75	24.5	7.11	6.66	7.75	2	clear

Sampled By: MR Signature(s): _____

PROJECT: NAS KEY WEST BRAC 51	JOB NO.:	BORING NO.: B13-01-11
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 10' BLS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 0930	DATE: 17 Dec
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 0940	DATE: 17 Dec
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONT. CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: Under grass/gravel surface cover.

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6 INCHES	INCHES DRIVEN	INCHES RECOVERED				OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	SOIL		24	18				0		2	LT TAN/CREAM SILTY SAND AND COARSE LIMESTONE ROCK FRAGMENTS, DRY
2-4	|		24	18				0		4	
4-6	|		24	20				0		6	DAMP TO MOIST @ 5' BLS
6-8	|		24	20				0		8	~~WET @ B.S.~~ WHITE TO CREAM OOLITIC LIME AND COARSE ROCK FRAGMENTS, WET
										10	BORING TERMINATED @ 10' BLS.
										12	

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: B03-GS-07 Project: NAS Key West BRAC SI Project Number 7593

Zone: B - East Martello Battery Subzone: GRYZNB-SZN3

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	12.63
Stickup Height (ft):	2.91
Casing Diameter (ID-inches):	½" 1.0 RCD
Static Water Level (ft below top of casing):	9.54
One Casing Volume (gal):	
Start Purge (hrs.):	0800
End Purge (hrs.):	0845
Total Purge Time (min.):	45
Total Amount Purged (gal):	1.53
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head)	
Depth Sampled:	10'
Sample Date:	12/18/97
Sample Time:	0850

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: Not Applicable

MS/MSD: YES: [ ] NO: [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X] NO: [ ]	Bottle Lot Number:	B717801
TCL SVOCs:	YES: [X] NO: [ ]	Bottle Lot Number:	H709901K
TCL PESTs:	YES: [ ] NO: [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ] NO: [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X] NO: [ ]	Bottle Lot Number:	C726691K

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	SAL
0800		23.3	6.39	9.71	6.91	<10	CLEAR	.54
0815		23.7	6.60	9.91	7.10	<10	CLEAR	.55
0830	1.53	23.9	6.62	9.93	7.31	<10	CLEAR	.55

Sampled By: P. HALVERSON Signature(s): P. Halverson

PROJECT: NAS KEY WEST BLDG 51	JOB NO.:	BORING NO.: B03-SC
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 10' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: ~~10~~ B.A. 1620	DATE: 17 D
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1631	DATE: 17 Dec
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA	DATE:	
SAMPLING METHOD: CONT. CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING:

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6 INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	SOIL		24	20	0		2	WHITE TO CREAM POLITIC LIMESTONE W COARSE ROCK FILAGMENTS, DRY.
2-4				20	0		4	
4-6				20	0		6	BRAND @ 5' BGS
6-8				20	0		8	WET @ 6' BGS
8-10							10	BORING TERMINATED @ 10' BGS.

NOTE: SOIL CORING TO 8' BGS.
SS CASING PUSHED TO 10' BGS TO INSTALL PIEZOMETER.

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: B03-GS-08 Project: NAS Key West BRAC SI Project Number 7593

Zone: B - East Martello Battery Subzone GRYZNB-SZN3

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	12.44
Stickup Height (ft):	2.92
Casing Diameter (ID-inches):	~~4~~ 2 1.0 ROD
Static Water Level (ft below top of casing):	4.42
One Casing Volume (gal):	
Start Purge (hrs.):	1430
End Purge (hrs.):	1600
Total Purge Time (min.):	90
Total Amount Purged (gal):	4
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~~12~~ 7 ~~9~~ 7
Sample Date:	12/17/97
Sample Time:	1600

Type of Screening Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	137780
TCL SVOCs:	YES: [X] NO [ ]	Bottle Lot Number:	H709901K
TCL PESTs:	YES: [ ] NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ] NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	C726601K

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	SAL
1431		26.3	6.99	22.9	8.15	896	CLOUDY	1.39
1445		25.9	7.02	23.3	8.41	513	CLOUDY	1.42
1500		26.0	7.06	23.5	7.96	134	CLOUDY	1.43
1515		25.4	7.05	23.4	7.62	103	CLOUDY	1.42
1536		25.0	7.08	23.5	7.82	<1	CLEARING	1.43
1545		24.8	7.06	23.6	7.83	191	GREY	1.43
1600	4 GAL	24.9	7.02	23.5	7.66	133	GREY	1.43

Sampled By: P. HALVERSON Signature(s): P. Halverson

PROJECT: NAS KEY WEST BRAC S1	JOB NO.:	BORING NO.: B-S-[illegible]
	LOGGED BY: B. ANDERSON	TOTAL DEPTH:
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1130	DATE: 17 D
DRILL RIG TYPE: GEODROBE	FINISH. TIME: 1136	DATE: 17 DEC
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA	DATE:	
SAMPLING METHOD: CONT. CORING	TIME:	
HAMMER WGT.: DROP HGT:	BACKFILLED, TIME:	DATE:
CONDITIONS:	LOCATION OF BORING: Under sands/gravel surface cover. Approx. 25' from pond.	

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
1/1	SOIL		24	12	0		2	WHITE TO CREAM/GREY OOLITIC LIMESTONE AND COARSE ROCK FRAGMENTS, DAMP
1/2			24	12	0		4	GREY SILTY SANDS & SILTY CLAY, WET
1/1			24	20	0		6	WHITE TO CREAM OOLITIC LIMESTONE AND ROCK FRAGMENTS/SHELLS, WET
1/2			24	20	0		8	TERMINATED BORING @ 10' BGS
							10	NOTE: SOIL CORING STOPPED @ 8' BGS CASING ADVANCED TO 10' BGS TO SET PIEZOMETER
							12	

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: B03-GS-09 Project: NAS Key West BRAC SI Project Number: 7593

Zone: B - East Martello Battery Subzone: GRYZNB-SZN3

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	11.65
Stickup Height (ft):	2.12
Casing Diameter (ID-inches):	1/2"
Static Water Level (ft below top of casing):	6.83
One Casing Volume (gal):	
Start Purge (hrs.):	0830
End Purge (hrs.):	0945
Total Purge Time (min.):	75
Total Amount Purged (gal):	2 GALS
Purge Method:	Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)
Sample Method:	VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).
Depth Sampled:	7.3'
Sample Date:	12/17/97
Sample Time:	1015

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
0830		21.7	6.79	9.86	7.88	119	CLEAR
0848		22.7	7.69	23.4	7.60	<10	CLEAR
0904		23.2	7.74	27.0	7.49	<10	CLEAR
0915		23.9	7.70	28.1	7.35	<10	CLEAR
0930		24.1	7.68	28.5	7.52	<10	CLEAR
0945	2 GALS	24.5	7.64	28.8	7.31	<10	CLEAR

Sampled By: P. HALVERSON Signature(s): _____

PROJECT: NAS · KEY WEST BRAC 81	JOB NO.:	BORING NO.: B03 - GS - [illegible]
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 10' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL UNDERY	START. TIME: 1540	DATE: 16 DEC
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1550	DATE: 16 DEC
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONT. CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING:

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-4	SOIL	24	20		0			WHITE TO CREAM OOLITIC LIMESTONE, DRY
2-4		24	20		0		2	
4-6		24	20		0		4	WET @ 4' BGS
6-8	↓	24	20		0		6	WHITE TO CREAM OOLITIC LIMESTONE AND SILT ~~SILTY CLAY~~, WET
							8	BORING TERMINATED @ 8' BGS
							10	↓

NOTE: GROUNDWATER SCREEN PUSHED TO 10' BGS ~~SILT TO SIL~~ B.A.

NOTES: _____ EDITED BY/DATE: _____

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900 Trail Ridge Road Aiken, SC 29803 (803) 649-7963 Fax: (803) 642-8454

GROUNDWATER SAMPLE LOG SHEET

Sample Name B63 [redacted]-MW-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: B-EAST MARTELLO BATTERY Subzone: GRID B-SEN 3

Airbill No: _____ Laboratory [redacted] Accutest

Total Depth (ft):	11.15'
Stickup Height (ft):	0.17'
Casing Diameter (ID-inches)	2"
Static Water Level (ft below top of casing):	5.25'
One Casing Volume (gal)	0.94 gallons
Start Purge (hrs.):	13:30
End Purge (hrs.):	15:09
Total Purge Time (min.)	99
Total Amount Purged (gal)	3.75
Purge Method: Penstaltic pump with teflon tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from teflon tubing, all other fractions pumped using penstaltic w/ teflon tubing (silicon in pump head).	
Depth Sampled	5.50'
Sample Date	2-23-94
Sample Time:	15:10

Type of Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Wel
- [X] HSA Permanent Well

Duplicate ID: Not Applicable

Type of Sample
- [X] Low Concentration
- [ ] High Concentratio
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

@ 14:20 I turned down pump to approximately 75 mL/min

ANALYSES:

Unpreserved VOCs

TCL VOCs ~~(HCL Preservative)~~ YES: [X] NO [ ] Bottle Lot Number: _____

TCL SVOCs: YES: [X] NO [ ] Bottle Lot Number: _____

TCL PESTs: YES: [ ] NO [X] Bottle Lot Number: _____

TCL PCBs: YES: [ ] NO [X] Bottle Lot Number: _____

AL Metals + Tin (HNO3 Preservative): YES: [X] NO [ ] Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Sal
13:35	0.1	26.2	6.92	16.1	8.71	183	clear	0.93
13:49	1.0	26.0	6.85	17.6	8.95	181	clear	1.03
14:06	2.0	25.9	6.87	17.7	8.90	13	clear	1.04
14:18	2.75	26.1	6.85	17.8	8.89	184	clear	1.04
14:36	3.0	26.4	6.77	16.4	8.23	153	clear	0.96
14:57	3.5	25.7	6.89	17.0	8.35	0	"	1.00
15:06	3.75	26.0	6.84	17.0	8.24	1	"	1.01

Sampled By MR Signature(s): _____

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GROUNDWATER SAMPLE LOG SHEET

Sample Name [redacted]-MW-02 (B63) Project: NAS Key West BRAC SI Project Number: 7593

Zone: 8-EAST MARTELLO BATTERY Subzone: GRNZNE-SL3

Airbill No: _____ Laboratory [redacted] Accutest

Total Depth (ft):	12.08 ft
Stickup Height (ft):	0.1 ft
Casing Diameter (ID-inches)	2 in
Static Water Level (ft below top of casing):	4.18 ft
One Casing Volume (gal)	1.2 gal
Start Purge (hrs.):	1100
End Purge (hrs.):	1215
Total Purge Time (min.)	75
Total Amount Purged (gal)	4 gallons
Purge Method	Penstaltic pump with teflon tubing (silicon tubing in pump head)
Sample Method	VOCs by gravity flow from teflon tubing, all other fractions pumped using penstaltic w/ teflon tubing (silicon in pump head).
Depth Sampled	~ 5 ft below TOC
Sample Date	25 Feb 1998
Sample Time:	1220

Type of Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Wel
- [X] HSA Permanent Well

Duplicate ID: Not Applicable

Type of Sample
- [X] Low Concentration
- [ ] High Concentratio
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

purge rate ≈ 200 ml/min

SVOCs metals - 1L bottle from Accutest VOCs

38897848 Field Worklist 38928853 Field Worklist 38928853 Field Worklist 38897402 Field Worklist 38897408 Field Worklist 38897406 Field Worklist 38897394 Field Worklist 38897354 Field Worklist

ANALYSES:

TCL VOCs ~~(HCL Preservative)~~ unpreserved VOCs	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
AL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	
1105		25.6	7.66	4.77	7.04	64	clear	0.24
1110		25.5	7.51	4.78	6.87	13	clear	0.25
1135		26.0	7.48	4.64	6.55	4	clear	0.24
1145		25.6	7.47	4.56	6.69	3	clear	0.23
1200		26.1	7.45	4.47	6.52	4	clear	0.23
1210		25.5	7.48	4.43	6.54	4	clear	0.23
1220	collect sample							

Sampled By _____ Signature(s): _____

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GROUNDWATER SAMPLE LOG SHEET

Sample Name B05 [redacted]-MW-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: B-EAST MAINTENANCE BATTERY [redacted]ea Subzone: [redacted] GRAB

Airbill No: _____ Laboratory [redacted] Accutest

Total Depth (ft):	10.89
Stickup Height (ft):	.16'
Casing Diameter (ID-inches)	2"
Static Water Level (ft below top of casing):	2.31'
One Casing Volume (gal)	1.4
Start Purge (hrs.):	09:05
End Purge (hrs.):	11:25
Total Purge Time (min.)	140
Total Amount Purged (gal)	6.25
Purge Method	Penstaltic pump with teflon tubing (silicon tubing in pump head)
Sample Method	VOCs by gravity flow from teflon tubing, all other fractions pumped using penstaltic w/ teflon tubing (silicon in pump head).
Depth Sampled	~~2.0~~ MR 2.5'
Sample Date	2-23-98
Sample Time:	11:27

Type of Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Wel
- [X] HSA Permanent Well

Duplicate ID: Not Applicable

Type of Sample
- [✓] Low Concentration
- [ ] High Concentratio
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

unpreserved VOCs

ANALYSES:

TCL VOCs ~~(HCL Preservative)~~:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
AL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Sal.
09:10	.10	26.9	6.84	14.7	7.44	173	slightly cloudy	0.85
09:28	1.0	26.8	7.02	16.5	7.50	195	" "	0.96
09:36	1.25	26.5	7.12	18.2	7.54	160	" "	1.07
09:45	2.0	26.8	7.15	18.8	7.45	67	clear	1.13
10:01	2.75	26.7	7.19	19.2	7.39	29	" "	1.15
10:14	3.25	27.1	7.20	19.5	7.46	18	clear	1.17
10:24	4.0	26.8	7.22	19.6	7.62	13	" "	1.18
10:40	4.5	27.2	7.22	20.1	7.58	7	" "	1.19
10:50	5.0	26.7	7.21	20.2	7.60	12 MR ~~5.44~~	clear	1.17
11:05	5.5	26.7	7.22	20.0	7.12	188	clear	1.20

Sampled By MK Signature(s): [signature]

PARCEL C
TRUMAN ANNEX DRMO WASTE STORAGE AREA

SUBZONE 1
(GRYZNC-SZN1)
SURFACE SOIL

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C01-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	21 Nov 97
Sample Time:	1140
Sample Depth (ft):	2'
FID Reading:	1<2
Sample Color:	
Sample Description:	Top to bottom: white/gray/brown/red med gr sand

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Type of Sample:
- [x] Low-Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: Not Applicable

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

1" surface dry soil and vegetation

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: DLR Signature(s): Dwight Kennerson

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C01-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date: 21 Nov 97

Sample Time: 1530

Sample Depth (ft): 2 bgs Lust

FID Reading:

Sample Color: cream

Sample Description: Unconsolidated med gr yg/a 3/4" fragline stone

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

Grass and gravel surface

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: DLC Signature(s): _____

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C01-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	21 NOV 97
Sample Time:	1155
Sample Depth (ft):	2'
FID Reading:	0
Sample Color:	TTP 1.5' Cream bot. 6" gray
Sample Description:	med.gr. Sand with broken rock frags.

Sample Method:
- [ ] DPT
- [ ] Hand Auger
- [ ] HSA

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: Not Applicable

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

½ asphalt surface

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: DK Signature(s): Dwight Kinnan

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C01-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date: 21 NOV 97

Sample Time: 1145

Sample Depth (ft): 2"

FID Reading: 0

Sample Color: top to bottom - med/ white/tan/gray/red/gr sand w/rocks

Sample Description: med gr. sand w/ rock frags

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: Not Applicable

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

surface 1/2" asphalt

ANALYSES:

			Bottle Lot Number:
TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	_____
TCL SVOCs:	YES: [X]	NO [ ]	_____
TCL PESTs:	YES: [X]	NO [ ]	_____
TCL PCBs:	YES: [ ]	NO [X]	_____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	_____

Sampled By: DK Signature(s): Dayle Kleinman

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C01-S-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C-Truman Annex DRMO Waste Storage Area Subzone: GRID-SW-1

Airbill No: _____ Laboratory: ~~GEL~~ ACCUTEST

Sample Date:	26 Feb 98
Sample Time:	1530
Sample Depth (ft):	3 inches to 1.5 ft
FID Reading:	0
Sample Color:	light brown
Sample Description:	coarse limestone gravel with organics & sand.

Sample Method:
- ☐ DPT
- ☒ Hand Auger
- ☐ HSA

Duplicate ID: —

Type of Sample:
- ☒ Low Concentration
- ☐ High Concentration
- ☒ Grab
- ☐ Composite
- ☐ Grab-Composite

MS/MSD: YES ☐ NO ☒

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

Original sample was not tested for all fractions, so this sample was collected on order to complete the suite of analyses.

ANALYSES:

TCL VOCs (HCL Preservative):	YES ☒	NO ☐	Bottle Lot Number: _____
TCL SVOCs:	YES ☒	NO ☐	Bottle Lot Number: _____
TCL PESTs:	YES ☒	NO ☐	Bottle Lot Number: _____
TCL PCBs:	YES ☐	NO ☐	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES ☒	NO ☐	Bottle Lot Number: _____

Sampled By: RD Signature(s): Ryan Olson

SUBZONE 3
(GRYZNC-SZN3)
SURFACE SOIL

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C03-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN3

Airbill No: _____ Laboratory: GEL

Sample Date:	12 DEC 97
Sample Time:	0945
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	CREAM / LT. TAN
Sample Description:	WEATHERED OOLITIC LIMESTONE, MED TO FINE GRAIN, DRY

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER SOIL GROUND COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: DJA Signature(s): Barbara Smith

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C03-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN3

Airbill No: _____ Laboratory: GEL

Sample Date:	2 DEC 97
Sample Time:	0930
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	CREAM / LT TAN
Sample Description:	WEATHERED OOLITIC LIMESTONE, MED. GRAIN, LOOSE DRY.

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
- ~~Not Applicable~~ C03-SS-D5

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: ~~X~~ NO ~~X~~ NO

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER SOIL/GRASS SURFACE COVER APPROX. 2' WIDE BTWN 2 ASPHALT PADS.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BSA Signature(s): Barbara Smith

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C03-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN3

Airbill No: _____ Laboratory: GEL

Sample Date:	02 DEC 97
Sample Time:	1120
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	SILTY SAND WITH SOME COARSE LIMESTONE ROCK FRAGMENTS, DRY

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

MINOR GRAVEL SURFACE COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BSM Signature(s): _____

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C03-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN3

Airbill No: _____ Laboratory: GEL

Sample Date:	02 DEC 97
Sample Time:	1020
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	CREAM / LT TAN
Sample Description:	OOLITIC LIMESTONE, WEATHERED — FILL MATL? COARSE ROCK FRAGMENTS, DRY

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

MINIMAL GRASS SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BSF Signature(s): Barbara Sutton

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C13-SS-05 Project: NAS Key West BRAC SI Project Number: 7593

Zone: ZONE C - TRUMAN ANNEX DRMO WASTE STORAGE AREA Subzone: GRYZNK-SUN

Airbill No: _____ Laboratory: GEL

Sample Date:	12-6-91
Sample Time:	13:20
Sample Depth (ft):	0-2'
FID Reading:	0
Sample Color:	Light brown
Sample Description:	Medium Sand

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: NA

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

TCL VOCs (HCL Preservative):	YES [X] NO [ ]	Bottle Lot Number:	
TCL SVOCs:	YES [X] NO [ ]	Bottle Lot Number:	
TCL PESTs:	YES [ ] NO [X]	Bottle Lot Number:	
TCL PCBs:	YES [ ] NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES [X] NO [ ]	Bottle Lot Number:	

Sampled By: MR Signature(s): Mark Ray

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: CTE-SS-06 Project: NAS Key West BRAC SI Project Number: 7593

Zone: ZONE C - TRUMAN ANNEX DRMO WASTE STORAGE AREA Subzone: GRNC-SZ

Airbill No: _____ Laboratory: GEL

Sample Date:	12-8-97
Sample Time:	~~2nd 12-8~~ 13:30
Sample Depth (ft):	0-2
FID Reading:	0
Sample Color:	Light brown with some dark patches
Sample Description:	medium to fine sand with some silt.

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: NA

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

TCL VOCs (HCL Preservative):	YES [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: Marty Ray Signature(s): Marty Ray

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: OU5-SS-07 Project: NAS Key West BRAC SI Project Number: 7593

Zone: ZONE C - TRUMAN ANNEX DRMO WASTE STORAGE AREA Subzone: GRZNC-SZN 3

Airbill No: _____ Laboratory: GEL

Sample Date:	12-8-97
Sample Time:	~~13:30~~ MR 13:45
Sample Depth (ft):	0 - 2
FID Reading:	0
Sample Color:	Light brown to tan
Sample Description:	medium sand with some fine sand

Sample Method:
- [x] ~~DPT~~
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: NA

Type of Sample:
- [x] ~~Low Concentration~~
- [ ] High Concentration
- [x] ~~Grab~~
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

TCL VOCs (HCL Preservative):	YES [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES [X]	NO [ ]	Bottle Lot Number:

Sampled By: Martha Ray Signature(s): Martha Ray

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: CB3-SS-06 Project: NAS Key West BRAC SI Project Number: 7593

Zone: ZONE C - TRUMAN ANNEX DRMO WASTE STORAGE AREA Subzone: GRID C-5

Airbill No: _____ Laboratory: GEL

Sample Date:	12-8-97
Sample Time:	13:35
Sample Depth (ft):	0-2
FID Reading:	0
Sample Color:	light brown to white
Sample Description:	medium sand

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: NA

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [x] NO [ ]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

TCL VOCs (HCL Preservative):	YES [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: Marty Ray Signature(s): Marty Ray

SUBZONE 4
(GRYZNC-SZN4)
SURFACE SOIL

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C04-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN4

Airbill No: _____ Laboratory: GEL

Sample Date:	21 NOV 97
Sample Time:	0850
Sample Depth (ft):	2'
FID Reading:	0
Sample Color:	Cream
Sample Description:	med grained sand with stone fragments

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

Topsoil surface 3"-4"

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [X]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [X]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: DK Signature(s): Dayton Kennon

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C04-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN4

Airbill No: 801210731301 Laboratory: GEL

Sample Date: 20 Nov 97

Sample Time: 1650

Sample Depth (ft): 2'

FID Reading: 0

Sample Color: gray

Sample Description: Dry Gray sand with broken fragmented rocks

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

DK
Hole bored in the middle of a dried puddle.

ANALYSES:

			Bottle Lot Number:
TCL VOCs (HCL Preservative):	YES: [X]	NO [X]	
TCL SVOCs:	YES: [X]	NO [X]	
TCL PESTs:	YES: [ ]	NO [X]	
TCL PCBs:	YES: [ ]	NO [X]	
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	

Sampled By: DK Signature(s): Douglas Kellner

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C04-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN4

Airbill No: 861210731301 Laboratory: GEL

Sample Date:	20 Nov 97
Sample Time:	1635
Sample Depth (ft):	2'
FID Reading:	180 - 200 ppm
Sample Color:	Creamy
Sample Description:	med gr, oolitic limestone 1/4" - 2" limestone fragments

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: Not Applicable

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

Hole bored in the middle of a dried puddle. Will return to collect VOC sample on Friday 21 NOV 97. 0845

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [X]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [X]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Sampled By: DK Signature(s): Dwight Kenne

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C04-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN4

Airbill No: 801218573135 / Laboratory: GEL

Sample Date:	20 NOV 97
Sample Time:	1555
Sample Depth (ft):	2'
FID Reading:	0
Sample Color:	creamy
Sample Description:	1"-3" broken frag. rock creamy med gr. oolitic limestone

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID:
~~Not Applicable~~ C04-SS-D3

MS/MSD: YES: [X] NO: [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

holes dredged in the middle of dredge OK puddle that looked like some root top. W. Went back to same spot on 21 NOV 97 0840 and collected the VOCs w/ Dup. + MS/MSD.

			ANALYSES:
TCL VOCs (HCL Preservative):	YES: [X]	NO [X]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [X]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Sampled By: DK Signature(s): [signature]

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: 04-SS-05 Project: NAS Key West BRAC SI Project Number: 7593

Zone: ZONE C - TRUMAN ANNEX DRMO WASTE STORAGE AREA Subzone: GRYZNC-SZN

Airbill No: _____ Laboratory: GEL

Sample Date:	12-9-97
Sample Time:	10:45
Sample Depth (ft):	0-2'
FID Reading:	0
Sample Color:	light Brown
Sample Description:	medium to fine sand

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: NA

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

TCL VOCs (HCL Preservative):	YES [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: Marty Ray Signature(s): Marty Ray

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: 0455-06 Project: NAS Key West BRAC SI Project Number: 7593

Zone: ZONEC - TRUMAN ANNEX DRMO WASTE STORAGE AREA Subzone: GRYZN

Airbill No: _____ Laboratory: GEL

Sample Date:	12-9-97
Sample Time:	~~10:10~~ 10:30 ~~10:45~~
Sample Depth (ft):	0-2
FID Reading:	0
Sample Color:	Light brown
Sample Description:	medium sand w/ small gravel

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: NA

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

TCL VOCs (HCL Preservative):	YES [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES [X]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES [X]	NO [ ]	Bottle Lot Number:

Sampled By: MP Signature(s): Mark Ry

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: C04-SS-07 Project: NAS Key West BRAC SI Project Number: 7593

Zone: ZCNEC-TRUMAN ANNEX DRMO WASTE STORAGE AREA Subzone: GRYZNC-SZN

Airbill No: _____ Laboratory: GEL

Sample Date:	12-9-97
Sample Time:	12:05
Sample Depth (ft):	0-2
FID Reading:	0
Sample Color:	light brown
Sample Description:	medium sand

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: C04-SS-D6

MS/MSD: YES [x] NO [ ]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

TCL VOCs (HCL Preservative):	YES [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: Marty Ray Signature(s): Marty Ray

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: 0045-S-08 Project: NAS Key West BRAC SI Project Number: 7593

Zone: ZONE C - TRUMAN ANNEX DRMO WASTE STORAGE AREA Subzone: GRYZN-S2

Airbill No: _____ Laboratory: GEL

Sample Date:	12-9-97
Sample Time:	11:20
Sample Depth (ft):	0-2
FID Reading:	0
Sample Color:	light brown to grey
Sample Description:	medium sand w/some small gravel

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: NA

MS/MSD: YES [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

TCL VOCs (HCL Preservative):	YES [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: MR Signature(s): Merit Ray

SUBZONE 6
(GRYZNC-SZN6)
GROUNDWATER

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: C06-GS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN6

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	14.34' T.O.C.
Stickup Height (ft):	2.75' ABOVE GRND
Casing Diameter (ID-inches):	1" I.D
Static Water Level (ft below top of casing):	10.05' T.O.C.
One Casing Volume (gal):	
Start Purge (hrs.):	① 1205 ② 1235
End Purge (hrs.):	1220 1258
Total Purge Time (min.):	15 + 23 = 38 min
Total Amount Purged (gal):	2.5 GAL. (EST.)
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	8.3' BGS (11.05' T.O.C.)
Sample Date:	21 NOV 97
Sample Time:	1300

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: Not Applicable

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

PIEZOMETER INSTALLED AT ASPHALT SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1247		29.3	6.56	2.06	7.06	-10	
1250		29.2	7.04	2.06	7.50	-10	
1257		29.1	7.14	2.70	7.54	-10	

Sampled By: BSK Signature(s): _____

ENVIRONMENTAL

SHEET _____ OF _____

PROJECT:	JOB NO.:	BORING NO.: C06-65-C
	LOGGED BY:	TOTAL DEPTH: 12'

DRILLING CONTRACTOR:	SURFACE ELEV.:	DATUM:
DRILLER'S NAME:	START. TIME: 1020	DATE: 21 Nov
DRILL RIG TYPE:	FINISH. TIME: 1055	DATE: 21 Nov
BORING METHOD:	WATER DEPTH:	
HOLE DIAMETER: 2"	DATE:	
SAMPLING METHOD:	TIME:	
HAMMER WGT.: DROP HGT:	BACKFILLED. TIME:	DATE:
CONDITIONS:	LOCATION OF BORING: Zone C	

Note: 1" asphalt surface

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2'	2'		24	12	0		2	med gray oolitic limestone sand w/ rock fragments upto 1" in size to 3'
2-4'			24	12	0		4	gray-cream color w/o rock fr. oolitic limestone med gr.
4-6'			24	12	0		6	moisture hit at 6' but not satu
6-8'			24	18	0		8	
8-10'	8'		24	OR 18	0		10	no soil sample for logging collec here. but 2' push was very easy and likely unconsolidated rock from of last 6".
							12	

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: C06-GS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN6

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	12.02'
Stickup Height (ft):	1.85'
Casing Diameter (ID-inches):	1/2"
Static Water Level (ft below top of casing):	9.2'
One Casing Volume (gal):	0.64
Start Purge (hrs.):	1136
End Purge (hrs.):	1150
Total Purge Time (min.):	14 min
Total Amount Purged (gal):	~1 gallon
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~ 9.5 ft. below TOC
Sample Date:	21 NOV 97
Sample Time:	1150

Type of Screening Sample:
- [x] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: ~~Not Applicable~~ C06-GS-D5

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [x] NO: [x] NO

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

cleared upwind.
FID readings = 0

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1136							
1140							
1143							
1146							
1150	Collect Samples						
1205	collect duplicate (C06-GS-D5)						

Sampled By: SD Signature(s): Donna C Owen

ENVIRONMENTAL

SHEET _____ OF _____

PROJECT:	JOB NO.:	BORING NO.: C06-GS-C
	LOGGED BY:	TOTAL DEPTH: 10'

DRILLING CONTRACTOR:	SURFACE ELEV.:	DATUM:
DRILLER'S NAME:	START. TIME: 0935	DATE: 21 Nov
DRILL RIG TYPE:	FINISH. TIME:	DATE: 21 Nov 9
BORING METHOD:	WATER DEPTH: 6'	
HOLE DIAMETER: 2"	DATE:	
SAMPLING METHOD: DPT	TIME:	
HAMMER WGT.: DROP HGT:	BACKFILLED. TIME:	DATE:
CONDITIONS:	LOCATION OF BORING: Zone C	

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED				OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY	
				12				0		2		Topsoil in top 2-3 inches
				18				0		4		Gray oolitic limestone sand wit 1/4 - 1" rock frags in Quartz
				24				0		6		lighter gray oolitic sand no rocks
				24				0		8		back to darker gray w/rocks water @ 6' shell frags present
				24				0		10		

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: C06-GS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN6

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	14.88' T.O.C.
Stickup Height (ft):	2.14' above grnd.
Casing Diameter (ID-inches):	1" I.D.
Static Water Level (ft below top of casing):	12.42' T.O.C.
One Casing Volume (gal):	0.100 gal.
Start Purge (hrs.):	1505
End Purge (hrs.):	1534
Total Purge Time (min.):	29
Total Amount Purged (gal):	2 gal. (~20 well vol)
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	
Sample Date:	06 DEC 97
Sample Time:	1535

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [X] NO: [X] DUP.

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

- TEMP PVC PIEZOMETER
- PUMP RATE ~ 220 ML/MIN.
- DPT CREW DEVELOPED THIS WELL BAILER ~ 2.5 GAL REMOVED

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO: [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO: [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO: [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO: [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO: [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1519		25.9	7.20	1.58	7.87	2	clear
1524		25.6	7.22	1.60	7.64	4	↓
1531		25.7	7.22	1.61	7.60	0	
1533	2 gal.	26.0	7.20	1.61	7.52	0	↓

Sampled By: _____ Signature(s): _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: C06-GS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN6

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	11.65' T.O.C.
Stickup Height (ft):	1.87' ABOVE GROUND
Casing Diameter (ID-inches):	0.5" DIA.
Static Water Level (ft below top of casing):	7.91' T.O.C.
One Casing Volume (gal):	
Start Purge (hrs.):	1734
End Purge (hrs.):	0824
Total Purge Time (min.):	50 min.
Total Amount Purged (gal):	~ 4 gal. (EST.)
Purge Method:	Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)
Sample Method:	VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).
Depth Sampled:	
Sample Date:	21 NOV 97
Sample Time:	0825

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

* FID HITS OF 40-45 ppm FROM BOREHOLE
4-5 ppm FROM PURGE WATER (METHANE ODOR?)
* UNDER ASPHALT SURFACE COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
0748		24.2	7.51	0.864	8.54	23	
0759		28.2	7.47	1.44	7.15	-10	
0807		28.0	7.54	1.44	7.15	23	
0813		28.3	7.37	1.42	6.99	-10	
0818		28.4	7.41	1.41	6.91	-10	
0822		28.5	7.46	1.42	6.82	-10	

Sampled By: DMX Signature(s): Barbara Andrews

ENVIRONMENTAL

SHEET _____ OF _____

PROJECT:	JOB NO.:	BORING NO.: CAG-GS-C-
	LOGGED BY: DK	TOTAL DEPTH: 10

DRILLING CONTRACTOR:	SURFACE ELEV.:	DATUM:
DRILLER'S NAME:	START. TIME: 1155	DATE: 20 Nov 07
DRILL RIG TYPE:	FINISH. TIME: 1210	DATE: 20 Nov 07
BORING METHOD: DPT	WATER DEPTH: 5.5'	
HOLE DIAMETER: 2"	DATE:	
SAMPLING METHOD:	TIME:	
HAMMER WGT.: DROP HGT:	BACKFILLED. TIME:	DATE:
CONDITIONS:	LOCATION OF BORING: Zone C	

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	90°		24	12	↑		2	Top 2 inches asphalt Med grained oolitic limestone 1/8"-1" Angular rock
2-4			24	12	500		4	
4-6			24	18	↓ / ⇒		6	Gray clay saturated; fine
6-8			24	24			8	small bits of asphalt at ~5'
8-10	↓		24	24	200		10	

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: C06-GS-05 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN6

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	13.26'
Stickup Height (ft):	2.9'
Casing Diameter (ID-inches):	1"
Static Water Level (ft below top of casing):	9.82'
One Casing Volume (gal):	0.14
Start Purge (hrs.):	0830
End Purge (hrs.):	0910
Total Purge Time (min.):	40
Total Amount Purged (gal):	~4 gallon
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled: ~~3.5' to 4'~~ 9-10' below TOC	
Sample Date:	21 NOV 97
Sample Time:	0910

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

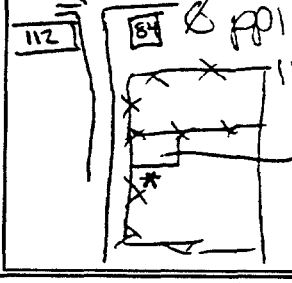
Duplicate ID:
~~Not Applicable~~ C06-GS-D6

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

FID: 50 ppm in borehole casing
0 ppm outside casing in breathing space



ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Sal
0830	0.2	26.3	7.54	1.16	7.79	129	slightly cloudy	0.05
0835		27.4	7.54	1.09	7.72	2	clear	0.04
0900		27.5	7.53	0.95	7.93	<10	↓	0.04
0904		27.4	7.53	0.94	8.03	<10		
0906		27.5	7.52	0.93	8.01	<10		
0908	~4 gal	27.5	7.51	0.93	7.96	<10	↓	
0910	collect sample							
~~0920~~ 0920	collect duplicate			C06-GS-D6				

Sampled By: RD Signature(s): Regina C Dixon

ENVIRONMENTAL

SHEET _____ OF _____

PROJECT:	JOB NO.:	BORING NO.: C06-GS-[illegible]
	LOGGED BY: DK	TOTAL DEPTH: 11'

DRILLING CONTRACTOR:	SURFACE ELEV.:	DATUM:
DRILLER'S NAME:	START. TIME: 1420	DATE: 20 Aug [illegible]
DRILL RIG TYPE:	FINISH. TIME: 1440	DATE: 20 Aug [illegible]
BORING METHOD: DPT	WATER DEPTH: 7'	
HOLE DIAMETER: 2"	DATE:	
SAMPLING METHOD:	TIME:	
HAMMER WGT.: DROP HGT:	BACKFILLED. TIME:	DATE:
CONDITIONS:	LOCATION OF BORING: Zone C	

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCIES	INCIES DRIVEN	INCIES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	60:1		24	12	0		0	Top 4" organic matter 4"-12" silt-
2-4				12	0		2	12"-24" gray colitic med gr sand with trace rock fragments
4-6				18	0		4	2'-5" creamy colitic med gr sand with high density of fragment rock limestone
6-8				24	0		6	5'-6' moist no rocks; fine to coarse creamy colitic
8-10			↓	24	0		8	6'-7' coarse with rocks
10-11	V		12	12	0		10	7-8' fine gray colitic; saturated
							11	8'-9' creamy colitic; med gr; no roc
								9-11' gray fine and med colitic w/o rocks

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: C06-GS-06 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN6

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	11.49' T.O.C.
Stickup Height (ft):	1.84' ABOVE GRND
Casing Diameter (ID-inches):	0.5" I.D.
Static Water Level (ft below top of casing):	6.72' T.O.C.
One Casing Volume (gal):	0.049 GAL.
Start Purge (hrs.):	0946
End Purge (hrs.):	1033
Total Purge Time (min.):	47 MIN.
Total Amount Purged (gal):	3 GAL (EST.)
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	5.38' BGS (7.72' T.O.C)
Sample Date:	21 NOV 97
Sample Time:	1034

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

- TEMP WELL SCREEN SET UNDER GRAVEL/GRASS SURFACE COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1012		27.2	7.40	0.538	7.86	28	
1019		27.1	7.40	0.543	7.73	-10	
1028		27.1	7.34	0.538	7.57	-10	
1032		26.9	7.37	0.537	7.76	-10	

Sampled By: DBA Signature(s): _____

ENVIRONMENTAL

SHEET _____ OF _____

PROJECT:	JOB NO.:	BORING NO.: C06-GS-C
	LOGGED BY:	TOTAL DEPTH: 10'

DRILLING CONTRACTOR:	SURFACE ELEV.:		DATUM:
DRILLER'S NAME:	START. TIME: 0720		DATE: 21 Nov
DRILL RIG TYPE:	FINISH. TIME: 0735		DATE: 21 Nov
BORING METHOD:	WATER DEPTH:	4.5'	
HOLE DIAMETER:	DATE:		
SAMPLING METHOD:	TIME:		
HAMMER WGT.: / DROP HGT:	BACKFILLED. TIME:		DATE:
CONDITIONS:	LOCATION OF BORING: Zone C		

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
				12	0		2	Top 2-3" surface topsoil Med gr creamy oolitic limestone w/ ¼" - 1" fragments
				18	0			
				24	0		4	4'-5' med gr oolitic sand w/ gray color
				24	<1		6	darker gray (no oolites) sand w/ small fr a few 1"-2" rocks at the bottom @ 7
				24	0		8	from 7.5' to ~~10~~ 8.5' fine gray cl from 8.5' to 10' creamy med g oolitic limestone sand w/ grav (1¼" to 1.5" rock fra
							10	

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: C06-GS-07 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN6

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	11.85'
Stickup Height (ft):	2.1" ~~2' 4" mr~~
Casing Diameter (ID-inches):	~~1/2 mr~~ 1/2"
Static Water Level (ft below top of casing):	8.00'
One Casing Volume (gal):	0.019075 gal
Start Purge (hrs.):	~~11:48 mr~~ 07:43
End Purge (hrs.):	08:40 2.25 gal
Total Purge Time (min.):	57
Total Amount Purged (gal):	2.25 gal
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	7.5'
Sample Date:	~~12-2-97 mr~~ 12-3-97
Sample Time:	08:42

Type of Screening Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: Not Applicable

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Flow rate = 150 mL/min 07:55
Flow rate = 200 mL/min 08:34

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
~~14:55~~ 07:55	1 qt	27.0	6.81	.93	7.29	8	clear
08:05	2 qt	27.2	6.95	.719	6.13	10	clear
08:15	1 gal	27.3	6.96	.710	5.84	10	clear
08:24	1½ gal	27.2	6.96	.725	6.73	10	clear
08:34	2 gal	27.3	6.95	.729	6.75	10	clear
08:40	2 gal 1 qt	27.2	6.96	.730	6.82	10	clear

Sampled By: Marty Kay Signature(s): Marty Kay

PROJECT: NAS. KEY WEST BRAC SI	JOB NO.:	BORING NO.: COG - GC - 5
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 10' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1130	DATE: 02 DEC 97
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1140	DATE: 02 DEC 97
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.: DROP HGT:	BACKFILLED. TIME:	DATE:
CONDITIONS:	LOCATION OF BORING: ZONE C UNDER GRAVEL SURFACE COVER	

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	SPLIT		24	16	0		2	CREAM/LIGHT TAN SILTY SAND ~~WITH~~ COARSE ROCK FRAGMENTS - WEATHERED LIMESTONE; DRY.
2-4	↓		↓	16	0		4	
4-6	↓		↓	16	0		6	MOIST @ 5' BGS
6-8	↓		↓	16	0		8	GRAY SILTY SANDS WITH SOME CLAY, WET
8-10	↓		24	12	2		10	CREAM/WHITE OOLITIC LIMESTONE, WEATHERED WET
10								BORING TERMINATED AT 10' BGS.

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: C06-GS-08 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN6

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	10.0'
Stickup Height (ft):	2'5"
Casing Diameter (ID-inches):	½"
Static Water Level (ft below top of casing):	8.01'
One Casing Volume (gal):	0.021691
Start Purge (hrs.):	14:48
End Purge (hrs.):	16:20
Total Purge Time (min.):	1 hr 32 min
Total Amount Purged (gal):	4½ gal
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	9.00'
Sample Date:	12-2-97
Sample Time:	16:20

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Flow rate = 150 mL / 1 min @ 14:51
150 mL / 45 sec @ 15:20
150 mL / 55 sec @ 15:45
15:48 cleaned Horiba, re took turbidity @ 342 NTU

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
14:51	0	26.9	6.80	.426	9.36	263	chalky white
14:59		26.7	7.21	.408	10.05	0	clear
15:13		27.1	7.30	.409	9.88	10	clear
15:20		27.0	7.36	.407	9.61	10	clear
15:31		26.9	7.33	.408	8.93	mR ~~12~~ 10	clear
15:45		26.8	7.36	.407	8.47	343	clear/slightly cloudy
15:50		26.4	7.30	.397	7.60	mR ~~50~~ 49	clear
16:00		26.4	7.32	.405	8.79	10	clear
16:10		24.8	7.34	.335	9.61	10 ~~mR~~	slightly cloudy
16:15		25.9	7.30	.387	8.40	10	clear

Sampled By: Marty Ray Signature(s): Marty Ray 12/2/97

PROJECT: NAS KEY WEST BRAC 5A	JOB NO.:	BORING NO.: C06 - GS - 5
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 12' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1012	DATE: 02 DEC 99
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1025	DATE: 02 DEC 99
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE C GRAVEL/GRASS SURFACE COVER

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	SPLIT		24	16	0		2	CREAM/LT TAN OOLITIC LIMESTONE, WEATH WITH SOME COARSE ROCK FRAGMENTS (1/2 - DRY. (FILL MAT'L?)
2-4	|		|	16	0		4	
4-6	|		|	16	0		6	MOIST @ 4-5' BGS (FILL MAT'L?)
6-8	|		|	16	0		8	WET @ 6' BGS ; ROCK FRAGMENTS 1/4-1/2
8-10	|		|	24	0		10	CREAM WEATHERED LIMESTONE WITH MED. GRAIN & SHELL FRAGMENTS, WI
10-12	↓		↓	24	0		12	BORING TERMINATED AT 12' BGS.
								GROUNDWATER WELL SCREEN SET AT 10' BGS.

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: LO6-GS-09 | Project: NAS Key West BRAC SI | Project Number: 7593

Zone: [redacted] ZONE C | Subzone: [redacted]

Airbill No: _____ | Laboratory: GEL

Total Depth (ft):	13.65' T.O.C.
Stickup Height (ft):	3.29' ABOVE GRND
Casing Diameter (ID-inches):	1" I.D.
Static Water Level (ft below top of casing):	9.76' T.O.C.
One Casing Volume (gal):	0.159 gal.
Start Purge (hrs.):	1121
End Purge (hrs.):	~~B.A. 1153~~ 12 1153
Total Purge Time (min.):	32 MIN.
Total Amount Purged (gal):	1.75 GAL.
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	10.76' T.O.C.
Sample Date:	22 NOV 97
Sample Time:	1155

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO: [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

UNDER GRASS SURFACE COVER.

TEMP PIEZOMETER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO: [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO: [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO: [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO: [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO: [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1135		28.3	7.00	1.14	8.45	753	
1141		28.0	7.05	0.893	8.14	-10	
1145		27.9	7.06	0.904	8.10	-10	
1150		27.9	7.08	0.909	8.00	5	

Sampled By: DMA | Signature(s): Barbara McDonnell

ENVIRONMENTAL

SHEET _____ OF _____

PROJECT:	JOB NO.:	BORING NO.: CP06-GS-09
	LOGGED BY:	TOTAL DEPTH: 10.5'

DRILLING CONTRACTOR:	SURFACE ELEV.:	DATUM:
DRILLER'S NAME:	START. TIME: 1700	DATE: 21 NOV 9
DRILL RIG TYPE:	FINISH. TIME: 1725	DATE: 21 NOV 9
BORING METHOD:	WATER DEPTH:	
HOLE DIAMETER: 2"	DATE:	
SAMPLING METHOD:	TIME:	
HAMMER WGT.: DROP HGT:	BACKFILLED. TIME:	DATE:
CONDITIONS:	LOCATION OF BORING:	

Zone C

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
			24	12	0		2	Top 6" gravelly sop surface soil 6"-3' unconsolidated rock fill material
			24	12	0		4	4'-5' begin creamy colitic limestone w/ fragmented rock water at 5'
			24	12	0		6	
			24	12	0		8	fine grained gr mixed oolitic lime sand w/ slight clayey property; gra color
			24	24	5		10	med + coarse grained sand w/ some rock frags
								9'-9.5' gray fine grained clayey w/o.ro
								9.5'-10' creamy med + coarse gr oolitic limestone w/ frag. rock

NOTES: _____ EDITED BY/DATE: _____

Brown & Root Environmental

900 Trail Ridge Road Aiken, SC 29803 (803) 649-7963 Fax: (803) 642-8454

GROUNDWATER SAMPLE LOG SHEET

Sample Name C06-MW-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN6

Airbill No: _____ Laboratory [redacted] ACCUTEST

Total Depth (ft):	11.90'
Stickup Height (ft):	0.08
Casing Diameter (ID-inches)	2"
Static Water Level (ft below top of casing):	6.16'
One Casing Volume (gal)	0.92 gal
Start Purge (hrs.):	07:35
End Purge (hrs.):	08:16
Total Purge Time (min.)	41
Total Amount Purged (gal)	3.0 gallons
Purge Method	Penstaltic pump with teflon tubing (silicon tubing in pump head)
Sample Method	VOCs by gravity flow from teflon tubing, all other fractions pumped using penstaltic w/ teflon tubing (silicon in pump head).
Depth Sampled	6.5'
Sample Date	2-25-98
Sample Time:	08:18

Type of Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Wel
- [x] HSA Permanent Well

Duplicate ID:
Not Applicable

Type of Sample
- [x] Low Concentration
- [ ] High Concentratio
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

unpreserved VOCs

TCL VOCs ~~(HCL Preservative)~~	YES: [X]	NO [ ]	Bottle Lot Number:	
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:	
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:	
AL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:	

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	sa l
07:40	0.1	25.0	6.86	1.08	7.05	999	cloudy	0.04
07:45	0.25	25.3	7.16	0.91	7.04	3	clear	0.04
07:55	1.0	25.3	7.17	0.91	7.05	3	clear	0.04
08:08	2.0	25.3	7.21	0.92	7.12	1	clear	0.04
08:16	3.0	25.6	7.25	0.91	7.11	0	clear	0.04

Sampled By _____ Signature(s): _____

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GROUNDWATER SAMPLE LOG SHEET

Sample Name C06-MW-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: C - Truman Annex DRMO Waste Storage Area Subzone: GRYZNC-SZN6

Airbill No: _____ Laboratory [redacted] ACCUTEST

Total Depth (ft):	12.01'
Stickup Height (ft):	0.14'
Casing Diameter (ID-inches)	2"
Static Water Level (ft below top of casing):	5.70'
One Casing Volume (gal)	1.04
Start Purge (hrs.):	13:37
End Purge (hrs.):	14:40
Total Purge Time (min.)	
Total Amount Purged (gal)	
Purge Method: Peristaltic pump with teflon tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from teflon tubing, all other fractions pumped using penstaltic w/ teflon tubing (silicon in pump head).	
Depth Sampled	
Sample Date	2-25-98
Sample Time:	14:41

Type of Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Wel
- [X] HSA Permanent Well

Duplicate ID: Not Applicable

Type of Sample
- [X] Low Concentration
- [ ] High Concentratio
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Unpreserved VOCs

ANALYSES:

			Bottle Lot Number:
TCL VOCs ~~(HCL Preservative)~~	YES: [X]	NO [ ]	
TCL SVOCs:	YES: [X]	NO [ ]	
TCL PESTs:	YES: [ ]	NO [X]	
TCL PCBs:	YES: [ ]	NO [X]	
AL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	
13:42	0.1	26.3	7.31	.605	8.62	180	clear	0.0
13:53	0.75	26.3	7.25	.602	9.09	205	slightly cloudy	0.0
14:00	2.0	26.7	7.27	.609	9.34	66	clear	0.02
14:18	2.5	27.0	7.30	.607	9.24	204	clear	0.02
14:30	3.0	27.1	7.25	.600	9.49	204	clear	0.02
14:35	3.25	27.0	6.78	0.92	10.37	6	clear	0.04
14:37	3.30	26.9	7.10	0.727	10.47	1	clear	0.03
14:40	3.35	26.9	7.12	0.721	10.52	1	clear	0.03

recalibrate here

Sampled By _____ Signature(s): _____

PARCEL D
TRUMAN ANNEX SEMINOLE BATTERY

SUBZONE 1
(GRYZND-SZN1)
SURFACE SOIL

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: D01-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: D - Truman Annex Seminole Battery Subzone: GRYZND-SZN1

Airbill No: 801210731231 Laboratory: GEL

Sample Date:	17 NOV 97
Sample Time:	1550
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	LOOSE SAND TRACE SILT, DRY

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ADJACENT TO / IN FRONT OF BATTERY ENTRANCE.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: F711501K; COC#: APC 10170

Sampled By: BA Signature(s): Barbara Nadeau

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: D01-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: D - Truman Annex Seminole Battery Subzone: GRYZND-SZN1

Airbill No: 801207312 31 Laboratory: GEL

Sample Date:	17 NOV 97
Sample Time:	1540
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE VERY LOOSE, DRY

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

			Bottle Lot Number:
TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	
TCL SVOCs:	YES: [X]	NO [ ]	
TCL PESTs:	YES: [ ]	NO [X]	
TCL PCBs:	YES: [ ]	NO [X]	
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	FT1150IK; COAST # ARC10690

Sampled By: DBR Signature(s): Barbara Anderson

SUBZONE 2
(GRYZND-SZN2)
SURFACE SOIL

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: D02-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: D - Truman Annex Seminole Battery Subzone: GRYZND-SZN2

Airbill No: 801210731231 Laboratory: GEL

Sample Date:	17 NOV 97
Sample Time:	1520
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE DRY, MOIST @ 2' BGS.

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ADJACENT (APPROX 1') TO PARKING AREA OFF ROADWAY - MAY GET RUNOFF.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: E7115010K; COUNT# APC10706

Sampled By: BJX Signature(s): Barbara Andrew

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: D02-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: D - Truman Annex Seminole Battery Subzone: GRYZND-SZN2

Airbill No: 801210731281 Laboratory: GEL

Sample Date:	17 NOV 97
Sample Time:	1500
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM/TAN
Sample Description:	OOLITIC LIMESTONE DRY

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ADJACENT TO ROADWAY - MAY HAVE SURFACE RUNOFF FROM ROAD. (APPROX. 4' FROM ROAD)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: FT1150K; CONT #: APC10710

Sampled By: BDK Signature(s): Barbara Anderson

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: D02-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: D - Truman Annex Seminole Battery Subzone: GRYZND-SZN2

Airbill No: 801210781221 Laboratory: GEL

Sample Date:	17 NOV 97
Sample Time:	1315 AND 1340
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM / TAN
Sample Description:	OOLITIC LIMESTONE MEDIUM GRAIN SOME PEBBLE GRAVEL VERY LOOSE, SEVERELY WEATHERED

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: D02-SS-D2

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [X] NO [ ]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: F711508K; CONT#: ARC1070

Sampled By: BDR Signature(s): Bowman Ashley

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: D02-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: D - Truman Annex Seminole Battery Subzone: GRYZND-SZN2

Airbill No: 801210784231 Laboratory: GEL

Sample Date:	17 NOV 97
Sample Time:	1240
Sample Depth (ft):	0-2'
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE, MED. GRAIN V. LOOSE/SOFT; SEVERELY WEATHERED

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: Not Applicable

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ONLY SOME OF ORIGINAL ROCK STRUCTURE PRESENT IN THE FORM OF PEBBLE AND COBBLE SIZE GRAVEL.

THE REST OF THE MATRIX ~~IS A SEVERELY~~ B.A. REDUCED TO SOIL BY WEATHERING.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: F7115 OIK, CONT #: APC1070

Sampled By: BJS Signature(s): Barbara Anderson

SUBZONE 3
(GRYZND-SZN3)
GROUNDWATER

ENVIRONMENTAL

SHEET 1 OF

PROJECT: NAS KEY WEST BRACS1	JOB NO.:	BORING NO.: B03-GC-02
	LOGGED BY: [illegible]	TOTAL DEPTH: 10' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 0955	DATE: 16 NOV 97
DRILL RIG TYPE: ~~DPT~~ GEOPROBE	FINISH. TIME: 1005	DATE: 18 NOV 97
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA	DATE:	
SAMPLING METHOD: CONTINUOUS	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE D

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
	SOIL		12"	9	0		1	3-4" TOPSOIL LIGHT TAN, MED. GRAIN SAND, MOI
			12"	9	↓			DAMP @ 3' BGS
			12"	9	0		2	
			12"	12	↓		3	WHITE TO CREAM OOLITIC LIMESTONE
			12"	12	0		4	WET.
			12"	12	↓		5	MED. GRAIN
			12"	12	0		6	LOOSE, PEBBLE GRAVEL INTERMIXED
			12"	12	↓		7	
			12"	12	0		8	
	↓		12"	12	↓		9	
							10	

NOTES: EDITED BY/DATE:

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: D03-GS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: D - Truman Annex Seminole Battery Subzone: GRYZND-SZN3

Airbill No: 801216231 Laboratory: GEL

Total Depth (ft):	11.4 ft
Stickup Height (ft):	2.5 ft
Casing Diameter (ID-inches):	1"
Static Water Level (ft below top of casing):	7.92'
One Casing Volume (gal):	~~1.200~~ 0.142
Start Purge (hrs.):	1800
End Purge (hrs.):	1900
Total Purge Time (min.):	60
Total Amount Purged (gal):	~2.5 gallons
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~10.4 ft below TOC
Sample Date:	14 NOV 97
Sample Time:	1900

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

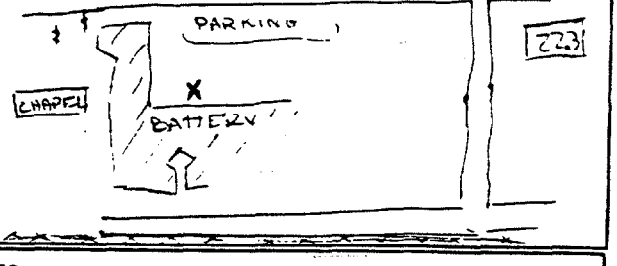
Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

front of Battery (side access) on athletic field



ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	8717 800 CONT#: ARC 1550
TCL SVOCs:	YES: [X] NO [ ]	Bottle Lot Number:	H789901K CONT#: ARC 1430
TCL PESTs:	YES: [ ] NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ] NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	0708381K CONT#: BC 1400

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Sal
1805	~ 0.1	25.1	7.41	1.77	8.08	999	cloudy	--
1818	~ 0.5	25.1	7.43	1.69	8.08	999	cloudy	0.07
1830	~ 1.0	24.9	~~0.52~~ 2.64	7.9	999	slightly cl.	0.12	
1835	Recalibrate Horiba with Quick Cal Solution							
1840	~ 1.5	25.2	6.52	1.68	7.8	40	slightly cloudy	.08
1847	~ 1.9	25.16	7.01	1.66	7.71	<10	clear	0.08
1850	~ 2.1	25.5	7.04	1.65	7.72	<10	clear	0.07
1858	~ 2.5	25.1	7.09	1.65	8.01	<10	clear	0.07

Sampled By: RD/DK Signature(s): Regina Clarke

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BRAC 81	JOB NO.:	BORING NO.: DOS-GS-01
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 10' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1040	DATE: 14 NOV 97
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1050	DATE: 18 NOV 97
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS.	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING:

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
	SOIL		24	18	0		2	3-4" TOPSOIL 6" FINE GRAINED LT TAN SAND, DRY 18" DARK BROWN SILTY SAND, MOIST
			24	18	0		4	
			24	24			6	@ 3' BGS - WHITE TO CREAM COLITIC LIMESTONE, WEATHERED, DAMP
			24	24			8	WET @ 5' BGS.
	↓		24	24			10	BORING TERMINATED AT 10' BGS

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: D03-GS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: D - Truman Annex Seminole Battery Subzone: GRYZND-SZN3

Airbill No: 8121 6173 1231 Laboratory: GEL

Total Depth (ft):	12.65'
Stickup Height (ft):	2 1/2'
Casing Diameter (ID-inches):	1/2"
Static Water Level (ft below top of casing):	7.55' below TOC
One Casing Volume (gal):	0.5559 gal
Start Purge (hrs.):	1140
End Purge (hrs.):	1350
Total Purge Time (min.):	118
Total Amount Purged (gal):	4.5 gallons
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	middle to top of 4' screen
Sample Date:	18 NOV 97
Sample Time:	1350

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

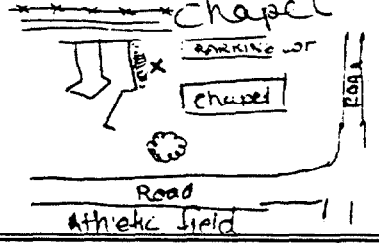
Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Side of Seminole Battery between battery and chapel



ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	B717801 CONT#: APC 1552
TCL SVOCs:	YES: [X] NO [ ]	Bottle Lot Number:	H709918K CONT #APC 1432
TCL PESTs:	YES: [ ] NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ] NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	C709281K CONT#: APC 1405

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Sal
1146	0	26.8	7.36	2.49	8.26	999	cloudy white	0.12
1200		27.0	7.34	2.38	8.22	999	cloudy	0.11
1212		26.7	7.3	2.40	8.27	156	somewhat cloudy	0.11
1216		26.7	7.31	2.41	8.29	999	cloudy	0.11
1219		26.8	7.25	2.47	8.40	999		0.12
1223		26.8	7.31	2.42	8.38	35999		0.11
1230		26.8	7.35	2.38	8.36	3235		0.11
1234		26.5	7.35	2.41	8.42	422324		
1237		26.3	7.39	2.42	8.39	29.3482		
1242		26.4	7.37	2.43	8.37	237 29.3	↓	
1247		26.1	7.37	2.41	8.49	231	slightly cloudy	↓

Sampled By: RJS Signature(s): Regina L. Cruse

See notes for more purge data

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BRAC SI	JOB NO.:	BORING NO.: BD3-GS-03
	LOGGED BY: DA	TOTAL DEPTH: 10' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1640	DATE: 17 NOV 97
DRILL RIG TYPE: ~~DPT~~ GEOPROBE	FINISH. TIME: 1700	DATE: 17 NOV 97
BORING METHOD: ~~DPT~~ DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS - ACETATE LINER	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE 5

Set well screen @ 6' to 10' BGS

GRASS SURFACE COVER.

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-1	SOIL		12	12	6		1	Top 3"-4" topsoil dark brown 4"-12" cream fine sandy dry
1-2	|		12	9	0		2	Creamy grain fine sandy dry
2-3	|		12	9	0		3	moisture hit to 3.5" coarse
3-4	|		12	9	0		4	saturated below 3.5' sandy
4-5	|		12	12	0		5	
5-6	|		12	12	0		6	
6-7	|		12	12	0		7	
7-8	|		12	12	0		8	white very coarse sand & oolitic limestone
8-9	|		12	12	0		9	
9-10	↓		12	12	0		10	BOREHOLE SAMPLING TERMINATED AT 9 ADVANCED TO 10' BGS FOR SETTING WELL

NOTES: _____ EDITED BY/DATE: _____

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BRACS1	JOB NO.:	BORING NO.: DC3-GS-04
	LOGGED BY: BA	TOTAL DEPTH: 8' BGS
DRILLING CONTRACTOR: GULF ATLANTIC DRILLING	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL BINDSEY	START. TIME: 1200	DATE: 17 NOV 9
DRILL RIG TYPE: ~~DPT~~ GEOPROBE	FINISH. TIME: 1225	DATE: 17 NOV 9
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: ACETATE SLEEVE - CONTINUOUS	TIME:	
HAMMER WGT.: DROP HGT:	BACKFILLED. TIME: ~ 1800	DATE: 17 NOV 9
CONDITIONS:	LOCATION OF BORING: ZONE D GRASS SURFACE COVER SET WELL SCREEN @ 4-8' BGS	

NOTE: THIS BOREHOLE ABANDONED PRIOR TO COLLECTING GROUNDW SAMPLE.

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
1/1	spill		12	12"	0		0	Top 3-4" => SURFACE TOPSOIL
1/1			12	10"	0		1	WHITE TO CREAM OOLITIC LIMESTONE
1/1			12	~~2~~ 6" BA	0		2	MEDIUM GRAIN, DRY
1/1			12	6"	0		3	MOIST ▽
1/1			12	12"	0		4	WHITE TO GREY OOLITIC LIMESTONE
1/1			12	12"	0		5	MED GRAIN, DAMP TO WET
1/1			12	2	0		6	BROWN SILTY SAND; MED GRAIN, WET
1/1	▽		12	2	0		7	
							8	BOREHOLE TERMINATED AT APPROX. 8' BGS

NOTES: _____ EDITED BY/DATE: _____

ENVIRONMENTAL

PROJECT: NAS KEY WEST BRAC S1	JOB NO.:	BORING NO.: D03-GS-04
	LOGGED BY: BA	TOTAL DEPTH: 12'
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 0835	DATE: 18 NOV 97
DRILL RIG TYPE: ~~DPT~~ GEOPROBE	FINISH. TIME: 0915	DATE: 18 NOV 97
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" O.D.	DATE:	
SAMPLING METHOD: CONTINUOUS FROM 8'-10' BGS	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED, TIME: DATE:

CONDITIONS:

LOCATION OF BORING:

ZONE D

B.A.

SET PVC WELL @ ~~10'~~ 10.5' BGS DEPTH. (TEMP PLUG)

NOTE: THIS BOREHOLE APPROX. 1' FROM D03-GS-04 (1)
REF. LITHOLOGY FROM OTHER BOREHOLE — SHEET 1 OF 2.

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
							2	
							4	
							6	
							8	
	SOIL	B.A. ~~24~~	24"	18"	0		10	
							12	
							14	

WHITE TO CREAM OOLITIC LIMESTONE, MED. GRAI
VERY LOOSE, WET.

BORING TERMINATED AT APPROX. 10.5 BGS.

NOTES:

EDITED BY/DATE:

PARCEL E
TRUMAN ANNEX BUILDINGS 102, 103, AND 104

SUBZONE 1
(GRYZNE-SZN1)
SURFACE SOIL

Brown & Root Environmental

900 Trail Ridge Road Aiken, SC 29803 (803) 649-7963 Fax: (803) 642-8454

SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E01-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	03 DEC 97
Sample Time:	1050
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	SILTY SAND WITH SOME COARSE ROCK FRAGMENTS

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BJR Signature(s): Barbara Mahn

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E01-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	03 DEC 97
Sample Time:	1335
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	SILTY SAND WITH SOME ROCK FRAGMENTS

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS SURFACE COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BJA Signature(s): Barbara Andrew

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E01-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	03 DEC 97
Sample Time:	0950
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	SILTY SAND WITH LITTLE COARSE ~~GRAVEL~~ ROCK FRAGMENTS

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BMK Signature(s): Barbara Anderson

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E01-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	03 DEC 97
Sample Time:	1310
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	SILTY SAND WITH SOME ROCK FRAGMENTS.

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER ASPHALT SURFACE COVER.

HIT CONCRETE @ ~2' BGS — COULD BE PAD FOR UTILITIES CONDUIT.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BA Signature(s): Barbara Anderson

SUBZONE 2
(GRYZNE-SZN2)
SURFACE SOIL

Brown & Root Environmental

900 Trail Ridge Road Aiken, SC 29803 (803) 649-7963 Fax: (803) 642-8454

SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E02-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN2

Airbill No: _____ Laboratory: GEL

Sample Date:	03 DEC 97
Sample Time:	1350
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LT TAN
Sample Description:	SILTY SAND WITH SOME COARSE ROCK FRAGMENTS

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

NUMBER GRASS SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: BM Signature(s): Barbara Andrew

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E02-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN2

Airbill No: _____ Laboratory: GEL

Sample Date:	03 DEC 97
Sample Time:	BA. ~~1250~~ 1400
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	LT TAN / BROWN
Sample Description:	SILTY SAND WITH COARSE ROCK FRAGMENTS (¼" - ½" DIA).

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BJA Signature(s): Barbara Anderson

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E02-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN2

Airbill No: _____ Laboratory: GEL

Sample Date:	13 DEC 97
Sample Time:	1455
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LT TAN
Sample Description:	SILTY SAND WITH LITTLE COARSE ROCK FRAGMENTS

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

LIMITED GRASS SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BJR Signature(s): Barbara Brown

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E02-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN2

Airbill No: _____ Laboratory: GEL

Sample Date:	03 DEC 97
Sample Time:	1515
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LT TAN
Sample Description:	SILTY SAND WITH SOME COARSE ROCK FRAGMENTS

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:	
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:	
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:	

Sampled By: BSK Signature(s): Barbara Sheehan

SUBZONE 3
(GRYZNE-SZN3)
SURFACE SOIL

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E03-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN3

Airbill No: _____ Laboratory: GEL

Sample Date:	03 DEC 97
Sample Time:	1535
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LT TAN
Sample Description:	SILTY SAND ~~WITH~~ AND COARSE LIMESTONE ROCK FRAGS

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS SURFACE COVER
ASPHALT & CONCRETE 2-3" UNDER SURFACE
SAMPLE COLLECTED FROM BENEATH THIS
SUBSURFACE ~~STRUCTURE~~ PAD.
SAMPLE DEPTH STILL APPROX. 0 - 2' BGS.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BM Signature(s): Barbara McCa

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E03-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN3

Airbill No: _____ Laboratory: GEL

Sample Date:	05 DEC 97
Sample Time:	0955
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	SILTY SAND W/ COARSE ROCK FRAGMENTS

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER ASPHALT SURFACE COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: _____ Signature(s): _____

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E03-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN3

Airbill No: _____ Laboratory: GEL

Sample Date:	~~04 DEC 97~~ B.A. 05 DEC 97
Sample Time:	1900
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN / BROWN
Sample Description:	SILTY SAND WITH COARSE ROCK FRAGMENTS.

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID:
~~Not Applicable~~ E03-SS-D

MS/MSD: YES: [X] NO: [X] B.A.

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO: [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO: [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO: [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO: [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO: [ ]	Bottle Lot Number: _____

Sampled By: _____ Signature(s): _____

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E03-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN3

Airbill No: _____ Laboratory: GEL

Sample Date:	04 DEC 97
Sample Time:	0900
Sample Depth (ft):	0 B.S. 1-3' BGS
FID Reading:	30 ppm
Sample Color:	LT TAN SILTY SAND GRAY SILTY SAND & CLAY
Sample Description:	SILTY SAND AND CLAY

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

CONCRETE PAD SUBSURFACE
SAMPLE COLLECTED BENEATH THIS AT 1-3' BGS.
DIESEL ODOR.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: _____ Signature(s): _____

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E03-SS-05 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN3

Airbill No: _____ Laboratory: GEL

Sample Date:	04 DEC 97
Sample Time:	0925
Sample Depth (ft):	~~0-2' BLS~~ B.A. 0.5-2.5' BLS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	SILT AND SAND WITH COARSE GRAVEL

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
~~Not Applicable~~

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER 6" OF ASPHALT FOLLOWED BY CONCRETE (APPROX. 3" EACH)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: _____ Signature(s): _____

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: EU3-SS-06 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E- BUILDINGS 102, 103, 104 Subzone: GRYNE-SE

Airbill No: _____ Laboratory: ~~SEL~~ ACCUTEST

Sample Date:	26 FEB 1998
Sample Time:	1610
Sample Depth (ft):	1" to 6"
FID Reading:	~~0~~ see "observations"
Sample Color:	light brown
Sample Description:	oolitic limestone; rocky

Sample Method:
- [ ] DPT
- [x] Hand Auger
- [ ] HSA

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

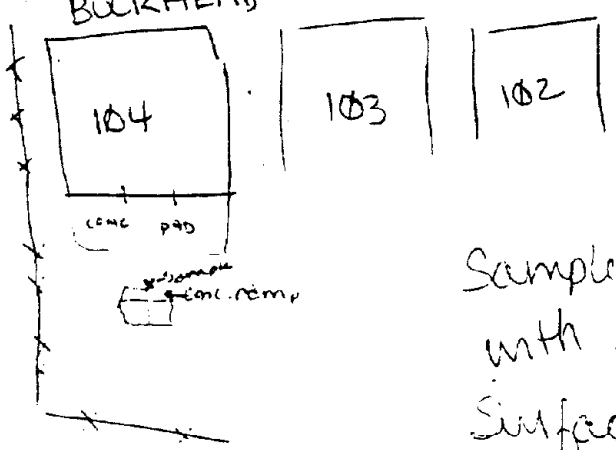
Duplicate ID: —

MS/MSD: YES [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Sample placed at base of concrete ramp leading to recessed pads where drum waste storage skids were previously located behind bldg 104.

Observations/Notes:



FID would not light, but there was no odor + no obvious staining of soil.

Sample was collected with hand auger.

Surface cover was grass

ANALYSES:

TCL VOCs (HCL Preservative):	YES [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES [ ]	NO [ ]	Bottle Lot Number: _____
TCL PCBs:	YES [ ]	NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: RD/MR Signature(s): Ryan C Cuson

SUBZONE 4
(GRYZNE-SZN4)
SURFACE SOIL

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E04-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN4

Airbill No: _____ Laboratory: GEL

Sample Date:	12-6-97
Sample Time:	10:40
Sample Depth (ft):	1.25'
FID Reading:	0
Sample Color:	brownish grey with patches of dark brown, some organics
Sample Description:	medium to fine sand w small ~~rocks~~ pieces of gravel

Sample Method:
- [ ] DPT
- [x] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:
located on opposite side of old transformer pads from E04-SS-04.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: M W Kay Signature(s): M W Kay

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E04-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN4

Airbill No: _____ Laboratory: GEL

Sample Date:	12-6-97
Sample Time:	~~10:50~~ MR 11:05
Sample Depth (ft):	1', 2', 3', 4'
FID Reading:	1'=0, 2'=0, 3'=, 4'=
Sample Color:	Light grey
Sample Description:	fine to medium sand Sample from 0' to 2½'

we hit rock in the hole at a 16" moved 1 foot toward the transformer pad.

Sample Method:
- ☐ DPT
- ☒ Hand Auger
- ☐ HSA

Duplicate ID: Not Applicable

Type of Sample:
- ☑ Low Concentration
- ☐ High Concentration
- ☑ Grab
- ☐ Composite
- ☐ Grab-Composite

MS/MSD: YES: ☐ NO ☒

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

TCL VOCs (HCL Preservative):	YES: ☐	NO ☒	Bottle Lot Number: _____
TCL SVOCs:	YES: ☒	NO ☐	Bottle Lot Number: _____
TCL PESTs:	YES: ☐	NO ☒	Bottle Lot Number: _____
TCL PCBs:	YES: ☒	NO ☐	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: ☒	NO ☐	Bottle Lot Number: _____

Sampled By: Marty Ray Signature(s): Marty Ray

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E04-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN4

Airbill No: _____ Laboratory: GEL

Sample Date:	12-6-97
Sample Time:	10:00
Sample Depth (ft):	1'
FID Reading:	0
Sample Color:	grey/brown
Sample Description:	medium to fine sand with some organics

Sample Method:
- [ ] DPT
- [x] Hand Auger
- [ ] HSA

Duplicate ID: ~~E04-00-D2~~

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:
approximately 1½ foot from the pad containing operating transformers and approximately 10 feet from an older pad which once held transformers

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: Marty Ray Signature(s): Marty Ray

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E04-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN4

Airbill No: _____ Laboratory: GEL

Sample Date:	12-6-97
Sample Time:	10:12
Sample Depth (ft):	0.75'
FID Reading:	0
Sample Color:	Brownish grey
Sample Description:	fine to medium sand with a small amount of organics

Sample Method:
- [ ] DPT
- [x] Hand Auger
- [ ] HSA

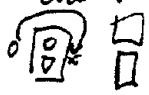
Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

This sample was moved to the opposite side of the transformer pad to be located between the old + new transformer pad in the area of likely run off



Observations/Notes:

site is located between the old & new transformer pads in the area of likely run-off.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: Matt Key Signature(s): Matt Key

SUBZONE 5
(GRYZNE-SZN5)
SURFACE SOIL

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E05-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN5

Airbill No: _____ Laboratory: GEL

Sample Date:	05 DEC 97
Sample Time:	1025
Sample Depth (ft):	0-2' BLS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM SAND & LIMESTONE FRAGMENTS
Sample Description:	ABOVE.

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: _____ Signature(s): _____

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E05-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN5

Airbill No: _____ Laboratory: GEL

Sample Date:	05 DEC 97
Sample Time:	1540
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	SILTY SAND & GRAVEL.

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

WEATHER GRASS SURFACE COVER
LOOKS LIKE STONE ASPHALT PARTICLES MIXED IN THROUGH.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: _____ Signature(s): _____

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E05-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN5

Airbill No: _____ Laboratory: GEL

Sample Date:	05 DEC 97
Sample Time:	1355
Sample Depth (ft):	0-2' BLS
FID Reading:	0 ppm
Sample Color:	GRAY BROWN
Sample Description:	SAND & GRAVEL WITH COARSE ROCK FRAGMENTS

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: _____ Signature(s): _____

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E05-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN5

Airbill No: _____ Laboratory: GEL

Sample Date:	05 DEC 97
Sample Time:	1515
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LT TAN
Sample Description:	SAND & GRAVEL WITH COARSE ROCK FRAGMENTS

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
~~Not Applicable~~ BDG-SS-05

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: _____ Signature(s): _____

SUBZONE 7
(GRYZNE-SZN7)
GROUNDWATER

Brown & Root Environmental

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: EG7-GS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Buildings 102, 103 + 104 Subzone: _____

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	
Stickup Height (ft):	
Casing Diameter (ID-inches):	
Static Water Level (ft below top of casing):	
One Casing Volume (gal):	
Start Purge (hrs.):	
End Purge (hrs.):	
Total Purge Time (min.):	
Total Amount Purged (gal):	
Purge Method:	
Sample Method:	
Depth Sampled:	
Sample Date:	
Sample Time:	

Type of Screening Sample:
- ☐ DPT Borehole
- ☐ Existing Monitoring Well
- ☐ HSA Temporary Well

Duplicate ID:

Type of Sample:
- ☐ Low Concentration
- ☐ High Concentration
- ☐ Grab
- ☐ Composite
- ☐ Grab-Composite

MS/MSD: YES ☐ NO ☐

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Concrete was encountered @ 2' - possibly indicating the presence of a utility conduit. This location was abandoned as a potential GW screening sample - an additional sample was added in Zone F (EG7-GS-10) just across the park road from this location

ANALYSES:

TCL VOCs (HCL Preservative):	YES ☐	NO ☐	Bottle Lot Number: _____
TCL SVOCs:	YES ☐	NO ☐	Bottle Lot Number: _____
TCL PESTs:	YES ☐	NO ☐	Bottle Lot Number: _____
TCL PCBs:	YES ☐	NO ☐	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES ☐	NO ☐	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color

Sampled By: _____ Signature(s): _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: E07-GS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	14.32' T.O.C.
Stickup Height (ft):	2.83' ABOVE GRND
Casing Diameter (ID-inches):	1" I.D.
Static Water Level (ft below top of casing):	10.73' T.O.C.
One Casing Volume (gal):	0.146 gal
Start Purge (hrs.):	1630
End Purge (hrs.):	1709
Total Purge Time (min.):	39 min.
Total Amount Purged (gal):	2.5 gal (est.)
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	~1 well volumes
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~ 15.32' T.O.C.
Sample Date:	06 DEC 07
Sample Time:	1710

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

TEMP PVC PIEZOMETER

UNDER GRASS SURFACE COVER.

PUMP RATE = 200 ml/min.

2.5 gal DEVELOPED + _____ gal PURGED

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1640		25.9	7.05	2.22	7.57	44	clear
1645		25.1	7.05	2.27	7.35	28	↓
1655	~2 gal	25.2	7.02	2.24	7.17	7	
1700		25.3	7.05	2.23	7.06	8	
1704	~2.5 gal	25.0	7.02	2.25	7.13	7	↓

Sampled By: BJT Signature(s): Brian Mc

PROJECT: KAS. KEY WEST BILAC S1	JOB NO.:	BORING NO.: E07-GS-[illegible]
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 12' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START, TIME: 0945	DATE: 03 DEC 0[illegible]
DRILL RIG TYPE: GEOPROBE	FINISH, TIME: 1000	DATE: 03 DEC 0[illegible]
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED, TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE K UNDER GRASS SURFACE COVER SET TEMP PIEZOMETER.

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
1-	SOIL		24	18	0		0	LIGHT TAN SILTY SAND WITH LITTLE COARSE ROCK (LIMESTONE) FRAGMEN DRY.
2-			24	18	0		2	
3-			24	24	0		4	WHITE TO CREAM OOLITIC LIMESTONE WITH SOME COARSE ROCK FRAGS, WEATHERED, MOIST TO DAMP
4-			24	24	0		6	WET @ 5' BGS.
5-			24	20	0		8	
6-	2		24	20	0		10	GREY OOLITIC LIMESTONE - DISCOLORED WET.
							12	BORING TERMINATED AT 12' BGS.
								NOTE: [illegible] IS WHITE/GREY SILTY SAND CLAY LENS APPROX. 6" THICK

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: E07-GS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	14.45'
Stickup Height (ft):	3.93'
Casing Diameter (ID-inches):	1"
Static Water Level (ft below top of casing):	11.55'
One Casing Volume (gal):	
Start Purge (hrs.):	1704
End Purge (hrs.):	1730
Total Purge Time (min.):	26
Total Amount Purged (gal):	~1.5 gal.
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~
Sample Date:	12-6-97
Sample Time:	1730

Type of Screening Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [x]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

flow rate ≈ 200 ml/min

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1704	0	25.5	7.30	1.96	7.51	63	Sl. cloudy
1710		25.9	7.29	1.96	7.50	3	clear
1715		26.2	7.27	1.95	7.48	1	clear
1720		26.0	7.29	1.96	7.60	1	clear
1724	~1.5 gal	26.0	7.29	1.97	7.56	0	clear

Sampled By: RD/MR Signature(s): Rana Clarion

PROJECT: NAS KEY WEST BRAC 81	JOB NO.:	BORING NO.: EC7-GS-2
	LOGGED BY: B ANDERSON	TOTAL DEPTH: 11' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1045	DATE: 03 DEC
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1100	DATE: 03 DEC
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING.	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED, TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE E UNDER GRASS SURFACE COVER

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0/2	SPLIT		24	12	0		0	LIGHT TAN SILTY SAND WITH SOME COARSE ROCK FRAGMENTS (1/4-1/2" DRY.
2/4			24	12	0		2	
4/6			24	18	0		4	LIGHT TAN SILTY SAND, ~~WET~~ ~~DAMP~~ B.A.
6/8			24	18	0		6	DARK BROWN SILTY SAND & CLAY, WET.
8/10			24	18	0		8	WHITE TO CREAM OOLITIC LIMESTONE WEATHERED, WET
10/12	↓		12	10	0		10	BORING TERMINATED AT 11' BGS
							12	
								NOTE: WHITE/GRAY SILTY SAND CLAY LENS, DAMP

NOTES: EDITED BY/DATE:

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: E07-GS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	12.2'
Stickup Height (ft):	.75'
Casing Diameter (ID-inches):	½"
Static Water Level (ft below top of casing):	8.3'
One Casing Volume (gal):	0.634
Start Purge (hrs.):	08:15
End Purge (hrs.):	09:50
Total Purge Time (min.):	95
Total Amount Purged (gal):	4.75
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	7.8'
Sample Date:	12-5-97
Sample Time:	07:50

Type of Screening Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: Not Applicable

MS/MSD: YES: [ ] NO [x]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Flow rate of 300 mL/min at 8:25

Flow rate of 150 mL/m at 8:37

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
08:25	.25 gal	25.5	6.25	.251	7.31	999	chalky white
08:37	1.5 gal	25.6	6.57	.241	7.34	619	chalky white
08:50	2.25 gal	25.7	7.06	.251	7.17	385	slightly cloudy
09:02	2.75 gal	25.8	7.38	.270	7.13	87	clear
09:13	3.25 gal	25.8	7.31	.290	7.22	12	clear
09:28	4.00 gal	25.9	7.40	.303	7.20	0	clear
09:33	4.25 gal	26.0	7.46	.308	6.95	8	clear
09:40	4.5 gal	26.1	7.45	.315	6.84	10	clear
09:45	4.75 gal	25.9	7.48	.318	6.67	1	clear

Sampled By: Marty Key Signature(s): Marty Key

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BRAC S1	JOB NO.:	BORING NO.: 807 - GS - 04
	LOGGED BY: B ANDERSON	TOTAL DEPTH: 12' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1445	DATE: 03 DEC 04
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1500	DATE: 03 DEC 04
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE E UNDER CHAIN SURFACE COVER

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY	
1/2	SS		24	18	0		2		LIGHT TAN SILTY SAND WITH SOME COARSE LIMESTONE ROCK FRAGMENT DRY
2/3			24	18	0				
4/5			24	20	0		4	—	BLACK / DARK BROWN SILT AND SAND, W
6/7			24	20	0		6	—	WHITE TO CREAM OOLITIC LIMESTONE,
8/9			24	24	0		8		WEATHERED, WITH COARSE ROCK FRAGMENTS, WET.
10/11	↓		24	24	0		10		
							12	—	BORING TERMINATED AT 12' BGS

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: E07-GS-05 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	12.08 +2' T.O.C.
Stickup Height (ft):	0.31' ABOVE GRND
Casing Diameter (ID-inches):	0.5" I.D.
Static Water Level (ft below top of casing):	7.28' T.O.C.
One Casing Volume (gal):	0.048 gal.
Start Purge (hrs.):	1045
End Purge (hrs.):	1309
Total Purge Time (min.):	144 min.
Total Amount Purged (gal):	10 gal (est.)
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	= 208 well volumes
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~ 8.28' T.O.C.
Sample Date:	06 DEC 97
Sample Time:	1310

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

FLOW RATE APPROX. 200 ML/MIN FOR SAMPLING.

(HIGHER FLOW RATE UTILIZED FOR "DEVELOPMENT") FOR ~ 15-20 MIN.

* CHECK HOURS W/ CAR FLUID - EVERYTHING

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

	Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
	1109	~2.5 gal	25.0	6.45	1.79	6.83	725	slightly opaque
	1116	~3 gal	25.1	7.25	1.77	6.77	158	fairly clear
	1124		25.5	7.33	1.53	6.85	107	clear
	1136	~4.5 gal	25.3	7.53	1.75	6.95	53	clear
	1146	~5 gal	25.4	7.45	1.75	6.79	27	clear
	1159		25.4	7.29	1.73	6.87	101	clear
*	1206		25.5	7.47	1.73	6.85	128	clear
	1216		24.3	6.89	1.70	6.89	124	clear
	1232		25.5	7.31	1.70	6.74	5606	chalky/opaque
	1254		25.0	7.32	1.69	6.79	65	clear

Sampled By: BMX Signature(s): Barbara McKee

1350	24.9	7.32	1.68	7.01	15	clear
1301	24.9	7.34	1.65	7.04	6	clear

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: E07-GS-09 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	11.65' T.O.C.
Stickup Height (ft):	1.62' above grnd.
Casing Diameter (ID-inches):	0.5" I.D.
Static Water Level (ft below top of casing):	7.92' T.O.C.
One Casing Volume (gal):	0.038 gal.
Start Purge (hrs.):	0825
End Purge (hrs.):	0914
Total Purge Time (min.):	49
Total Amount Purged (gal):	~5 gal (est.)
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	(~131 well volumes)
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~9.92' T.O.C.
Sample Date:	06 DEC 97
Sample Time:	0915

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

0825 - 0845) pump RATE >> 300 ml/min

0845 - 0914) pump RATE 200 ml/min.

WELL POINT UNDER GRASS SIDEWALK COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
0830	~3.5 gal	24.8	6.54	2.34	6.93	15	clear
0855		25.2	7.15	3.10	7.01	13	↓
0903	~4.5 gal	24.9	7.25	3.10	6.83	12	↓
0909		25.1	7.27	3.10	6.91	8	↓
0913		25.3	7.27	3.12	7.02	9	↓

Sampled By: BAX Signature(s): Barbara Anderson

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: E07-GS-10 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	12.67'
Stickup Height (ft):	3.08'
Casing Diameter (ID-inches):	0.5
Static Water Level (ft below top of casing):	5.45'
One Casing Volume (gal):	
Start Purge (hrs.):	1150
End Purge (hrs.):	~~1150~~ 1220
Total Purge Time (min.):	~~30~~ 30
Total Amount Purged (gal):	~ 1.5 gal
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~ 9 ft below TOC
Sample Date:	12/6/94
Sample Time:	1220

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Developed just prior to purge - generated ~ 4 gal of dev. fluid.
purged @ ~ 200 ml/min

FID = 0 ppm

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	
TCL SVOCs:	YES: [X] NO [ ]	Bottle Lot Number:	
TCL PESTs:	YES: [ ] NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ] NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1155	~0.1 gal	23.2	7.53	2.74	8.01	20	sl. cloudy
1200		24.4	7.65	2.82	7.09	3	clear
1204		24.3	7.66	2.84	7.74	0	clear
1207	~1.5 gal	24.3	7.68	2.84	7.86	0	clear

Sampled By: _____ Signature(s): _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: E07-GS-11 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	12.45
Stickup Height (ft):	3'
Casing Diameter (ID-inches):	1"
Static Water Level (ft below top of casing):	8.62'
One Casing Volume (gal):	~ 0.16 gal.
Start Purge (hrs.):	1455
End Purge (hrs.):	1525
Total Purge Time (min.):	30
Total Amount Purged (gal):	1.75 gal
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~ 10 ft
Sample Date:	12-6-97
Sample Time:	1525

Type of Screening Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [x]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

flow rate of ~ 220 ml/min

PID reading = 0 ppm

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1455	0	24.8	7.44	3.19	8.10	34	sl. cloudy
1459		24.8	7.45	3.43	8.10	18	mostly clear
1505		24.9	7.44	3.53	8.10	7	clear
1513	1.25	25.1	7.46	3.55	7.92	0	clear
1520	1.75 gal	25.1	7.46	3.58	7.82	1	clear

Sampled By: RD/MR Signature(s): Ryan C Cuson Matt Ky

ENVIRONMENTAL

SHEET 1 OF ____

PROJECT: NAS KEY WEST BRAC S1	JOB NO.:	BORING NO.: B02 - GS - 11
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 9' BLS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1510	DATE: 05.
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1520	DATE: 05 DEC
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE E UNDER GRASS SURFACE COVER

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY	
1	SILT		24	20	0		2		LIGHT TAN SILTY SANDS AND GRAVEL W COARSE ROCK FRAGMENTS, DRY.
3			24	20	0		4		
5			24	20	0		6		GRAY/BROWN SILTY SANDS & CLAY. DAMP TO WE
7	W		24	20	5		8		WHITE TO CREAM OOLITIC LIMESTONE, WEATHERED, WITH COARSE ROCK FRAGME WET
							10		BORING TERMINATED AT 9' BLS
							12		

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: E07-GS-12 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	13.51
Stickup Height (ft):	2.98
Casing Diameter (ID-inches):	1"
Static Water Level (ft below top of casing):	5.86'
One Casing Volume (gal):	~0.16 gal
Start Purge (hrs.):	1305
End Purge (hrs.):	1350
Total Purge Time (min.):	45 min
Total Amount Purged (gal):	~3 gal.
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~ 7'
Sample Date:	12-6-97
Sample Time:	1355

Type of Screening Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: Not Applicable

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

flow rate ≈ 230 ml/min

FID = Ø

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	
1305	Ø	23.8	7.64	3.42	8.38	~130	S. cloudy	sal Ø.17
1310	clean	turbidity	indicator					
1312		24.5	7.69	3.83	8.15	40	S. cloudy	Ø.19
1325		25.Ø	7.62	4.08	7.93	14	clear	Ø.24
1330	Drop BA pill	VOCs	@ EOF	GS-05				
1345	~2.5 gal	24.5	7.65	4.88	8.18	3	clear	Ø.25
1347		24.6	7.64	4.88	8.16	Ø	clear	↓
1350	~ 3 gal	24.6	7.64	4.90	8.08	Ø	clear	

Sampled By: RD Signature(s): Regina C Dixon

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BRAC 51	JOB NO.:	BORING NO.: EC7-GS-12
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 10' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1348	DATE: 05 DEC.
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1358	DATE: 05 DEC.
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING.	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED, TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE E UNDER GRASS SURFACE COVER IN SLIGHT DEPRESSION

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED				OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY	
0-4	SOIL		24	19			D	0		2		GRAY BROWN SAND & GRAVEL WITH COARSE FRAGMENTS, MOIST TO DAMP
4-8			24	18			D	0		4		CREAM SANDS AND COARSE ROCK FRAGMENTS WET @ 4' BGS.
8-12			24	24			B	5		6		SILTY SANDS AND CLAY, GRAY, WET
12-16			24	24			D	10		8		CREAM OOLITIC LIMESTONE, WEATHERED, LO WET
							B.A.			10		(NO SAMPLE COLLECTED FOR SCREENING) ~~BORING~~ B.A.
												BORING TERMINATED AT 10' BGS.
										12		

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: E07-GS-13 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	11.65 T.O.C.
Stickup Height (ft):	2.00' ABOVE GRND.
Casing Diameter (ID-inches):	0.5" I.D.
Static Water Level (ft below top of casing):	7.12' T.O.C.
One Casing Volume (gal):	0.046 gal.
Start Purge (hrs.):	1430
End Purge (hrs.):	1514
Total Purge Time (min.):	44 min.
Total Amount Purged (gal):	2.5 gal (est.)
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	54 well vol.
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~ 12.65' T.O.C.
Sample Date:	06 DEC 97
Sample Time:	1515

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

PUMP. RATE APPROX 175 ml/MIN

DPT CREW DEVELOPED WELL BY REMOVING 2.5 gal. EARLIER TODAY

CALIBRATED ON HORIBA @ 1445

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1440		25.3	7.13	1.45	6.74	0	clear
1455		24.2	6.97	1.38	8.26	72	↓
1500		24.9	7.09	1.36	7.69	-2	↓
1507		24.9	7.09	1.36	7.71	-2	↓
1513		24.8	7.14	1.36	7.46	-2	↓

Sampled By: BK Signature(s): Barbara McCann

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: E07-MW-22 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	14.08' T.O.C.
Stickup Height (ft):	0.41' below pad.
Casing Diameter (ID-inches):	2" I.D.
Static Water Level (ft below top of casing):	7.06' T.O.C.
One Casing Volume (gal):	1.15 gal.
Start Purge (hrs.):	1000
End Purge (hrs.):	1049
Total Purge Time (min.):	49 min.
Total Amount Purged (gal):	~4.5 gal.
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~8.06' T.O.C.
Sample Date:	09 DEC 97
Sample Time:	1050

Type of Screening Sample:
- [ ] DPT Borehole
- [x] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [x]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

EXISTING PERMANENT MW
2" DIA, PVC

UNDER GIZARD SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1022		28.0	7.27	13.0	8.08	-2	clear
1026		28.4	7.31	12.5	8.51	-1	↓
1034		28.4	7.34	12.2	8.48	-2	↓
1041		28.6	7.33	12.1	8.98	-2	↓

Sampled By: _____ Signature(s): _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: E07-MW-26 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	13.92' T.O.C.
Stickup Height (ft):	0.28' below pad.
Casing Diameter (ID-inches):	2" I.D.
Static Water Level (ft below top of casing):	7.11' T.O.C.
One Casing Volume (gal):	1.11 gal.
Start Purge (hrs.):	0800
End Purge (hrs.):	0854
Total Purge Time (min.):	54 min.
Total Amount Purged (gal):	~ 4 gal. (est.)
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~ 8.11' T.O.C.
Sample Date:	04 DEC 97
Sample Time:	0855

Type of Screening Sample:
- [ ] DPT Borehole
- [x] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

EXISTING PERMANENT 2" PVC MW WITH WELL POINT UNDER A PITLESS SURFACE COVER.

PUMP RATE APPROX. 220 mL/min

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:	
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:	
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:	

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
0827		27.6	6.81	1.05	6.88	0	clear
0836		26.0	6.94	1.07	7.07	0	"
0843	~ 3.5 gal	26.3	6.99	1.06	7.10	0	"
0851		26.4	6.99	1.09	7.00	0	"

Sampled By: _____ Signature(s): _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: EGT-MW-26 Project: NAS Key West BRAC SI Project Number: 759
Zone: E- Buildings 102, 103, 104 Subzone: GRNE-
Airbill No: _____ Laboratory: ~~GEL~~ ACCUTEST

Total Depth (ft):	13.7 ft
Stickup Height (ft):	0.1 ft
Casing Diameter (ID-inches):	2 in
Static Water Level (ft below top of casing):	7.25 ft
One Casing Volume (gal):	
Start Purge (hrs.):	0840
End Purge (hrs.):	0935
Total Purge Time (min.):	55 min
Total Amount Purged (gal):	~4 gallons
Purge Method:	peristaltic pump - low-flow w/ teflon tubing - silicon tubing in pump head
Sample Method:	gravity flow from teflon tubing.
Depth Sampled:	~8 ft below TOC
Sample Date:	24 Feb 98
Sample Time:	0935

Type of Screening Sample:
- [ ] DPT Borehole
- [x] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: —

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [ ] NO [x]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

needed to collect VOCs unpreserved due to effervescence original sample collected on 22 ~~Feb~~ 98.

purge rate ≈ 250 to 300 ml/min

ANALYSES:

TCL VOCs (~~HCL Preservative~~):	YES [x]	NO [ ]	Bottle Lot Number: No preservative
TCL SVOCs:	YES [ ]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES [ ]	NO [ ]	Bottle Lot Number:
TCL PCBs:	YES [ ]	NO [ ]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES [ ]	NO [ ]	Bottle Lot Number:

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
0842		24	6.8	1.0	7.4	56	clear
0854		26	7.2	1.1	7.0	30	↓
0912		25	7.3	↓	7.2	20	↓
0920		25	↓	↓	7.3	<10	↓
0930		26	↓	↓	7.0	↓	↓
0934	~4 gal.	26	↓	↓	7.1	↓	↓

Sat
0.2
↓

Sampled By: RD Signature(s): Dyana Cowan

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: E07-MW-27 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	13.72' T.O.C.
Stickup Height (ft):	0.43' BELOW PAD.
Casing Diameter (ID-inches):	2" I.D.
Static Water Level (ft below top of casing):	7.32' T.O.C
One Casing Volume (gal):	1.04 gal.
Start Purge (hrs.):	0910
End Purge (hrs.):	0959
Total Purge Time (min.):	49
Total Amount Purged (gal):	~ 4 gal (est.)
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~ 14.5' T.O.C.
Sample Date:	07 DEC 97
Sample Time:	

Type of Screening Sample:
- [ ] DPT Borehole
- [X] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: E07-GS-D1

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [X] NO [X] DA

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

SAMPLE ID: 01012

FID = 5 ppm ON PURGE WATER

PUMP RATE = 220 ml/min

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
0932	~2.25	25.9	6.75	1.32	7.02	-10	clear
0940		25.1	6.91	1.29	7.35	-10	↓
0945		26.2	6.87	1.30	6.96	-10	↓
0957	4	25.8	6.96	1.29	7.23	-10	↓

Sampled By: _____ Signature(s): _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: E07-MW-27 Project: NAS Key West BRAC SI Project Number: 7593

Zone: [redacted] ZONE E Subzone: [redacted]

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	13.72 FROM T.O.C.
Stickup Height (ft):	N/A.
Casing Diameter (ID-inches):	2" DIA.
Static Water Level (ft below top of casing):	6.70 FROM T.O.C.
One Casing Volume (gal):	1.15 GAL
Start Purge (hrs.):	1338
End Purge (hrs.):	
Total Purge Time (min.):	
Total Amount Purged (gal):	
Purge Method: Peristaltic pump with ~~polyethylene (PE)~~ tubing (silicon tubing in pump head)	TEFLON
Sample Method: VOCs by gravity flow from ~~PE~~ tubing, all other fractions pumped using peristaltic w/ ~~PE~~ tubing (silicon in pump head).	TEFLON / TEFLON
Depth Sampled:	7.5' FROM T.O.C.
Sample Date:	22NOV97
Sample Time:	

Type of Screening Sample:
- [ ] DPT Borehole
- [X] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYZED FOR TEFLON TUBING

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1353		29.5	7.05	1.78	7.58	77	SLIGHTLY YELLOW GAS
1400	~1 GAL	28.7	7.10	1.75	6.36	42	

Sampled By: _____ Signature(s): _____

SUBZONE 9
(GRYZNE-SZN9)
SURFACE SOIL

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E09-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN9

Airbill No: _____ Laboratory: GEL

Sample Date:	04 DEC 97
Sample Time:	0750
Sample Depth (ft):	0-2' BGS
FID Reading:	1 PPM
Sample Color:	LIGHT TAN
Sample Description:	LOOSE FILL - SILTY SAND AND COARSE ROCK FRAGMENTS

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER ASPHALT SURFACE COVER.

SOME ASPHALT PARTICLES IN SAMPLE

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:	_____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:	_____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:	_____
TCL PCBs:	YES: [X]	NO [ ]	Bottle Lot Number:	_____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:	_____

Sampled By: _____ Signature(s): _____

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: EW9-SS-01-R Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Buildings 102, 103 + 104 Subzone: GRIDNE-SW

Airbill No: _____ Laboratory: ~~OEL~~ Accutest

Sample Date:	26 Feb 98
Sample Time:	1550
Sample Depth (ft):	6 inch to 2 feet
FID Reading:	0
Sample Color:	light brown
Sample Description:	oolitic limestone, rock fragments

Sample Method:
- [ ] DPT
- [X] Hand Auger
- [ ] HSA

Duplicate ID: —

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

"R" - designates resample due to high SVOCs.

Observations/Notes:

- Resample placed adjacent to original sample. Concrete corer was used. - sample was overlain by 1 to 2 inches of asphalt, but no significant amount of concrete was encountered within this location.
- A concerted effort was made to pick out asphalt fragments, but some frags. were very small + cut as likely few asphalt is contained in sample.
- Sample was moist to wet due to water used as lubricant in corer.

ANALYSES:

TCL VOCs (HCL Preservative):	YES [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES [ ]	NO [ ]	Bottle Lot Number: _____
TCL PCBs:	YES [X]	NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BD/MR Signature(s): Regina C Dixon

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E09-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN9

Airbill No: _____ Laboratory: GEL

Sample Date:	12-6-97
Sample Time:	11:40
Sample Depth (ft):	1'
FID Reading:	surface 8ppm 5ppm @ 6"
Sample Color:	brownish to black
Sample Description:	medium sand

Sample Method:
- [ ] DPT
- [x] Hand Auger
- [ ] HSA

Duplicate ID:
~~E09-GS-B1~~ N/A

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [x] NO [x] N.A.

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

Noticable amount of "oil" on surface soil in this location apparently leaking from the tank has occurred at some time.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: Marty Ray Signature(s): Marty Ray

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E09-SS-02-R Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Buildings 102, 103, 104 Subzone: GRVNDF-SING

Airbill No: _____ Laboratory: ~~TMA~~ Accutest

Sample Date:	22 Feb 98
Sample Time:	1430
Sample Depth (ft):	0 to 5 inches
FID Reading:	> 100 ppm
Sample Color:	Dark brown
Sample Description:	Silty sand - strong hydrocarbon odor - seep sample when excited

Sample Method:
- [ ] DPT
- [x] Hand Auger
- [ ] HSA

Duplicate ID: —

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

No contaminants were previously detected on this location when there was obviously leakage from the adjacent waste oil tank, so this location was sampled.

Observations/Notes:

Waste oil tank is obviously still leaky - can see drops of dark liquid fall from tank onto pad adjacent to sample location.

Sample located from soil just off edge of pad. Soil is obviously dark & stained.

ANALYSES:

TCL VOCs (HCL Preservative):	YES [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES [ ]	NO [ ]	Bottle Lot Number: _____
TCL PCBs:	YES [x]	NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: RD/MR Signature(s): Regina C Cuson

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E09-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN9

Airbill No: _____ Laboratory: GEL

Sample Date:	05 DEC 97
Sample Time:	0945
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	SAND BACK B.A. (BACKFILL MAT'L ?)

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER ASPHALT SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: _____ Signature(s): _____

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: E09-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: E - Truman Annex Buildings 102, 103 and 104 Subzone: GRYZNE-SZN9

Airbill No: _____ Laboratory: GEL

Sample Date:	15 DEC 97
Sample Time:	1005
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	SAND

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRASS SURFACE COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: _____ Signature(s): _____

PARCEL F
TRUMAN ANNEX BUILDING 223

SUBZONE 1
(GRYZNF-SZN1)
SURFACE SOIL

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: F01-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	02 DEC 97
Sample Time:	1420
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	SILTY SAND AND COARSE ROCK FRAGMENTS (LIMESTONE), DRY

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRAVEL SURFACE COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BRX Signature(s): _____

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: F01-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	02 DEC 97
Sample Time:	1355
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	SILTY SANDS AND COARSE ROCK FRAGMENTS (LIMESTONE), DRY

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low-Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER GRAVEL SURFACE COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [x]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: _____

Sampled By: BJX Signature(s): _____

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: F01-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	02 DEC 97
Sample Time:	1405
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	SILTY SAND AND COARSE ROCK FRAGMENTS, DRY

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDER ASPHALT SURFACE COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BSB Signature(s): Barbara McLean

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: F01-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	12 DEC 97
Sample Time:	1415
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	LIGHT TAN
Sample Description:	SILTY SAND AND COARSE ROCK FRAGMENTS, DRY.

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

UNDERLYING GRAVEL SURFACE COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: BOX Signature(s): Barbara Anderson

SUBZONE 3
(GRYZNF-SZN3)
SURFACE SOIL

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: F03-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GIRYZNF-SZN3

Airbill No: _____ Laboratory: GEL

Sample Date:	12-8-97
Sample Time:	08:55
Sample Depth (ft):	0-2'
FID Reading:	0
Sample Color:	Dark brown soil for top 2 inches the white silty sand
Sample Description:	sandy on top (brown) the silty sand for rental underneath with small gravel throughout.

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: Marty Ray Signature(s): Marty Ray

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: F03-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN3

Airbill No: _____ Laboratory: GEL

Sample Date:	12-8-97
Sample Time:	0810
Sample Depth (ft):	0-2'
FID Reading:	2'=0 , 3'=1ppm 5'=6ppm
Sample Color:	white
Sample Description:	silty to Fine sand

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

0-5.5' was white silty sand then @ 5.5 foot turned to dark, set pizometer at 10'

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: Marty Ray Signature(s): Marty Ray

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: F03-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN3

Airbill No: _____ Laboratory: GEL

Sample Date:	12-8-97
Sample Time:	0910
Sample Depth (ft):	0-2'
FID Reading:	0
Sample Color:	light brown to white
Sample Description:	medium to fine sand

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: Marty Ray Signature(s): Marty Ray

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: F03-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN3

Airbill No: _____ Laboratory: GEL

Sample Date:	12-8-97
Sample Time:	09:05
Sample Depth (ft):	0-2'
FID Reading:	0
Sample Color:	brown to white
Sample Description:	Fine to medium sand

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: Marty Ray Signature(s): Marty Ray

SUBZONE 7
(GRYZNF-SZN7)
GROUNDWATER

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: F07-GS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F-Truman Annex Bldg 223 Subzone: GRYN-SC

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	14.34'
Stickup Height (ft):	3.86
Casing Diameter (ID-inches):	1¼
Static Water Level (ft below top of casing):	9.31'
One Casing Volume (gal):	0.013
Start Purge (hrs.):	09:15
End Purge (hrs.):	09:58
Total Purge Time (min.):	48
Total Amount Purged (gal):	2.25gal
Purge Method:	low flow pump
Sample Method:	low flow pump
Depth Sampled:	
Sample Date:	12-7-97
Sample Time:	10:00

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: NA

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Previous sampling @ this site (12/4/97) was aborted due to an electrical storm.

Flow rate = 150 mL/min

ANALYSES:

TCL VOCs (HCL Preservative):	YES [ ] NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES [ ] NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES [ ] NO [ ]	Bottle Lot Number: _____
TCL PCBs:	YES [ ] NO [ ]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES [ ] NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
09:20	.25 gal	26.6	6.27	6.01	6.81	614	cloudy white
09:28	.75 gal	25.7	6.87	5.31	6.70	40	clear
09:40	1.25 gal	26.2	6.93	5.19	6.02	443	clear
09:45	1.5 gal	26.2	6.87	5.26	6.50	8	clear
09:50	1.75 gal	26.5	6.86	5.22	6.42	6	clear
09:58	2.25 gal	26.3	6.89	5.22	6.50	4	clear

Sampled By: Marty Ray Signature(s): Marty Ray

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: F07-GS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	14.2
Stickup Height (ft):	3.9
Casing Diameter (ID-inches):	
Static Water Level (ft below top of casing):	9.54
One Casing Volume (gal):	
Start Purge (hrs.):	
End Purge (hrs.):	
Total Purge Time (min.):	
Total Amount Purged (gal):	
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	
Sample Date:	2-4-97
Sample Time:	

Type of Screening Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Sampling aborted due to electrical storm.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
09:15	500mL	27.7	6.39	~~4~~ 3.68	6.90	473	Murky white
09:35	.75 gal	27.2	6.73	3.19	6.46	10	clear
09:48	1.25 gal	27.3	6.97	2.85	6.51	10	clear
09:59	1.5 gal	27.6	7.06	2.69	6.65	10	clear
10:10	2.0 gal	27.3	7.29	2.42	6.7811	10	clear

Sampled By: _____ Signature(s): _____

PROJECT: NAS KEY WEST BRAC 81	JOB NO.:	LOGGED BY: B. ANDERSON	BORING NO.: F-2-FS-2
			TOTAL DEPTH: 11' BGS
DRILLING CONTRACTOR: GULF ATLANTIC		SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY		START. TIME: 1600	DATE: 02 DEC 9
DRILL RIG TYPE: GEOPROBE		FINISH. TIME: 1615	DATE: 02 DEC 9
BORING METHOD: DIRECT PUSH		WATER DEPTH:	
HOLE DIAMETER: 2" DIA.		DATE:	
SAMPLING METHOD: CONTINUOUS CORING		TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED, TIME:	DATE:
CONDITIONS:		LOCATION OF BORING: ZONE F UNDER GRASS SURFACE COVER	

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2'	GRAB		24	18	0		0	TOP 3"-4" ORGANIC TOPSOIL; LIGHT TAN SILTY SAND WITH SOME ROCK FRAGMENTS 1/4 - 1" DIA., DR
2-4'	|		24	12	0		2	
4-6'	|		24	18	0		4	TAN/GRAY SILTY SAND AND CLAY WE
6-8'	|		24	18	0		6	WET @ 5' BGS.
8-9'	|		24	24	0		8	WHITE TO CREAM OOLITIC LIMESTONE, WEATHERED WITH COARSE ROCK FRAGMEN
9-11'	↓		12	12	0		10	WET.
							12	BORING TERMINATED AT 11' BGS.

NOTES: _____ EDITED BY/DATE: _____

Brown & Root Environmental

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: F07-GS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	12.48'
Stickup Height (ft):	1.3'
Casing Diameter (ID-inches):	~~0.25~~ 0.5
Static Water Level (ft below top of casing):	8.83'
One Casing Volume (gal):	
Start Purge (hrs.):	0815
End Purge (hrs.):	0850
Total Purge Time (min.):	40
Total Amount Purged (gal):	~ 2.5 gallons
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~ 9' below TOC
Sample Date:	12/3/97
Sample Time:	0850

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: F07-GS-D2

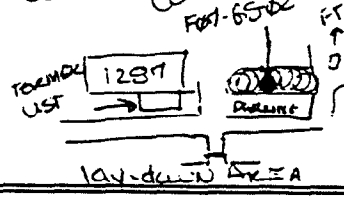
Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [X] NO [ ]

FID = 0 ppm

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Start flowrate @ ~ 400 ml/min for first 3 readings - then backed off to ~ 240 ml/min



SAMPLE IS LOCATED IN A BRUSH AREA - ALTHOUGH DID NOT REQUIRE ANY BRUSH REMOVAL

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Sal
0817	~0	25.8	7.02	2.18	8.12	<10	clear	0.10
0825		26.5	7.15	2.27	7.90			0.11
0827		26.4	7.19	2.31	7.87			
0830	~1	26.4	7.20	2.29	7.96			
0834		26.3	7.20	2.29	7.94			
0836		26.3	7.19	2.30	7.95	<4		
0840		26.4	7.21	2.32	7.95	<1		
0845		26.4	7.20	2.33	7.95	<10		
0847	~2.5	26.4	7.20	2.34	7.96	<10		

Sampled By: [illegible] Signature(s): [illegible]

PROJECT: NAS KEY WEST BIZMAC 81	JOB NO.:	BORING NO.: F07 - GC - [illegible]
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 11' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1510	DATE: 02 DEC [illegible]
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1520	DATE: 02 DEC [illegible]
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED, TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE F UNDER GRAVEL / GRASS SURFACE COVER. SET PIEZOMETER (1" I.D.)

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	SOIL		24	18	0		2	WHITE TO CREAM SILTY SAND AND COA LIMESTONE FRAGMENTS, DRY
2-4				18	0		4	
4-6				18	0		6	RAMP AT 6' BGS.
6-8				18	0		8	WHITE / GRAY SILTY SAND AND CLAY,
8-10			↓	18	1		10	TAN / GRAY SILTY SAND, WET
10-12	↓		12	9	1		12	BORING TERMINATED AT 11' BGS

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: F07-GS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	13.47' T.O.C.
Stickup Height (ft):	2.91' above grnd
Casing Diameter (ID-inches):	1" I.D.
Static Water Level (ft below top of casing):	7.87' T.O.C.
One Casing Volume (gal):	0.228 gal.
Start Purge (hrs.):	1225
End Purge (hrs.):	1329
Total Purge Time (min.):	64 min.
Total Amount Purged (gal):	2.5 gal.
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~ 8.87' T.O.C.
Sample Date:	09 DEC 97
Sample Time:	1330

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

TEMP. 1" DIA PVC PIEZOMETER.

VERY SLOW RECHARGE.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	
TCL SVOCs:	YES: [X] NO [ ]	Bottle Lot Number:	
TCL PESTs:	YES: [ ] NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ] NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1235		28.7	7.47	1.28	8.42	44	clear
1255		24.3	7.47	1.37	8.74	9	↓
1310		28.1	7.46	1.43	9.05	1	
1325		27.9	7.54	1.47	8.36	0	↓

Sampled By: TOM NICOTERA Signature(s): Tom Nicotera

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: F07-GS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	12.15' T.O.C.
Stickup Height (ft):	1.5'
Casing Diameter (ID-inches):	1/2
Static Water Level (ft below top of casing):	8.86' T.O.C.
One Casing Volume (gal):	0.19511
Start Purge (hrs.):	10:05
End Purge (hrs.):	11:10
Total Purge Time (min.):	65
Total Amount Purged (gal):	2.0 gal
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	9.4'
Sample Date:	12-3-97
Sample Time:	11:10

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: Not Applicable

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

175 mL/min Flow rate

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
10:15	1 gal	27.4	6.97	1.53	7.86	16	grey
10:25	1/2 gal	27.3	6.93	1.51	7.35	0	light grey
10:39	3 gal	27.4	6.94	1.50	7.53	10	light grey
10:53	1.25 gal	27.5	6.94	1.49	7.64	10	light grey
11:05	1.75 gal	27.8	6.94	1.48	7.99	10	clear to light grey

Sampled By: Mary Kay Signature(s): Mary Kay

PROJECT: NAS KEY WEST BZMC S1	JOB NO.:	BORING NO.: FT2 - ES - 2
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 11' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 0727	DATE: 03 [illegible]
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 0735	DATE: 03 [illegible]
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.: DROP HGT:	BACKFILLED. TIME:	DATE:
CONDITIONS:	LOCATION OF BORING: ZONE K UNDER GRASS SURFACE COVER.	

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	SOIL		24	12	0		2	LIGHT TAN SILTY SAND AND COARSE LIMESTONE ROCK FRAGMENTS (WEATHERED OOLITIC LIMESTONE), DRY
2-4			24	12	0		4	MOIST @ 4' BGS
4-6			24	24	1		6	WHITE/GRAY SILTY SAND AND CLAY, DRY TO WET
6-8			24	24	10		8	GRAY OOLITIC LIMESTONE, WEATHERERED COARSE FRAGMENTS, WET
8-10			24	18	10		10	DIESEL ODOR
10-12	V		12	4	10		12	BORING TERMINATED AT 11' BGS

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: F07-GS-05 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	11.36'
Stickup Height (ft):	~~1.95'~~ 2.05'
Casing Diameter (ID-inches):	1/2"
Static Water Level (ft below top of casing):	8.06'
One Casing Volume (gal):	0.0136
Start Purge (hrs.):	14:15
End Purge (hrs.):	16:38
Total Purge Time (min.):	136m
Total Amount Purged (gal):	9 gals
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	7.75'
Sample Date:	12.5.97
Sample Time:	16:40

Type of Screening Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
14:50	2 gals	28.8	7.43	1.02	6.39	720	chalky
15:05	3.25 gal	29.4	7.23	0.97	6.06	99	slightly chalky
15:17	4.25 gal	29.1	7.17	0.97	5.73	273	chalky
15:25	5.0 gal	29.2	7.15	0.95	5.77	2	clear
15:38	6.0 gal	28.3	7.19	0.96	5.76	34	clear
15:49	6.75 gal	28.8	7.27	1.00	6.08	10	clear
16:14	7.5 gal	28.6	7.20	0.97	6.00	10	clear
16:20	8.0 gal	28.6	7.13	0.94	5.93	78	clear
16:36	8.5 gal	29.0	7.02	0.94	5.96	303	chalky
16:38	9.0 gal	27.7	7.18	0.96	6.20	9	clear

Sampled By: Marty Ray Signature(s): Marty Ray

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: F07-GS-06 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	11.58' T.O.C.
Stickup Height (ft):	1.21' above grad
Casing Diameter (ID-inches):	0.5" I.D.
Static Water Level (ft below top of casing):	7.92' T.O.C.
One Casing Volume (gal):	0.037 gal.
Start Purge (hrs.):	1045
End Purge (hrs.):	1304
Total Purge Time (min.):	139 min.
Total Amount Purged (gal):	9 gal.
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~ 8.92' T.O.C.
Sample Date:	08 DEC 97
Sample Time:	1305

Type of Screening Sample:
- [x] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

WELL POINT UNDER GROUT SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1110	~2.5 gal	25.5	7.38	1.17	7.12	268	slightly opaque
1121		25.4	7.43	1.16	7.00	29	clear
1130		26.1	7.38	1.15	7.09	17	clear
1140						→	chalky
1153		26.6	7.42	1.17	7.30	255	↓
1216		27.1	7.69	1.16	8.37	559	↓
1230		26.2	7.60	1.16	8.31	67	clear
1249		26.0	7.47	1.16	7.66	43	↓
1253		26.2	7.47	1.16	7.72	21	↓
1300		25.7	7.45	1.16	7.67	16	↓

Sampled By: _____ Signature(s): _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: F07-GS-07 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	12.01
Stickup Height (ft):	3.14
Casing Diameter (ID-inches):	1"
Static Water Level (ft below top of casing):	6.33
One Casing Volume (gal):	0.23 gal.
Start Purge (hrs.):	0851
End Purge (hrs.):	0926
Total Purge Time (min.):	35 min
Total Amount Purged (gal):	~2.25 gal.
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~10' below TOC
Sample Date:	5 Dec 1997
Sample Time:	0930

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

FID = 0 ppm
flowrate during purge was ~230 ml/min.
Sample collected from pump - was able to sustain flow due to high groundwater levels from rain.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Sal
0851	0	23.7	7.49	0.870	8.30	<10	sl. cloudy	0.03
0855		23.4	7.73	0.858	8.22	<10	clear	0.03
pump slowing - change from internal batt to car battery								
0901		23.7	7.77	0.866	8.15	<10	clear	0.03
antecdal								
0909		23.8	6.96	0.964	8.39	<10	clear	0.04
0912		24.0	7.55	0.900	8.35			0.04
0915		24.0	7.00	0.897	8.35			0.03
0917		24.0	7.61	0.897	8.37			
0920	~2.25	24.0	7.62	0.899	8.43	<10	clear	

Sampled By: R Dixon Signature(s): Regina Dixon

PROJECT:	JOB NO.:	BORING NO.: FDT-65-C
	LOGGED BY: DR	TOTAL DEPTH: 8.5'

DRILLING CONTRACTOR:	SURFACE ELEV.:	DATUM:	
DRILLER'S NAME:	START. TIME: 1550	DATE: 21 NC	
DRILL RIG TYPE:	FINISH. TIME: 1620	DATE: 21 NC	
BORING METHOD: DPT	WATER DEPTH:	3.5'	
HOLE DIAMETER: 2"	DATE:		
SAMPLING METHOD:	TIME:		
HAMMER WGT.: DROP HGT:	BACKFILLED. TIME:	DATE:	

CONDITIONS:

LOCATION OF BORING:

Zone F

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
				18	0		2	
				24	0		4	
				24	0		6	
				24	0		8	
				24	0		10	

0'-3' med gr. gray/cream colored limestone with 1/8" to 1" fragments

3'-4' thick dense very dark brown fine to med gr clay like material

4-10.5' creamy colored, saturated med-coarse/very coarse oolitic limestone with 1/4 to 1" fragmen

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: F07-GS-08 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	11.49' T.O.C.
Stickup Height (ft):	2.1' ABOVE GRND
Casing Diameter (ID-inches):	0.5" I.D.
Static Water Level (ft below top of casing):	7.2'
One Casing Volume (gal):	0.0437 GAL
Start Purge (hrs.):	STARTED & STOPPED
End Purge (hrs.):	SEVERAL TIMES.
Total Purge Time (min.):	260 MIN.
Total Amount Purged (gal):	0.5 GAL.
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	6.1' BGS (8.2' T.O.C)
Sample Date:	21 NOV 97
Sample Time:	1640

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

- WELL SCREEN SET SHALLOW - DPT HIT REFUSAL.
- SAMPLED ~~BEFORE~~ EVEN THOUGH TURBIDITY @ ~50 NTU.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1619		28.0	7.01	1.29	8.03	32	
1629		27.8	7.14	1.25	7.93	45	
1634		27.7	7.16	1.27	7.83	46	

Sampled By: BDX Signature(s): Barbara Andrews

ENVIRONMENTAL

SHEET _____ OF _____

PROJECT:	JOB NO.:	BORING NO.: F07-GS-08
	LOGGED BY: DK	TOTAL DEPTH: 10'

DRILLING CONTRACTOR:	SURFACE ELEV.:	DATUM:
DRILLER'S NAME:	START. TIME: 1410	DATE: 2/22/99
DRILL RIG TYPE:	FINISH. TIME: 1430	DATE: 2/22/99
BORING METHOD:	WATER DEPTH:	
HOLE DIAMETER: 2"	DATE:	
SAMPLING METHOD:	TIME:	
HAMMER WGT.: DROP HGT:	BACKFILLED. TIME:	DATE:
CONDITIONS:	LOCATION OF BORING:	

Zone F

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2'	SS		24	18	0		2	
2-4'	SS		24	24	0		4	
4-6'	SS		24	24	0		6	
6-8'	SS		24	24	0		8	
			24				10	

note: grass + gravel surface

creamy-tan oolitic limestone

→ creamy-tan oolitic w/o rock frags

→ dark brown med grained w/ rock frags

→ med + very coarse oolitic limestone saturated w/ water very dense, hard, highly consolidated @ 7.5"

Pushed screen pt to 10' no samples

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: F07-GS-09 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	12.95
Stickup Height (ft):	1' 8"
Casing Diameter (ID-inches):	½"
Static Water Level (ft below top of casing):	8.85'
One Casing Volume (gal):	0.0251615
Start Purge (hrs.):	~~14:50~~ 13:50
End Purge (hrs.):	~~16:00~~ 17:00
Total Purge Time (min.):	70
Total Amount Purged (gal):	3.0 gal
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	9.80'
Sample Date:	12-3-97
Sample Time:	~~16:00~~ 17:00

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

200 mL/min

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
15:58 ~~14:58~~ MR	1 gal.	27.0	6.83	.593	7.99	999	chalky white
16:10 ~~15:10~~ MR	½ gal	26.8	6.98	.533	7.42	999	chalky white
1623 ~~15:23~~ MR	1.25 gal	26.8	6.93	~~.540~~ .540	7.39	85	slightly chalky
1632 ~~15:32~~ MR	2.0 gal	26.7	6.89	.539	7.33	7	clear
1642 ~~15:42~~ MR	2.5 gal	26.6	6.95	.540	7.18	1	clear
1648 ~~15:48~~ MR	2.75 gal	26.6	6.94	.540	6.99	2	clear
1656 ~~15:56~~ MR	3.0 gal	26.6	6.92	.539	7.02	1	clear

Sampled By: Marty Ray Signature(s): Marty Ray

PROJECT: NAS KEY WEST BRAC S1	JOB NO.:	BORING NO.: F07-GS-CC
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 11' BGS

DRILLING CONTRACTOR: GULF ATLANTIC		SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY		START. TIME: 0820	DATE: 03 DEC
DRILL RIG TYPE: GEOPROBE		FINISH. TIME: 0835	DATE: 03 DEC
BORING METHOD: DIRECT PUSH		WATER DEPTH:	
HOLE DIAMETER: 2" DIA.		DATE:	
SAMPLING METHOD: CONTINUOUS CORING		TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME:	DATE:

CONDITIONS:

LOCATION OF BORING:

ZONE K

UNDER GRAVEL / GRASS SURFACE COVER

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED				OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	SOIL		24	18				0		2	LIGHT TAN SILTY SAND AND COARSE LIMES FRAGMENTS (¼"-1" DIA); WEATHERED LIMESTONE, DRY
2-4			24	18				0		4	
4-6			24	24				0		6	WHITE TO CREAM OOLITIC LIMESTONE, WEATHERED, MED. GRAIN W/ COARSE ROCK FRAGMENTS, WET @ 6' BGS
6-8			24	24				0		8	
8-10			24	24				0		10	
10-12	↓		12	24				0		12	BORING TERMINATED AT 11' BGS

NOTES: _____ EDITED BY/DATE: _____

Brown & Root Environmental

900 Trail Ridge Road Aiken, SC 29803 (803) 649-7963 Fax: (803) 642-8454

GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: ~~E07-GS-07~~ E07-GS-10 Project: NAS Key West BRAC SI Project Number: 7593

Zone: ~~E- Truman Annex Buildings 102, 103 and 104~~ F- Subzone: GRYZNE-SZN7

Airbill No: _____ Laboratory: GEL

Total Depth (ft):	12.62'
Stickup Height (ft):	2.43
Casing Diameter (ID-inches):	½"
Static Water Level (ft below top of casing):	8.89'
One Casing Volume (gal):	0.0142
Start Purge (hrs.):	11:10
End Purge (hrs.):	12:17
Total Purge Time (min.):	67
Total Amount Purged (gal):	1.75
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	9.0'
Sample Date:	12-5-79
Sample Time:	12:19

Type of Screening Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

This point was added in Zone F when DPT encountered concrete @ 2' in E07-GS-01. E07-GS-10 is located just across fence + park road from E07-GS-01. (This was also the location originally designated in the WP for E07-GS-04, which was moved to the area in front of 1239 + 1226 in order to equalize sample point distribution

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
11:11	1 cup	26.6	7.18	2.31	6.68	270	grey
11:25	.5 gallon	26.4	7.32	2.41	6.63	372	light grey
11:35	.75 gallon	26.5	7.33	2.42	6.85	10	clear
11:45	1 gallon	26.8	7.33	2.43	6.79	108	clear
11:53	1.4 gallon	26.7	7.42	2.37	6.59	10	clear
12:03	1.5 gallon	26.9	7.47	2.36	6.75	78	clear
12:08	1.25 gal	26.9	7.34	2.41	6.86	10	clear
12:12	1.5 gal	27.1	7.26	2.42	6.89	10	clear
12:17	1.75 gal	27.3	7.34	2.43	7.00	10	clear

Sampled By: Marty Ray Signature(s): Marty Ray

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GROUNDWATER SAMPLE LOG SHEET

Sample Name F07-MW-08 Project: NAS Key West BRAC SI Project Number: 7593

Zone: F - Truman Annex Building 223 Subzone: GRYZNF-SZN7

Airbill No: _____ Laboratory [redacted] Accutest

Total Depth (ft):	10.56'
Stickup Height (ft):	.17'
Casing Diameter (ID-inches)	2"
Static Water Level (ft below top of casing):	2.91'
One Casing Volume (gal)	1.22
Start Purge (hrs.):	08:38
End Purge (hrs.):	08:52
Total Purge Time (min.)	70
Total Amount Purged (gal)	4.0
Purge Method: Peristaltic pump with teflon tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from teflon tubing, all other fractions pumped using peristaltic w/ teflon tubing (silicon in pump head).	
Depth Sampled	~~2.5~~ MR 3.0'
Sample Date	2-24-98
Sample Time:	08:55

Type of Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Wel
- [x] HSA Permanent Well

Duplicate ID: Not Applicable

Type of Sample
- [x] Low Concentration
- [ ] High Concentratio
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (~~HCL Preservative~~) unpreserved VOCs	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
AL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	sal
08:42	0.1	22.6	6.72	1.60	8.36	18	clear	0.07
08:57	1.0	23.5	7.00	1.60	7.88	55	clear	0.07
08:20	2.0	22.6	6.98	1.67	8.33	170	slightly cloudy	0.07
08:37	2.75	23.6	7.05	1.81	9.27	3	clear	0.07
08:43	3.25	23.3	7.03	1.58	7.15	2	clear	0.07
08:52	4.0	23.5	7.05	1.59	8.99	4	clear	0.07

Sampled By MR Signature(s): Mark Ray

PARCEL H
TRUMBO POINT PIERS D-1 AND D-3

SUBZONE 6
(GRYZNH-SZN6)
GROUNDWATER

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GROUNDWATER SAMPLE LOG SHEET

Sample Name: H06-MW-13 | Project: NAS Key West BRAC SI | Project Number: 7593

Zone: H - Trumbo Point Piers D-1 & D-3 | Subzone: GRYZNH-SZN6

Airbill No: _____ | Laboratory: ~~CEL~~ ACCUTEST

Total Depth (ft):	12.91 ft
Stickup Height (ft):	0.2 ft
Casing Diameter (ID-inches)	2 in
Static Water Level (ft below top of casing):	5.04 ft
One Casing Volume (gal)	1.28 gal.
Start Purge (hrs.):	0800
End Purge (hrs.):	0920
Total Purge Time (min.)	80 min
Total Amount Purged (gal)	4 gal
Purge Method: Penstaltic pump with teflon tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from teflon tubing, all other fractions pumped using penstaltic w/ teflon tubing (silicon in pump head).	
Depth Sampled	5 to 6 ft below TOC
Sample Date	26 Feb 98
Sample Time:	

Type of Sample:
- [ ] DPT Borehole
- [X] Existing Monitoring Wel
- [ ] HSA Permanent Well

Duplicate ID: XXX-MW-D2

Type of Sample
- [✓] Low Concentration
- [ ] High Concentratio
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [X] NO [ ]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

lots of orange - brown water standing in depression where flush-mount is accessed.

purging at slightly less than 200 ml/min

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Salin
0805		25.5°C	6.59	1.09	7.41	<10	clear	0.05
0815		25.1°C	7.07	1.06	7.46	<10		0.04
0823		25.1°C	7.96	0.939	7.52	<10		0.04
0836		26.0°C	8.02	1.02	7.56	<10		0.04
0905		26.0°C	8.04	1.01	7.53	<10		0.04
0910		26.1°C	8.05	0.914	7.73	<10		0.04
0915		26.2°C	8.05	0.919	7.74	<10		0.04
0925	Collect Sample							

VOCs XXX-MW-D2 Sampled By JD Signature(s): Regina Conn

VOCs H06-MW-13

(used Accutest metals bottles - no barcodes)

Field Worklist

Brown & Root Environmental

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GROUNDWATER SAMPLE LOG SHEET

Sample Name H06-MW-41 Project: NAS Key West BRAC SI Project Number: 7593

Zone: H - Trumbo Point Piers D-1 & D-3 Subzone: GRYZNH-SZN6

Airbill No: _____ Laboratory [redacted] ACCUTEST

Total Depth (ft):	8.91'
Stickup Height (ft):	.18
Casing Diameter (ID-inches)	2"
Static Water Level (ft below top of casing):	4.06
One Casing Volume (gal)	0.8 gallons
Start Purge (hrs.):	07:45
End Purge (hrs.):	
Total Purge Time (min.)	
Total Amount Purged (gal)	
Purge Method: Peristaltic pump with teflon tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from teflon tubing, all other fractions pumped using peristaltic w/ teflon tubing (silicon in pump head).	
Depth Sampled	
Sample Date	2-26-98
Sample Time:	08:45

Type of Sample:
- [ ] DPT Borehole
- [X] Existing Monitoring Wel
- [X] HSA Permanent Well

Duplicate ID: Not Applicable

Type of Sample
- [X] Low Concentration
- [ ] High Concentratio
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
AL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Sal
07:50	0.1 gal	25.7	6.58	1.33	7.70	10	clear	0.05
08:08	1.0 gal	26.2	6.78	1.27	7.60	10	clear	0.05
08:24	2.0	26.1	6.90	1.29	7.75	10	clear	0.05
08:31	2.75	26.1	7.00	1.33	7.76	10	clear	0.06
08:42	3.00	24.7	6.98	1.34	7.70	10	clear	0.06

Sampled By _____ Signature(s): _____

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GROUNDWATER SAMPLE LOG SHEET

Sample Name H06-MW-42 Project: NAS Key West BRAC SI Project Number: 7593

Zone: H - Trumbo Point Piers D-1 & D-3 Subzone: GRYZNH-SZN6

Airbill No: _____ Laboratory [redacted] ACCUTEST

Total Depth (ft):	
Stickup Height (ft):	
Casing Diameter (ID-inches)	
Static Water Level (ft below top of casing):	
One Casing Volume (gal)	
Start Purge (hrs.):	
End Purge (hrs.):	
Total Purge Time (min.)	
Total Amount Purged (gal)	
Purge Method: Peristaltic pump with teflon tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from teflon tubing, all other fractions pumped using penstaltic w/ teflon tubing (silicon in pump head).	
Depth Sampled	
Sample Date	
Sample Time:	

Type of Sample:
- [ ] DPT Borehole
- [X] Existing Monitoring Wel
- [ ] HSA Permanent Well

Duplicate ID: Not Applicable

Type of Sample
- [X] Low Concentration
- [ ] High Concentratio
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Not sampled - free product present > 1/2 inch, as measured with a bailer.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:	
TCL SVOCs:	YES: [ ]	NO [X]	Bottle Lot Number:	
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:	
AL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:	

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color

Sampled By _____ Signature(s): Regina C Dixon

Brown & Root Environmental

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GROUNDWATER SAMPLE LOG SHEET

Sample Name H06-MW-103 Project: NAS Key West BRAC SI Project Number: 7593

Zone: H - Trumbo Point Piers D-1 & D-3 Subzone: GRYZNH-SZN6

Airbill No: _____ Laboratory [redacted] ACCUTEST

Total Depth (ft):	13.05 ft
Stickup Height (ft):	0.02 ft
Casing Diameter (ID-inches)	2 in
Static Water Level (ft below top of casing):	5.3 ft
One Casing Volume (gal)	1.26 gal.
Start Purge (hrs.):	1045
End Purge (hrs.):	1140
Total Purge Time (min.)	55
Total Amount Purged (gal)	~4.5 gal
Purge Method: Peristaltic pump with teflon tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from teflon tubing, all other fractions pumped using peristaltic w/ teflon tubing (silicon in pump head).	
Depth Sampled	5 to 6 ft below TOC
Sample Date	20 FEB 98
Sample Time:	1145

Type of Sample:
- [ ] DPT Borehole
- [X] Existing Monitoring Wel
- [ ] HSA Permanent Well

Duplicate ID: Not Applicable

Type of Sample
- [X] Low Concentration
- [ ] High Concentratio
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

~ 275 ml/min

38897384
38897384
Field Worklist

38897383
38897383
Field Worklist

38897381
38897381
Field Worklist

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
AL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Sal
1046		27.7°C	7.05	1.20	7.58	<10	clear	0.05
1050 → Natural Horiba		27.1°C	7.09	1.23	7.63	<10	clear	0.05
1055		27.8	6.54	1.24	7.87	9	clear	0.05
1115		27.9	7.03	1.04	8.68	1	clear	0.05
1125		27.7	7.02	1.00	8.94	.5	clear	0.04
1135		27.8	7.04	0.98	9.10	5	clear	0.04
1140		27.7	7.04	0.97	9.16	9	clear	0.04

Sampled By _____ Signature(s): Ryna Conson

PARCEL K
WATER FRONT MAINTENANCE FACILITIES

SUBZONE 1
(GRYZNK-SZN1)
SURFACE SOIL

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: K01-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN1

Airbill No: _____ Laboratory: GEL

Sample Date:	20 NOV 97
Sample Time:	0920
Sample Depth (ft):	1' asphalt + 2' soil
FID Reading:	0
Sample Color:	Creamy yellow
Sample Description:	Creamy, color fine to medium oolitic sandy limestone

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

Asphalt surface

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: DK Signature(s): Dwight Kennon

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: K01-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN1

Airbill No: 881218732164 Laboratory: GEL

Sample Date:	19 NOV 97
Sample Time:	1050
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	SILTY SANDS, SOME CLAY MOIST

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

ASPHALT SURFACE COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Sampled By: BNR Signature(s):

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: K01-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN1

Airbill No: 8081210731764 Laboratory: GEL

Sample Date:	19 NOV 97
Sample Time:	1025
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	TAN
Sample Description:	SILTY SAND W/ COARSE ROCK FRAGMENTS

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

Duplicate ID: Not Applicable

MS/MSD: YES: [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

GRASS SURFACE COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [x]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [x]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number:

Sampled By: BMK Signature(s): Barbara Anderson

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: K01-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN1

Airbill No: 8961210731764 Laboratory: GEL

Sample Date:	19NOV97
Sample Time:	0915
Sample Depth (ft):	0-2' BLS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	SILTY SAND / OOLITIC LIMESTONE

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

GRASS SURFACE COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Sampled By: BJA Signature(s): Barbara Medina

SUBZONE 2
(GRYZNK-SZN2)
SURFACE SOIL

Brown & Root Environmental

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: K02-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN2

Airbill No: 810521473264 Laboratory: GEL

Sample Date:	19 NOV 97
Sample Time:	1125
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM / LT TAN
Sample Description:	SAND WITH LITTLE SILT; OOLITIC LIMESTONE FRAGMENTS (1/4 - 1" DIA.) DRY

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

SURFACE
UNDER GRASS COVER

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Sampled By: DMA Signature(s): Barbara Anderson

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: K02-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN2

Airbill No: 801210784264 Laboratory: GEL

Sample Date:	19 NOV 97
Sample Time:	1410
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	TAN
Sample Description:	SAND WITH LITTLE SILT, SOME ROCK FRAGS (1/4" DIA), DRY

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

GRAVEL/GRASS SURFACE COVER.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Sampled By: [illegible] DA. Signature(s): [illegible]

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: K02-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN2

Airbill No: _____ Laboratory: GEL

Sample Date:	20 Nov 97
Sample Time:	1010
Sample Depth (ft):	2"
FID Reading:	0
Sample Color:	gray/white
Sample Description:	1/8" to 2" fragments of rock fine to medium oolitic limestone

Sample Method:
- [ ] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

Surface 6"-8" organic material + grass

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number: _____
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number: _____
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: _____

Sampled By: DK Signature(s): Dan Keeney

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: K02-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN2

Airbill No: _____ Laboratory: GEL

Sample Date:	20 Nov 97
Sample Time:	0730
Sample Depth (ft):	0-2'
FID Reading:	0
Sample Color:	Cream
Sample Description:	oolitic creamy med gr sand with 1/8" to 2" rock frags

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [x]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

2-3" of surface gravel debris

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [x]	NO [ ]	Bottle Lot Number: 30885220
TCL SVOCs:	YES: [x]	NO [ ]	Bottle Lot Number: 30885209
TCL PESTs:	YES: [ ]	NO [x]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [x]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [x]	NO [ ]	Bottle Lot Number:

Sampled By: DK Signature(s): [signature]

SUBZONE 3
(GRYZNK-SZN3)
SURFACE SOIL

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: K03-SS-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN3

Airbill No: 801210713231 Laboratory: GEL

Sample Date:	14 NOV 97
Sample Time:	1145
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE WEATHERED, DRY

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

SURFACE COVER IS ASPHALT

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [X]	Bottle Lot Number:
TCL SVOCs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: FTIL501K, COUT#: APC1070

Sampled By: BMK Signature(s): Barbara Anderson

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: K03-SS-02 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN3

Airbill No: 8081 2108 1312 64 Laboratory: GEL

Sample Date:	19 NOV 97
Sample Time:	1530
Sample Depth (ft):	0 - 2' BGS
FID Reading:	
Sample Color:	LT TAN / CREAM ~~SAND AND OOLITIC LIMESTONE FRAGMENTS, DRY~~
Sample Description:	SAND AND OOLITIC LIMESTONE FRAGMENTS, DRY.

Sample Method:
- [x] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID:
Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

SOIL SAMPLE LOCATIONS MOVED TO BACK OF BUILDINGS - ORIGINAL LOCATION TOO CLOSE TO ROADWAY - WOULD GET ROAD RUNOFF.

Observations/Notes:

ASPHALT SURFACE COVER.

~~SM~~ B.A.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [X]	Bottle Lot Number:
TCL SVOCs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Sampled By: BA Signature(s): Barbara Andrew

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: K03-SS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN3

Airbill No: 8081210132311 Laboratory: GEL

Sample Date:	18 NOV 97
Sample Time:	1150
Sample Depth (ft):	0 - 2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	OOLITIC LIMESTONE, WEATHERED, DRY

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [✓] Low Concentration
- [ ] High Concentration
- [✓] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

SURFACE COVER IS ASPHALT.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [X]	Bottle Lot Number:
TCL SVOCs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: E7115ØK, COUT # APC1876

Sampled By: BTA Signature(s): [signature]

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SURFACE SOIL SAMPLE LOG SHEET

Sample Name: K03-SS-04 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN3

Airbill No: 861210732231 Laboratory: GEL

Sample Date:	18NOV97
Sample Time:	1210
Sample Depth (ft):	0-2' BGS
FID Reading:	0 ppm
Sample Color:	WHITE TO CREAM
Sample Description:	VOLITIC LIMESTONE, WEATHERED, DRY

Sample Method:
- [X] DPT
- [ ] Hand Auger
- [ ] HSA

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

If Sample Location was Changed from that Designated in the Workplan, The Rationale is Provided Here, along with a Description of the New Location:

Observations/Notes:

SURFACE COVER IS GRASS.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [ ]	NO [X]	Bottle Lot Number:
TCL SVOCs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number: FT1150K; COC #: ARC10070

Sampled By: BAX Signature(s): Barbara Brown

SUBZONE 5
(GRYZNK-SZN5)
GROUNDWATER

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BRAC 81	JOB NO.:	BORING NO.: KWF-GS-01
	LOGGED BY: BA	TOTAL DEPTH: 12' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1520	DATE: 18 NOV 97
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1525	DATE: 18 NOV 97
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:

CONDITIONS:

LOCATION OF BORING:

ZONE K

GRASS SURFACE COVER.

PIEZOMETER LOCATION. (TEMPORARY)

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY	
0-2			24	18	0		0		LT TAN SAND AND GRAVEL, SOME WEATHERED OOLITIC LIMESTONE; DRY
2-4			24	18	0		2		TAN SAND, DRY; BACKFILL SOILS
4-6				18	0		4		MOIST TO DAMP @ 5' BGS
6-8				18	200 ppm		6		BLACK AND GREEN DISCOLORED SOILS; SAND, COARSE GRAIN, WET; DIESEL
8-10			↓	18	10 ppm		8		WHITE TO LIGHT TAN OOLITIC LIMESTONE, ~~SOME ROCK~~ MED GRAIN, WEATHERED WET.
							10		
							12		BORING TERMINATED AT 12' BGS

NOTES: EDITED BY/DATE:

ENVIRONMENTAL

SHEET 1 OF

PROJECT: NAS KEY WEST BRAC S1	JOB NO.:	BORING NO.: K05-GL-02
	LOGGED BY: BAS	TOTAL DEPTH: 12' BGS.
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 0750	DATE: 19 NOV
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 0808	DATE: 19 NOV 97
BORING METHOD: HAND AUGER TO 2.5' BGS;	WATER DEPTH:	
HOLE DIAMETER: 2" DIRECT PUSH >2.5' BGS.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.: DROP HGT:	BACKFILLED. TIME:	DATE:
CONDITIONS:	LOCATION OF BORING: ZONE K ASPHALT SURFACE COVER APPROX. 50' FROM SHORELINE AT THE PIERS NEAR BLDG 149.	

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6 INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2			24	24			0	ASPHALT SURFACE COVER
2-4			24	12			2	BACKFILL MAT'L: GRAY/WHITE CLAYEY SAND MOIST TO DAMP
4-6			24	18			4	LT TAN SANDS
6-8			24	18			6	WHITE TO CREAM / LT TAN OOLITIC LIMESTONE, WEATHERED, COARSE FRAGMENTS, WET @ 7' BGS
8-10			24	12			8	
							10	
							12	BORING TERMINATED AT 12' BGS.

NOTES: EDITED BY/DATE:

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: K05-GS-03 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K-Water front Maintenance facilities Subzone: GRVZNK-SZNS

Airbill No: 801210TB2764 Laboratory: GEL

Total Depth (ft):	12.65'
Stickup Height (ft):	0.6'
Casing Diameter (ID-inches):	4.38" 0.5"
Static Water Level (ft below top of casing):	9.38'
One Casing Volume (gal):	0.04
Start Purge (hrs.):	1240
End Purge (hrs.):	1305
Total Purge Time (min.):	25
Total Amount Purged (gal):	~2.5 gal.
Purge Method:	Peristaltic Pump w/ polyethylene (PE) tubing (silicon in pump head)
Sample Method:	VOCs by gravity flow from PE tubing. other analyticals pumped using peristaltic w/ PE tubing (silicon in pump head)
Depth Sampled:	~8.6' below TOC
Sample Date:	19 NOV 97
Sample Time:	~~1030~~ 1305

RD

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

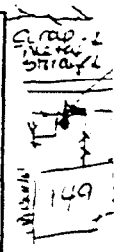
Duplicate ID: N/A

Type of Sample:
- [ ] Low Concentration
- [ ] High Concentration
- [ ] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

flow rate ≈ 200 ml/min
Sample point from outside fence to just inside fence. Concrete pad @ main waste storage area as depicted - sample point inside fence area @ base of slope. Main waste storage shed appears to be active.



ANALYSES:

TCL VOCs (HCL Preservative):	YES [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES [X]	NO [ ]	Bottle Lot Number:

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Sal
1240	0	27.5	7.09	41.8	7.62	6.76	cloudy	2.76
1245		27.6	7.07	42.2	7.59	47	mostly clear	2.72
1250		27.4	6.66	42.0	7.58	1	clear	2.71
1254		27.6	6.93	42.2	7.57	0	clear	2.72
1257		27.7	6.98	42.2	7.61	<2	clear	2.73
1300		27.6	7.01	42.3	7.60	<2	clear	2.73
1302	~2.5 gal	27.6	7.03	42.3	7.61	<2	clear	2.73
1305	Collect Sample K05-GS-03							

Sampled By: RD Signature(s): Rona Clark

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BRAC S1	JOB NO.:	BORING NO.: K06-GS-02
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 12' BGL
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 0912	DATE: 19 NOV
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1420	DATE: 19 NOV 97
BORING METHOD: DPT (DIRECT PUSH)	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE K GRASS SURFACE COVER

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	split		24	18	0		2	
2-4				24	0		4	
4-6				18	0		6	
6-8				18	0		8	
8-10	↓		↓	18	0		10	
							12	

3-4" TOPSOIL

LT TAN SILTY SAND W/ OOLITIC LIMESTONE FRAGMENTS - PEBBLE GRAVEL SIZE (1-2" DIA.)

DAMP @ 7' BGS

WHITE TO CREAM OOLITIC LIMESTONE, MED GRAIN, PEBBLE SIZE ROCK FRAGMENTS, WET

BORING TERMINATED AT 12' BGS

NOTES: _____ EDITED BY/DATE: _____

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BIRAC SI	JOB NO.:	BORING NO.: KOS-GS-04
	LOGGED BY: BJR	TOTAL DEPTH: 12' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1140	DATE: 19 NOV 97
DRILL RIG TYPE: ~~DT~~ GEOPROBE	FINISH. TIME: 1150	DATE: 19 NOV 97
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2"	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.: DROP HGT:	BACKFILLED. TIME:	DATE:
CONDITIONS:	LOCATION OF BORING: ZONE K GRASS SURFACE COVER.	

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	SOIL		24	24	0		2	
2-4				18			4	
4-6				18			6	
6-8				18			8	
8-10				12			10	
10-12	↓		↓	12	↓		12	

- LT TAN FINE SAND TRACE SILT, ~~WITH~~ SOME LIMESTONE ROCK FRAGMENTS (1/4" DIA); DRY
- WHITE TO CREAM OOLITIC LIMESTONE, WEATHERED, SOME ROCK FRAGMENTS (1-3" DIA. DRY.
- FILL MAT'L: BLACK / GRAY WHITE SAND AND CLAY, LITTLE SILT, DAMP.
- WHITE TO CREAM OOLITIC LIMESTONE, MED GRAIN, SOME ROCK FRAGMENTS, WET
- GRAY/WHITE FINE SAND, WET
- BORING TERMINATED AT 12' BGS.

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: K05-GS-05 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN5

Airbill No: 810210 B1264 Laboratory: GEL

Total Depth (ft):	15.35'
Stickup Height (ft):	3'
Casing Diameter (ID-inches):	~~10.45'~~ 1"
Static Water Level (ft below top of casing):	10.45'
One Casing Volume (gal):	0.2
Start Purge (hrs.):	0832
End Purge (hrs.):	0907
Total Purge Time (min.):	35
Total Amount Purged (gal):	~ 2.5 gallons
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~ 11' below TOC
Sample Date:	19 Nov 99
Sample Time:	0911

Type of Screening Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [x] Low Concentration
- [ ] High Concentration
- [x] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)
DPT crew developed ~ 2 gallons. begin purge at rate of ~ 118 ml/min. change (increase) rate to 203 ml/min @ 0842

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
0832	0	25.8	6.79	20.2	1.67	343	Slight cloudy
0842		26.5	6.95	22.4	1.39	13	clear
0847		26.7	7.01	22.5	1.32	20	
0855		26.5	6.98	15.9	1.38	0	
0900		26.6	6.92	21.5	1.46	0	
0902	2.5	26.7	6.99	21.6	1.46	<2	

Sampled By: RD Signature(s): Regina C Dixon

Actual - readings were jumping around.

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BRAC SI	JOB NO.:	BORING NO.: KOG - GC - 05
	LOGGED BY: BDA	TOTAL DEPTH: 12' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1355	DATE: 18 NOV 97
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1410	DATE:
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2"	DATE:	
SAMPLING METHOD: CONTINUOUS	TIME:	
HAMMER WGT.: DROP HGT:	BACKFILLED. TIME:	DATE:
CONDITIONS:	LOCATION OF BORING:	

- ZONE K
- GS-05 LOCATION
- GRASS/GRAVEL SURFACE COVER
- PIEZOMETER LOCATION (TEMP)

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY	WHITE/LT TAN
0-2	GRAB		24	12	0		0		SILTY SAND, DRY
2-4				12	0		2		WHITE OOLITIC LIMESTONE - PEBBLE GRAIN DRY.
4-6				12	0		4		WHITE TO CREAM OOLITIC LIMESTONE, MED GRAIN. WEATHERED
6-8				12	0		6		MOIST @ 5' BGS
8-10	↓		↓	12	0		8		WET @ 6' BGS
10-12							10		WET ↓
							12		BORING TERMINATED AT 12' BGS

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: K05-GS-06 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN5

Airbill No: 881218761264 Laboratory: GEL

Total Depth (ft):	12.63' below TOC
Stickup Height (ft):	0.6'
Casing Diameter (ID-inches):	1/2"
Static Water Level (ft below top of casing):	8.12'
One Casing Volume (gal):	0.05 gal
Start Purge (hrs.):	1614
End Purge (hrs.):	1630
Total Purge Time (min.):	16
Total Amount Purged (gal):	~1.5 gal
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~8.9' ft below TOC
Sample Date:	19 Nov 97
Sample Time:	

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Developed by DPT crew ~2.5 gallons of development fluid.

Purge flowrate ≈ 250 ml/min

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Sal
1614	0	27.5	6.32	20.8	7.51	113	somewhat cloudy	1.25
1617		27.8	6.91	22.3	7.31	0	clear	1.35
1620		27.7	6.95	22.4	7.29	6		1.36
1623		27.4	6.98	22.4	7.25	6		1.36
1625		27.9	6.98	22.4	7.23	6		1.37
1627	~1.4	27.8	6.99	22.4	7.22	1		1.37
1630	← Collect Sample							

Sampled By: RD Signature(s): Dana Carson

Auto cal Horiba - successful

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BZAC 81	JOB NO.:	BORING NO.: KOE-GS-06
	LOGGED BY: B. ANDERSON	TOTAL DEPTH:
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1400	DATE: 19 NOV 97
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1415	DATE: 19 NOV 97
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE K GRAVEL/GRASS SURFACE COVER

~~NO GRAVEL 1" x 5' PVC WELL SCREEN~~
~~2" x 5' PVC RISERS~~

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	SOIL		24	24	0		2	
2-4				18	0		4	
4-6				18	0		6	
6-8				18	0		8	
8-10				18	1		10	
10-12	↓		↓	18	1		12	

TAN SAND WITH LITTLE SILT, SOME ROCK FRAGMENTS/SHELL FRAGMENTS (<1/4" DIA), DRY

MOIST @ 5' BGS

WHITE TO CREAM OOLITIC LIMESTONE, WEATHERED, COARSE ROCK FRAGMENT (1/4 - 2" DIA), WET

GRAY/WHITE MED TO FINE SAND, SOME ROCK FRAGMENTS, WET.

BORING TERMINATED AT 12' BGS.

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: K05-GS-07 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN5

Airbill No: 806210731381 Laboratory: GEL

Total Depth (ft):	11.65' T.O.C.
Stickup Height (ft):	1.66'
Casing Diameter (ID-inches):	0.5" I.D.
Static Water Level (ft below top of casing):	7.60' T.O.C.
One Casing Volume (gal):	~~4.05~~ 6.A. 0.0413 gal.
Start Purge (hrs.):	1630
End Purge (hrs.):	1703
Total Purge Time (min.):	33 min.
Total Amount Purged (gal):	~2.5 gal est.
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	9.94' BGS (9.60' T.O.C.)
Sample Date:	20 NOV 97
Sample Time:	1705

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: ~~Not Applicable~~ K05-GS-DB

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [X] NO: [ ]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

DEVELOPMENT = 3 gal
73 well vol.

PURGE = 2.5 gal
60 well vol.

ANALYSES:

			Bottle Lot Number:
TCL VOCs (HCL Preservative):	YES: [X]	NO: [ ]	
TCL SVOCs:	YES: [X]	NO: [ ]	
TCL PESTs:	YES: [ ]	NO: [X]	
TCL PCBs:	YES: [ ]	NO: [X]	
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO: [ ]	

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1646		27.6	7.00	5.35	8.19	9	
1654		27.3	7.05	5.27	7.99	<10	
1700		27.1	7.02	5.21	7.70	<10	

Sampled By: DA Signature(s): [signature]

ENVIRONMENTAL

SHEET _____ OF _____

PROJECT:	JOB NO.:	BORING NO.: K'05-05-C
	LOGGED BY:	TOTAL DEPTH: 10'

DRILLING CONTRACTOR:	SURFACE ELEV.:		DATUM:
DRILLER'S NAME:	START, TIME: 1000		DATE: 2012
DRILL RIG TYPE:	FINISH, TIME: 1020		DATE: 2012
BORING METHOD:	WATER DEPTH:	6.5'	
HOLE DIAMETER:	DATE:		
SAMPLING METHOD:	TIME:		
HAMMER WGT.: DROP HGT:	BACKFILLED, TIME:		DATE:
CONDITIONS:	LOCATION OF BORING:		

Zone K

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2'	40:1		24	12	0		0	0-6" surface organic matter
2-4'			24	18	0		2	creamy colored mud or oolitic limestone w/ ½" to 2" fragmen rock
4-6'			24	24	0		4	
6-8'			24	24	0		6	medium to coarse grained
8-10'			24	24	0		8	moisture to saturation starts here coarse grained
8-10'	↓		24	24	0		10	last 6" gray l./fine clay + fine gra oolitic limestone mixed

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: K05-GS-08 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN5

Airbill No: 8012107313361 Laboratory: GEL

Total Depth (ft):	13.19' T.O.C.
Stickup Height (ft):	2.77'
Casing Diameter (ID-inches):	1" I.D.
Static Water Level (ft below top of casing):	9.76'
One Casing Volume (gal):	0.14 gal
Start Purge (hrs.):	1120
End Purge (hrs.):	1245
Total Purge Time (min.):	145 min.
Total Amount Purged (gal):	~ 10.5 gal est.
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	~ 7.5' BGS
Sample Date:	20 NOV 97
Sample Time:	1246

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

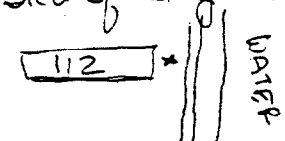
Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Sample moved to waterfront side of bldg 112



PURGE/DEVELOP : 10 gal
WELL VOL. REMOVED : 43

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	
TCL SVOCs:	YES: [X] NO [ ]	Bottle Lot Number:	
TCL PESTs:	YES: [ ] NO [X]	Bottle Lot Number:	
TCL PCBs:	YES: [ ] NO [X]	Bottle Lot Number:	
TAL Metals + Tin (HNO3 Preservative):	YES: [X] NO [ ]	Bottle Lot Number:	

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
1135		28.4	7.13	1.16	7.93	31	
1200		28.6	7.29	1.18	8.32	18	
1220		28.3	7.19	1.18	7.78	8	
1241		28.4	7.19	1.20	7.96	3	
1245		28.4	7.15	1.19	7.95	6	

Sampled By: DJK Signature(s): Barbara McCann

ENVIRONMENTAL

SHEET 1 OF

PROJECT: NAS KEY WEST BRAC SI	JOB NO.:	BORING NO.: K-OE-GS-02
	LOGGED BY: B. ANDERSON	TOTAL DEPTH: 12' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL WINDSOR	START. TIME: 1030	DATE: 14 NOV 97
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1640	DATE: 14 NOV 97
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA	DATE:	
SAMPLING METHOD: CONTINUOUS	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:

CONDITIONS:

LOCATION OF BORING:

ZONE K

GRAVEL / GRASS SURFACE COVER

* INSTALL PIEZOMETER (TEMPORARY)
1 X 5' PVC WELL SCREEN
2 X 5' PVC RISERS

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6 INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	SW		24	14	0		2	GRAVEL TOPSOIL
2-4				14	0		4	WHITE TO CREAM OOLITIC LIMESTONE, WEATHERED, SOME ROCK FRAGMENTS, DRY
4-6				20	0		6	
6-8				20	0		8	TOP OF GW @ 6' BGS
8-10				24	1		10	WET @ 7' BGS. GRAY SAND, WET.
10-12	↓		↓	24	0		12	WHITE TO CREAM OOLITIC LIMESTONE, WEATHERED
								BORING TERMINATED AT 12' BGS
								* NOTE: PIEZOMETER INSTALLED TO 11' BGS. WELL SCREEN @ 6'-11' BGS.

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: K05-GS-09 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN5

Airbill No: 8801210731301 Laboratory: GEL

Total Depth (ft):	11.47' T.O.C.
Stickup Height (ft):	1.53'
Casing Diameter (ID-inches):	0.5" I.D.
Static Water Level (ft below top of casing):	7.76' T.O.C.
One Casing Volume (gal):	0.038 gal.
Start Purge (hrs.):	1445
End Purge (hrs.):	~~1700~~ B.A. 1516
Total Purge Time (min.):	31 min.
Total Amount Purged (gal):	~2.5 gal.
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	7.23' BGS (8.76' T.OC)
Sample Date:	20 NOV 97
Sample Time:	1519

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: ~~Not Applicable~~ K05-GS-04

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

DEVELOPMENT: 2.5 gal
~1.6 well vol.

PURGE = 2.5 gal
~1.6 well volumes

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
~~1445~~ 1458		29.3	6.90	0.1614	7.69	2	
1502		29.2	7.11	0.1604	7.37	8	
1508		29.1	7.29	0.1613	7.34	10	
1513		29.1	7.22	0.1610	7.45	<10	
1516		29.0	7.21	0.1615	7.57	<10	

Sampled By: BM Signature(s): Barbara Anderson

ENVIRONMENTAL

SHEET _____ OF _____

PROJECT:	JOB NO.:	BORING NO.: K05-05-C
	LOGGED BY:	TOTAL DEPTH: 12'

DRILLING CONTRACTOR:	SURFACE ELEV.:		DATUM:
DRILLER'S NAME:	START. TIME: 0730		DATE: 20 Nov 97
DRILL RIG TYPE:	FINISH. TIME: 0840		DATE: 20 Nov 97
BORING METHOD: DPT	WATER DEPTH:	4' BLS	
HOLE DIAMETER: 2"	DATE:	20 Nov 97	
SAMPLING METHOD:	TIME:		
HAMMER WGT.: DROP HGT:	BACKFILLED. TIME:		DATE:

CONDITIONS:

LOCATION OF BORING:

Zone K

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-2	SOIL		24	17	0		0	
2-4			24	12	0		2	
4-6			24	29 18	0		4	
6-8			24	18	0		6	
8-10			24	24	0		8	
10-12	↓		24	24	0		10	
							12	

2-3" grained debris from 3"-2
creamy med. gr. sand 1/4"-2" frag

Grey - cream colored sand/calcite clas
Small 1/4" to 2" cobbles/fragments limesto

Moisture

Saturated last 6" solid grey
med gr calcite crystals to
yellowish color some occasional
fragments of limestone

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SCREENING SAMPLE LOG SHEET

Sample Name: K05-GS-10 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN5

Airbill No: 801210731361 Laboratory: GEL

Total Depth (ft):	10.75'
Stickup Height (ft):	1.10'
Casing Diameter (ID-inches):	0.5" I.D.
Static Water Level (ft below top of casing):	4.10'
One Casing Volume (gal):	0.068 gal
Start Purge (hrs.):	0823
End Purge (hrs.):	0948
Total Purge Time (min.):	125 min.
Total Amount Purged (gal):	6.5 gal.
Purge Method: Peristaltic pump with polyethylene (PE) tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from PE tubing, all other fractions pumped using peristaltic w/ PE tubing (silicon in pump head).	
Depth Sampled:	4' BGS. (5' T.O.C.)
Sample Date:	20 NOV 97
Sample Time:	0950

Type of Screening Sample:
- [X] DPT Borehole
- [ ] Existing Monitoring Well
- [ ] HSA Temporary Well

Duplicate ID: Not Applicable

Type of Sample:
- [X] Low Concentration
- [ ] High Concentration
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES: [ ] NO [X]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

~~PURGE~~
DEVELOPMENT: 2.5 gal
37 well volumes

PURGE: 6.5 gal
95 well volumes.

ANALYSES:

TCL VOCs (HCL Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:
TCL SVOCs:	YES: [X]	NO [ ]	Bottle Lot Number:
TCL PESTs:	YES: [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES: [ ]	NO [X]	Bottle Lot Number:
TAL Metals + Tin (HNO3 Preservative):	YES: [X]	NO [ ]	Bottle Lot Number:

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
0833		28.3	6.71	1.01	7.19	4	CLEAR
0850		29.1	7.05	6.790	7.27	50	↓
0930		28.7	7.14	0.803	7.31	30	↓
0937		28.8	7.16	0.810	7.23	2	↓
0940		29.0	7.14	0.803	7.19	5	↓
0943		29.0	7.09	0.799	7.22	7	↓
0945		28.9	7.10	0.803	7.31	2	↓

Sampled By: B.A Signature(s): Barbara Andrew

ENVIRONMENTAL

SHEET 1 OF 1

PROJECT: NAS KEY WEST BRAC SI	JOB NO.:	BORING NO.: K05-ES-12
	LOGGED BY: BJA	TOTAL DEPTH: 12' BGS
DRILLING CONTRACTOR: GULF ATLANTIC	SURFACE ELEV.:	DATUM:
DRILLER'S NAME: BILL LINDSEY	START. TIME: 1518	DATE: 19 NOV 97
DRILL RIG TYPE: GEOPROBE	FINISH. TIME: 1534	DATE: 19 NOV 97
BORING METHOD: DIRECT PUSH	WATER DEPTH:	
HOLE DIAMETER: 2" DIA.	DATE:	
SAMPLING METHOD: CONTINUOUS CORING	TIME:	
HAMMER WGT.:	DROP HGT:	BACKFILLED. TIME: DATE:
CONDITIONS:		LOCATION OF BORING: ZONE K ASPHALT SURFACE COVER

SAMPLE DEPTH	SAMPLE TYPE	BLOWS / 6-INCHES	INCHES DRIVEN	INCHES RECOVERED	OVA READING (ppm)	LAB SAMPLE	DEPTH IN FEET	LITHOLOGY
0-1	SOIL		24	6	0		2	2-3" ASPHALT DEBRIS
1-2				6	0			LT TAN / WHITE TO CREAM OOLITIC LIMESTONE, WEATHERED, SOME ROCK FRAGMENTS (1/8" - 2" DIA), DRY
2-3				12	0		4	MOIST @ 4' BGS
3-4				12	0		6	GRAY / BROWN SAND AND LARGE ROCK FRAGMENTS (2" DIA), DAMP TO
4-5				24	0		8	WET
5-7	↓		↓	24	0		10	
							12	BORING TERMINATED AT 12' BGS

NOTES: _____ EDITED BY/DATE: _____

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GROUNDWATER SAMPLE LOG SHEET

Sample Name: K05-MW-01 | Project: NAS Key West BRAC SI | Project Number: 7593

Zone: K - Waterfront Maintenance facilities | Subzone: GRYZNKSZN5

Airbill No: _____ | Laboratory: GEL

Total Depth (ft):	11.45'
Stickup Height (ft):	0.25'
Casing Diameter (ID-inches)	2"
Static Water Level (ft below top of casing):	7.43'
One Casing Volume (gal)	0.65 gal
Start Purge (hrs.):	0755
End Purge (hrs.):	0845
Total Purge Time (min.)	50 min
Total Amount Purged (gal)	~4 gallons
Purge Method	peristaltic pump with teflon tubing - low flow method
Sample Method	gravity flow
Depth Sampled	~ 9' below TOC
Sample Date	2/26/98
Sample Time:	0850

Type of Screening Sample:
- [ ] DPT Borehole
- [X] Existing Monitoring Wel
- [X] HSA Permanent Well

Duplicate ID: XXX-MW-D1

Type of Sample
- [X] Low Concentration
- [ ] High Concentratio
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD: YES [X] NO [ ]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

Sample for VOCs with unpreserved vials, due to effervescence in first set of vials.

FID: breathing zone = 0
downhole = 200 ppm

flow rate ~200 ml/min

ANALYSES:

TCL VOCs ~~(HCL Preservative)~~:	YES [X]	NO [ ]	Bottle Lot Number: unpreserved
TCL SVOCs:	YES [ ]	NO [X]	Bottle Lot Number:
TCL PESTs:	YES [ ]	NO [X]	Bottle Lot Number:
TCL PCBs:	YES [ ]	NO [X]	Bottle Lot Number:
AL Metals + Tin (HNO3 Preservative):	YES [ ]	NO [X]	Bottle Lot Number:

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color	Sal
0758		23.7	6.59	10.6	7.77	103	cloudy	0.6 %
0805		24.3	7.32	9.06	8.24	23	clear	0.5 %
0815		24.5	7.46	9.03	8.98	13	clear	0.5 %
0820		25.1	7.50	8.94	8.82	9	clear	0.49 %
0830		24.9	7.53	8.95	8.81	8	clear	0.49 %
0840		24.6	7.54	8.92	8.87	6	clear	0.49 %
0845		25.1	7.53	8.91	8.84	5	clear	0.49 %

Sampled By: RD | Signature(s): Regina Clinton

Brown & Root Environmental

900 Trail Ridge Road Aiken, SC 29803 (803) 649-7963 Fax: (803) 642-8454

GROUNDWATER SAMPLE LOG SHEET

Sample Name K05-MW-01 Project: NAS Key West BRAC SI Project Number: 7593

Zone: K - Water Front Maintenance Facilities Subzone: GRYZNK-SZN5

Airbill No: _____ Laboratory ~~GET~~ Accutest

Total Depth (ft):	11.35'
Stickup Height (ft):	0.25'
Casing Diameter (ID-inches)	2"
Static Water Level (ft below top of casing):	6.20
One Casing Volume (gal)	0.8 gallon
Start Purge (hrs.):	10:26
End Purge (hrs.):	11:31
Total Purge Time (min.)	65
Total Amount Purged (gal)	3.0 gal
Purge Method: Penstaltic pump with teflon tubing (silicon tubing in pump head)	
Sample Method: VOCs by gravity flow from teflon tubing, all other fractions pumped using peristaltic w/ teflon tubing (silicon in pump head).	
Depth Sampled	7.20'
Sample Date	21Feb98
Sample Time:	11:38

Type of Sample:
- [ ] DPT Borehole
- [ ] Existing Monitoring Wel
- [X] HSA Permanent Well

Duplicate ID: XXX-MW-D1

Type of Sample
- [X] Low Concentration
- [ ] High Concentratio
- [X] Grab
- [ ] Composite
- [ ] Grab-Composite

MS/MSD YES: [X] NO [ ]

Observations/Notes: (Any change in sample location from that designated in the Workplan should be explained and described here.)

MW installed + developed on 19 Feb 1998.

For 2" well volume

$V = 0.1632\ h$ where h = height of water column in feet

FID = 0.0

ANALYSES:

- TCL VOCs (HCL Preservative): YES: [X] NO [ ] Bottle Lot Number: _____
- TCL SVOCs: YES: [X] NO [ ] Bottle Lot Number: _____
- TCL PESTs: YES: [ ] NO [X] Bottle Lot Number: _____
- TCL PCBs: YES: [ ] NO [X] Bottle Lot Number: _____
- TAL Metals + Tin (HNO3 Preservative): YES: [X] NO [ ] Bottle Lot Number: _____

Time	Total Volume Removed (gals)	Temperature (Deg C)	pH	Conductivity (mS/cm)	DO	Turbidity (NTU)	Color
~~10:29~~ 10:34	0.1 gal	25.3	6.67	9.3	7.98	23	clear
~~10:46~~	~~0.5 gal~~						
10:43	1.0 gal	25.1	7.35	8.24	8.08	10	clear
11:00	2.0 gal	25.5	7.46	7.71	8.13	~~45~~ 45	clear
11:09	2.5 gal	25.5	7.45	7.42	8.36	4	clear
11:21	2.75 gal	25.5	7.53	7.50	8.40	3	clear
11:30	3.00 gal	25.5	7.53	7.19	8.31	2	clear

Sampled By MR Signature(s): Mark Ray

PART 3 – SURVEY DATA

Location	Northing	Easting	Elevation (feet)	Date
A11-MW-04	83174.583	402957.003	3.31	03/03/98
A11-MW-05	82840.357	402964.531	4.71	03/03/98
A11-MW-06	82890.412	403623.694	4.56	03/03/98
B03-MW-01	81831.56	400385.154	6.93	03/30/98
B03-MW-02	81859.406	400076.092	5.23	03/30/98
B03-MW-03	82209.42	400810.564	4.18	03/30/98
C06-MW-01	79171.913	387334.167	7.55	04/01/98
C06-MW-02	79364.39	387738.57	7.01	04/01/98
F07-MW-08	79306.198	388330.186	4.39	04/01/98
G02-MW-01	84965.206	403325.357	4.66	03/17/98
H06-MW-103	84771.298	390675.069	0	
H06-MW-13	84872.918	390606.674	5.75	
H06-MW-41	84849.817	390801.197	5.71	
H06-MW-42	84738.347	390774.379	5.98	
K05-MW-01	79131.753	386969.179	7.38	04/01/98

Note: Surveying was performed by F. H. Hildebrandt.

APPENDIX C

ESTIMATED RISK PROCESS

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TABLES

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APPENDIX C

ESTIMATED RISK PROCESS

C.1 ESTIMATED RISK PROCESS FOR SURFACE SOIL SUBZONES

Human health risk estimates were calculated for chemicals detected in excess of their action levels. These estimates were based on human health risk assessments in the Supplemental RFI/RIs for sites at NAS Key West (B&R Environmental, 1997 and 1998) if risk values were available for compounds in question. When one or two risk values were available for a given compound, estimates were based on a ratio of detected concentrations to risk values. When there were two ratios for a single chemical, the more conservative resulting estimated risk was used. When three or more risk values were available for a given compound, estimates were calculated from a trend analysis. Representative concentrations from the Supplemental RFI/RI Investigations were used for the x-axis and corresponding risk values were used for the y-axis and a trend line was fitted to these values. The line was used to estimate risk values for new detected concentrations. In instances where risk values were not available from the Supplemental RFI/RI Investigations for a given compound, generic RGOs were used as benchmarks. Benchmarks were concentrations representative of a carcinogenic risk of 1.0×10^{-6} or a noncarcinogenic hazard index of 1.0. Maximum detected concentrations from SI analytical results were used in the SI estimated risk process.

Subzones were analyzed based on proposed future uses and potential receptors: residential, trespasser, and site/occupational worker. Tables C-1 through C-3 contain risk values from the Supplemental RFI/RI Investigations and the estimated risks for chemicals detected in excess of their action levels in surface soil subzones by future use category and chemical.

C.2 ESTIMATED RISK PROCESS FOR THE SEDIMENT SUBZONE

Parcel A, subzone 9 was the only sediment sampling location. Concentrations of seven metals, two phthalates, and one organochlorine pesticide detected in sediment exceeded ecological guidelines used in this report. None of these chemicals in surface-water samples taken from the same locations exceeded ecological guidelines and none in groundwater at the site exceeded action levels. Table C-4 gives the sediment guidelines for these 10 chemicals. A discussion of the ecological significance of these exceedances requires a brief overview of other guideline values for the same contaminants, which also are shown in Table C-4.

Effects range-low (ER-L) and threshold effects level (TEL) values were developed by the National Oceanic and Atmospheric Administration (NOAA) and FDEP, respectively. These values are used to identify sediment concentrations below which adverse ecological effects would rarely be observed. Sediment concentrations in the range between the ER-L and the effects range-median (ER-M) or between the TEL and the probable effects level (PEL) represent concentrations anticipated to be occasionally associated with adverse effects. Concentrations greater than the ER-M or PEL are anticipated to be frequently associated with adverse effects. Therefore, ascribing risk to a sediment contaminant detected at a concentration that exceeds the TEL (or ER-L) but below the PEL (or ER-M) can be misleading. With this in mind, the ecological significance of the sediment exceedances is discussed below.

Cadmium exceeded the TEL value in three samples. However, the highest concentration was 0.89 ppm, which is only slightly greater than the TEL, considerably less than the PEL, and less than the ER-L. Copper exceeded the TEL in only one sample (20.15 ppm). This value was only slightly greater than the TEL, considerably less than the PEL, and less than the ER-L. Thus, cadmium and copper detections in sediment do not appear to pose ecological risks at Hamaca Hawk Missile Site. Lead was detected in 7 of 8 sediment samples, but all detected values (except sample SD-05; 466 ppm) were less than the ER-M and PEL. Lead does not appear to pose ecological risks, except potentially in the vicinity of sample SD-05.

No sediment ecological guidelines were available for aluminum or vanadium. Instead, concentrations of these two metals were compared to twice the average background values, which were exceeded in samples SD-07 and SD-08. The vanadium concentrations only slightly exceeded twice the average background value. Vanadium is rarely highly toxic in the environment (Mailman, 1980). Zinc exceeded ecological guidelines in only one sediment sample (SD-04, 518 ppm); this value was greater than both the ER-M and PEL. Sample SD-04 was also the only sample in which barium was detected.

Bis(2-ethylhexyl)phthalate and butyl benzyl phthalate were detected only in sample SD-05. The detected concentration of bis(2-ethylhexyl)phthalate was 710 ppb, which is less than the PEL and the Region 3 BTAG ecological benchmark. The single butyl benzyl phthalate value (292 ppb) was considerably less than the EPA Sediment Quality Benchmark of 11,000 ppb. 4,4'-DDE was detected in two samples; concentrations in both samples only slightly exceeded the TEL and ER-L values and were considerably less than the PEL and ER-M values.

In summary, most sediment chemicals that exceeded ecological guidelines only slightly exceeded the TEL values, and/or were infrequently detected. However, lead in sample SD-05 could potentially pose ecological risks. In addition, five chemicals in sample SD-05 exceeded the most conservative ecological

guidelines, more chemicals than in any other sample. Further sampling in the vicinity of sample SD-05 may serve to better characterize the nature and extent of sediment contamination and associated potential ecological risks.

C.3 ESTIMATED RISK PROCESS FOR TRUMAN ANNEX GROUNDWATER SUBZONE

Analytes that exceeded action levels in groundwater samples were limited to benzene and phenanthrene. These organic compounds were detected in only one monitoring well (K05-MW-01). Ecological receptors are not directly exposed to groundwater, and no groundwater screening values have been developed based on ecological concerns. Therefore, groundwater concentrations of benzene and phenanthrene were compared to surface water screening values in accordance with EPA Region 4 (1995b) and FDEP requirements.

The EPA Region 4 ecological screening value for benzene in marine surface water is 109 µg/L (EPA, 1995b). The FDEP ecological screening value for benzene in marine surface water is 71.28 µg/L. (FDEP, 1996). The single detected concentration of benzene (1.2 µg/L) is well below both the FDEP and EPA Region 4 criteria. Therefore, based on the infrequent detection of this contaminant, and its detected value well below the available screening levels, there is no evidence of ecological risks from benzene in groundwater at the site.

EPA Region 4 has not established an ecological screening value for phenanthrene in surface water, but EPA's Office of Solid Waste and Emergency Response recommends an ecological screening value of 8.3 µg/L for phenanthrene in marine surface water (EPA, 1996). FDEP has established an ecological screening value in marine surface water of 0.031 µg/L (annual average) for the total concentration of the following PAH compounds: acenaphthylene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, benzo(k)fluoranthene, benzo(g,h,i)perylene, dibenzo(a,h)anthracene, ideno(1,2,3-cd)pyrene, and phenanthrene (FDEP, 1996). Since phenanthrene was the only one of these PAH compounds detected in groundwater, the screening value of 0.031 µg/L is applicable to phenanthrene in this case. The detected concentration of phenanthrene (187 µg/L) is well above both the EPA Region 4 and FDEP criteria.

In order for groundwater contaminants to pose risks to ecological receptors, groundwater must discharge into surface water or sediment. The direction of groundwater flow in the vicinity of monitoring well K05-MW-01 has not been determined. However, surface water bodies are potentially down gradient from this well if the flow of groundwater is toward the northwest, north, east, or southeast. A water-filled moat surrounding Fort Zachary Taylor is located approximately 75 feet northwest of the monitoring well. Open water of the Gulf of Mexico lies approximately 600 feet north of the well. Key West's "Inner harbor" is

located to the east and southeast of the well, and is approximately 300 feet from the well at its nearest point.

The maximum expected phenanthrene groundwater concentration at these three potential exposure points were evaluated using ECTran modeling (Appendix C.4). The modeling indicated that, depending on the size of the groundwater plume, a westward groundwater flow would reach the moat in 2 to 4 years and result in a maximum groundwater concentration of 21 to 76 µg/L at the point of entry into the moat. However, since phenanthrene was not detected in screening sample GS-02, taken directly between the moat and well # K05-MW-01, significant westward migration apparently does not exist. A northward flow would reach the Gulf of Mexico in 22 years, and the maximum concentration would be 0.000912 to 0.00183 µg/L. However, phenanthrene was not detected in screening sample GS-01, located north of well # K05-MW-01 (Figure 4-20, SI Workplan). In addition, the predicted maximum concentrations are well below EPA and FDEP screening values. An eastward flow would reach the harbor in 14 years, and the maximum concentration would be 0.0824 to 0.144 µg/L.. These values are slightly greater than the FDEP criteria of 0.031 µg/L, but much less than the EPA criteria of 8.3 µg/L. However, there are several monitoring wells to the east and southeast of well # K05-MW-01 (Figure 4-20, SI Workplan). Phenanthrene was not detected in any of these wells.

In summary, phenanthrene was detected in only one monitoring well. Phenanthrene was not detected in any sample between this well and nearby surface water bodies. These results, combined with the results of groundwater modeling, suggest that there is no migration of phenanthrene-contaminated groundwater to nearby water bodies. Therefore, the potential for risks to ecological receptors appears to be negligible.

C.4 ECTRAN MODELING OF PHENANTHRENE IN TRUMAN ANNEX GROUNDWATER

C.4.1 EcTran Modeling to Gulf of Mexico and the "Inner Harbor"

Objectives

Potential impacts of phenanthrene groundwater plume identified at the BRAC Parcel K Site need to be evaluated. Quantitative estimates of the maximum phenanthrene groundwater concentration at the nearest potential groundwater exposure points (receptors) are required for this evaluation. An ECTran modeling task was conducted to provide the necessary estimates to support the evaluation. This memo summarizes the modeling approach used and the results obtained.

General Approach

Site-specific groundwater flow and contaminant transport model were developed following a general modeling approach. The following steps are included in the general approach:

- Define the existing groundwater plume – The uncertainties exist in the determination of plume size because of only one groundwater sample. To be conservative, two simulations were conducted based on the different plume sizes. One simulation was based on the plume as big as 200 feet by 200 feet and another simulation was based on the plume size of 100 feet by 100 feet. The concentration of 192 ug/L from sample was assumed as the initial plume concentration.

- Conceptualized the hydrogeological conditions – Groundwater flow direction and velocity were defined based on your Email and our phone conversation (see the following SITE-SPECIFIC ASSUMPTIONS).

- Identify the nearest potential exposure point – Based on the groundwater flow direction, the phenanthrene groundwater concentration at two receptors were simulated. One receptors is 600 feet from the initial plume and another receptor is 300 feet from the initial plume.

- Estimate the maximum groundwater concentration at the exposure point – ECTran model simulations were conducted to determine the phenanthrene maximum groundwater concentrations at the receptors within a 1000 years simulation time frame.

Site-Specific Assumptions

The site-specific assumptions in the modeling task are summarized below:

- Soil Concentration – 0 (Soil is not contaminated)

- Plume Size – 200 feet x 200 feet and 100 feet x 100 feet

- Exposure Point (Receptor) – 600 feet and 300 feet from the initial plume

- Hydraulic Conductivity – 73 feet /day (Average of 9.6 feet/day and 136.8 feet/day)

- Hydraulic Gradient – 0.0062 (Average of 0.00133 and 0.011)

- Effective Porosity – 0.3 (Assumed)
- Infiltration Rate – 10 inches/year (Assumed as a quarter of the rainfall)
- Plume thickness – 9.2 feet (for 200 feet by 200 feet plume), and 6.1 feet (for 100 feet by 100 feet) (calculated from mixing depth formula, Chiou, et al., 1993)
- Initial Phenanthrene Groundwater Concentrations – 192 ug/L (sample value)
- KOC – 5240 (Abdul et al., 1987)
- Foc – 0.002 (EPA, 1996)
- Partition coefficient – 10.5 L/kg (equal to KOC x Foc)
- Half life – 2.2 years (Howard et al., 1991)

Summary of Results

Table C-5 lists the simulated phenanthrene maximum groundwater concentrations at the receptors within 1,000 years.

C.4.2 EcTran Modeling to the Moat at Fort Zachary Taylor

Objectives

Potential impacts of phenanthrene groundwater plume identified at the BRAC Parcel K Site need to be evaluated. Quantitative estimates of the maximum phenanthrene groundwater concentration at the nearest potential groundwater exposure points (receptors) are required for this evaluation. An ECTran modeling task was conducted to provide the necessary estimates to support the evaluation. This memo summarizes the modeling approach used and the results obtained.

General Approach

A site-specific groundwater flow and contaminant transport model was developed following a general modeling approach. The following steps are included in the general approach:

- Define the existing groundwater plume – The uncertainties exist in the determination of plume size because only two groundwater samples were available. To be conservative, two simulations were conducted based on the different plume sizes. One simulation was based on the plume as big as 100 feet by 100 feet and another simulation was based on the plume size of 50 feet by 50 feet. The concentration of 192 µg/L from sample was assumed as the initial plume concentration.

- Conceptualized the hydrogeological conditions - Groundwater flow direction and velocity were defined based on your Email and our phone conversation (see the following Site-Specific Assumptions).

- Identify the nearest potential exposure point - Based on the groundwater flow direction, the phenanthrene groundwater concentration at the edge of the Moat were simulated. The distance from the edge of the Moat to the edge of the plume is 15 ft for plume size of 100 ft by 100 ft and 45 ft for the plume size of 50 ft by 50 ft (As shown in the Figures).

- Estimate the maximum groundwater concentration at the exposure point - ECTran model simulations were conducted to determine the phenanthrene maximum groundwater concentrations at the receptor (edge of the Moat) within a 1000 years simulation time frame.

Site-Specific Assumptions

The site-specific assumptions in the modeling task are summarized below:

- Soil Concentration – 0 (Soil is not contaminated)

- Plume Size – 100 feet x 100 feet and 50 feet x 50 feet

- Exposure Point (Receptor) – 15 feet and 45 feet from the initial plume

- Hydraulic Conductivity – 73 feet /day (Average of 9.6 feet/day and 136.8 feet/day)

- Hydraulic Gradient – 0.0062 (Average of 0.00133 and 0.011)

- Effective Porosity – 0.3 (Assumed)

- Infiltration Rate – 10 inches/year (Assumed as a quarter of the rainfall)

- Plume thickness – 6.1 feet (for 100 feet by 100 feet plume), and 4.1 feet (for 50 feet by 50 feet) (calculated from mixing depth formula, Chiou, et al., 1993)

- Initial Phenanthrene Groundwater Concentrations – 192 µg/L (sample value)

- KOC – 5240 (Abdul et al., 1987)

- Foc – 0.002 (EPA, 1996)

- Partition coefficient – 10.5 L/kg (equal to KOC x Foc)

- Half life – 2.2 years (Howard et al., 1991)

Summary of Results

Table C-6 lists the simulated Phenanthrene maximum groundwater concentrations at the receptor within 1,000 years.

TABLE C-1

HUMAN HEALTH RISK ESTIMATES FOR RESIDENTIAL SCENARIO SUBZONES

Location	Concentration	Carcinogenic Risk	Noncarcinogenic Risk	Risk Intersect[1]
ANTIMONY (mg/kg)				
RFI/RI Risk Values[2]				
SWMU 4	2.5	NA	0.084	-
SWMU 5	4.2	NA	0.14	-
SWMU 7	4.51	NA	0.15	-
IR 1	32.8	NA	1.1	-
IR 3	1.64	NA	0.055	-
IR 7	4.8	NA	0.16	-
SI Risk Estimates				
Parcel C Subzone 3	41.1	NA	**1.38**	-
Parcel C Subzone 4	93.5	NA	**3.14**	-
ARSENIC (mg/kg)				
RFI/RI Risk Values[2]				
SWMU 5	13	1.50E-04	1.4	-
SWMU 7	4.52	5.10E-05	0.49	-
IR 1	3.32	3.80E-05	0.36	-
IR 3	3.46	3.90E-05	0.37	-
SI Risk Estimates				
Parcel A Subzone 1	2.7	**3.00E-05**	0.29	-
Parcel A Subzone 4	28.8	**3.30E-04**	**3.1**	-
LEAD (mg/kg)				
RFI/RI Risk Values[2]				
IR 1	680	-	-	32.10
IR 1	175	-	-	1.10
IR 3	566	-	-	22.39
IR 3	158	-	-	0.77
Background	48	-	-	0.03
SI Risk Estimates				
Parcel C Subzone 3	2,110	-	-	**100+**
Parcel C Subzone 4	7,690	-	-	**100+**

Location	Concentration	Carcinogenic Risk	Noncarcinogenic Risk	Risk Intersect[1]
THALLIUM (mg/kg)				
Residential RGO[3]	5.5	NA	1.0	-
SI Risk Estimates				
Parcel A Subzone 7	6.2	NA	**>1.0**	-
Parcel C Subzone 3	6.05	NA	**>1.0**	-
Parcel C Subzone 4	10	NA	**>1.0**	-
BENZO(A)PYRENE (µg/kg)				
RFI/RI Risk Values[2]				
SWMU 1	2,040	2.30E-05	NA	-
SWMU 7	2,190	2.50E-05	NA	-
SI Risk Estimates				
Parcel C Subzone 3	180	**2.05E-06**	NA	-
Parcel C Subzone 4	532.5	**6.08E-06**	NA	-
DIBENZO(A,H)ANTHRACENE (µg/kg)				
RFI/RI Risk Values[2]				
SWMU 1	605	6.90E-06	NA	-
SI Risk Estimates				
Parcel A Subzone 1	122.3	**1.39E-06**	NA	-

Bold location and risk value indicate carcinogenic risk in excess of 1.0E-06, noncarcinogenic risk in excess of 1.0, or risk intersect in excess of 10, and therefore indicative of potential human health risks.
NA = Not applicable.

1 Human health risk posed by lead were based on integrated exposure and uptake biokinetic lead modeling performed during the Supplemental RFI/RIs (B&R Environmental, 1997 and 1998).
2 B&R Environmental, 1997 and 1998
3 EPA, 1998

TABLE C-2

HUMAN HEALTH RISK ESTIMATES FOR TRESPASSER SCENARIO SUBZONES
PAGE 1 OF 2

Location	Concentration	Carcinogenic Risk	Noncarcinogenic Risk
ARSENIC (mg/kg)			
RFI/RI Risk Values(1)			
SWMU 5	13	4.8E-06	0.07
SWMU 7	4.52	1.7E-06	0.02
IR 1	3.32	1.2E-06	0.02
IR 3	3.46	1.3E-06	0.02
SWMU 1	5.83	2.1E-06	0.03
SI Risk Estimates			
Parcel D Subzone 1	2.7	9.9E-07	0.01
Parcel E Subzone 2	4.5	**1.7E-06**	0.02
THALLIUM (mg/kg)			
Residential RGO(2)	5.5	NA	1.0
SI Risk Estimates			
Parcel E Subzone 1	6.3	NA	**>1.0**
Parcel E Subzone 2	6.2	NA	**>1.0**
Parcel E Subzone 4	6.1	NA	**>1.0**
BENZO(A)ANTHRACENE (µg/kg)			
RFI/RI Risk Values(1)			
SWMU 7	1,640	3.9E-08	NA
SWMU 1	3,420	8.1E-08	NA
SI Risk Estimates			
Parcel E Subzone 9	40,100	9.5E-07	NA
BENZO(B)FLUORANTHENE (µg/kg)			
RFI/RI Risk Values(1)			
SWMU 1	5,200	1.2E-07	NA
SI Risk Estimates			
Parcel D Subzone 1	1,900	4.4E-08	NA
Parcel E Subzone 2	1,510	3.5E-08	NA
Parcel E Subzone 9	48,900	**1.1E-06**	NA
BENZO(A)PYRENE (µg/kg)			
RFI/RI Risk Values(1)			
SWMU 7	2,040	4.80E-07	NA
SWMU 1	2,190	5.20E-07	NA
SI Risk Estimates			
Parcel D Subzone 1	505	7.07E-08	NA
Parcel E Subzone 2	988	1.99E-07	NA
Parcel E Subzone 3	517	7.39E-08	NA
Parcel E Subzone 4	110	<0	NA
Parcel E Subzone 5	105	<0	NA
Parcel E Subzone 9	31,800	**8.42E-06**	NA

TABLE C-2

HUMAN HEALTH RISK ESTIMATES FOR TRESPASSER SCENARIO SUBZONES
PAGE 2 OF 2

Location	Concentration	Carcinogenic Risk	Noncarcinogenic Risk
INDENO(1,2,3-CD)PYRENE			
RFI/RI Risk Values[1]			
SWMU 1	2,760	3.70E-08	NA
SWMU 7	1,480	3.50E-08	NA
SI Risk Estimates			
Parcel E Subzone 2	1,470	3.5E-08	NA
Parcel E Subzone 3	1,650	3.9E-08	NA
Parcel E Subzone 9	15,600	3.7E-07	NA

Bold location and risk value indicate carcinogenic risk in excess of 1.0E-06, noncarcinogenic risk in excess of 1.0, or risk intersect in excess of 10, and therefore indicative of potential human health risks.
NA = Not applicable.

1 B&R Environmental, 1997 and 1998
2 EPA, 1998

TABLE C-2a

HUMAN HEALTH RISK ESTIMATES FOR TRESPASSER SCENARIO SUBZONES

Location	Carcinogenic Risk Concentration	Carcinogenic Risk	Noncarcinogenic Risk Concentration	Noncarcinogenic Risk
AROCLOR-1254				
Residential RGO[1]	320	1.0E-06	2,900	1.0
SI Risk Estimates				
Parcel E Subzone 9	2,160	**>1.0E-06**	2,160	<1.0

Bold location and risk value indicate carcinogenic risk in excess of 1.0E-06, noncarcinogenic risk in excess of 1.0, or risk intersect in excess of 10, and therefore indicative of potential human health risks.

1 EPA, 1998

TABLE C-3

HUMAN HEALTH RISK ESTIMATES FOR SITE/OCCUPATIONAL WORKER SCENARIO SUBZONES

Location	Concentration	Carcinogenic Risk	Noncarcinogenic Risk	Risk Intersect[1]
ARSENIC (mg/kg)				
RFI/RI Risk Values[2]				
SWMU 5	13	2.8E-05	1.8E-01	–
SWMU 7	4.52	9.9E-06	6.2E-02	–
IR 1	3.32	7.3E-06	4.5E-02	–
IR 3	3.46	7.6E-06	4.7E-02	–
SWMU 1	5.83	1.3E-05	7.7E-02	–
SI Risk Estimates				
Parcel F Subzone 1	5.2	**1.1E-05**	7.1E-02	–
Parcel F Subzone 3	16.8	**3.6E-05**	2.3E-01	–
LEAD (mg/kg)				
RFI/RI Risk Values[2]				
IR 1	680	–	–	32.10
IR 1	175	–	–	1.10
IR 3	566	–	–	22.39
IR 3	158	–	–	0.77
Background	48	–	–	0.03
SI Risk Estimates				
Parcel C Subzone 1	978	–	–	**45.81**
THALLIUM (mg/kg)				
Industrial RGO[3]	140	NA	1.0	–
SI Risk Estimates				
Parcel C Subzone 1	5.5	NA	<1.0	–
Parcel F Subzone 1	7.7	NA	<1.0	–
AROCLOR-1260 (µg/kg)				
RFI/RI Risk Values[2]				
SWMU 7	16,500	3.8E-05	NA	–
SI Risk Estimates				
Parcel C Subzone 1	2,700	**6.2E-06**	NA	–
BENZO(A)PYRENE (µg/kg)				
RFI/RI Risk Values[2]				
SWMU 7	2,040	2.6E-06	NA	–
SI Risk Estimates				
Parcel C Subzone 1	478	6.1E-07	NA	–

Bold location and risk value indicate carcinogenic risk in excess of 1.0E-06, noncarcinogenic risk in excess of 1.0, or risk intersect in excess of 10, and therefore indicative of potential human health risks.
NA = Not applicable.

1 Human health risk posed by lead were based on integrated exposure and uptake biokinetic lead modeling performed during the Supplemental RFI/RIs (B&R Environmental, 1997 and 1998).
2 B&R Environmental, 1997 and 1998
3 EPA, 1998

TABLE C-4

SEDIMENT ECOLOGICAL GUIDELINES

Chemical	NOAA[1]		FDEP[2]		Other Guidelines
	ER-L	ER-M	TEL	PEL	
Aluminum	–	–	–	–	**2,664 ppm**[3]
Barium	–	–	–	–	**40 ppm**[4]
Cadmium	1.2 ppm	9.6 ppm	**0.676 ppm**	4.21 ppm	
Copper	34 ppm	270 ppm	**18.7 ppm**	108 ppm	
Lead	46.7 ppm	218 ppm	30.2 ppm	112 ppm	**34.18 ppm**[3]
Vanadium					**10.44 ppm**[3]
Zinc	150 ppm	410 ppm	**124 ppm**	271 ppm	
Bis(2-ethylhexyl) phthalate	–	–	**182 ppb**	2647 ppb	1,300 ppb[5]
Butyl benzyl phthalate	–	–	–	–	**63 ppb**[5] 11,000 ppb[6]
4,4'-DDE	2.2 ppb	27 ppb	**2.07 ppb**	374 ppb	

Bold values indicate the numerical guidelines used in Appendix C.

1 National Oceanic and Atmospheric Administration; ER-L = Effects Range-Low; ER-M = Effects Range-Median. Values taken from Long et al. (1995)

2 Florida Department of Environmental Protection; TEL = Threshold Effects Level; PEL = Probable Effects Level (FDEP, 1996)

3 Two times the average background concentration

4 Baudo et al. (1990)

5 EPA Region 3 BTAG *screening level* (EPA, 1995a)

6 EPA Sediment Quality Benchmark (EPA, 1996)

TABLE C-5

PHENANTHRENE GROUNDWATER CONCENTRATION SIMULATION
BRAC PARCEL K

Initial GW Concentration (µg/L)	GW Plume Size (feet x feet)	Distance from GW Plume to Receptor (feet)	Simulated Maximum GW concentration at Receptor (µg/L)	Time of Maximum GW Concentration (year)
192	200 x 200	600	1.83E-03	22
192	200 x 200	300	1.44E-01	14
192	100 x 100	600	9.12E-04	22
192	100 x 100	300	8.24E-02	14

TABLE C-6

PHENANTHRENE GROUNDWATER CONCENTRATION SIMULATION
BRAC PARCEL K

Initial GW Concentration (µg/L)	GW Plume Size (feet x feet)	Distance from GW Plume to Receptor (feet)	Simulated Maximum GW concentration at Receptor (µg/L)	Time of Maximum GW Concentration (year)
192	100 x 100	15	75.7	2.1
192	50 x 50	45	20.6	4.4

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APPENDIX D

NINE BRAC PARCELS SITE INSPECTION ELECTRONIC DATA SET

Note: The computer files on this compact disk (CD) are not guaranteed for accuracy. Computer files are subject to modifications or alterations that are beyond the control of the sender. This CD was scanned with Norton Anti Virus for Windows 95, Version 2.01 (©1990-1996 Symantec) on June 3, 1998. No viruses were detected on that date.