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APPROACH FOR EVALUATION OF STUDY AREA WITH POLYAROMATIC
HYDROCARBONS GREATER THAN SCREENING CRITERIA NTC ORLANDO FL
3/13/1997
ABB ENVIRONMENTAL

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March 13, 1997

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**SUBJECT: Approach for Evaluation of Study Areas with PAH Concentrations Greater than Screening Criteria
Study Areas 16, 17, 18, 21, 23, 26 (Background Surface Soil Samples), 27, 39 and 40**

Dear Wayne:

Due to OPT decisions regarding some of the study areas (SAs) which have undergone site screening, ABB-ES has been tasked with completing additional site screening activities to evaluate the risk associated with detections concentrations of certain compounds. This information will assist the OPT in making technically sound and environmentally responsible decisions regarding the remediation and transfer of various parcels at NTC, Orlando.

This letter presents ABB-ES's suggested approach for evaluating polycyclic aromatic hydrocarbon (PAH) concentrations greater than screening criteria in surface soils, subsurface soils and sediment at NTC, Orlando (PAH detections have not occurred in other environmental media at NTC). The approach considers approaches to site screening that have been used at other military bases in Florida, and ABB-ES has incorporated EPA and FDEP comments (FDEP letter dated 2/4/97 and telephone conversation between Ted Simon and Michael Murphy on 1/23/97). The general approach is followed by discussions for each site, which include the objectives and rationale for additional sampling, and recommendations of specific sample locations to fill data gaps. After OPT review and discussion, the contents of this letter will be implemented as additional PAH site screening activities. The results will be incorporated into environmental site screening reports for each affected study area.

BACKGROUND. During data evaluation of the analytical results and preparation of the Site Screening Report for the Group III Study Areas at McCoy Annex (SAs 16 through 26), it became apparent that PAH concentrations greater than applicable Florida screening criteria at several study areas would prevent transfer until additional screening data were obtained. Accordingly, ABB-ES's recommendations in the Group III report included further screening at SAs 16, 17, 18, 23, and 26 for PAHs (although other contaminants at some of these sites were also of concern). The OPT subsequently added SAs 21, 27, 39 and 40 due to surface soil samples where PAH concentrations exceeded residential Florida soil cleanup goals (SCGs) (but not industrial SCGs). Table 1 presents a summary of each affected study area.

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OBJECTIVE. The overall objective of any additional site screening activities is to sufficiently evaluate the PAHs in soils at the subject study areas so that a risk characterization can be completed resulting in one of the three following recommendations:

- a FOSL/FOST with no requirement for further evaluation
- a FOSL/FOST with institution controls to limit exposure
- a limited remedial action

AN APPROACH FOR EVALUATING PAH CONCENTRATIONS GREATER THAN SCREENING CRITERIA IN SOILS.

Field Investigation The suggested approach is intended to provide additional information concerning the maximum concentration of PAHs present in soils at each affected site, as well as to provide a statistically representative characterization of the distribution of PAH compounds. Risks associated with detected PAH concentrations will be characterized based on exposure point concentrations (EPCs), described in the Risk Characterization section, below. Results of the focused risk assessment will be the basis for determination of a recommendation for a FOSL/FOST, or the need for remediation.

To accomplish this, an adequate data base for each site must be compiled. All of the subject sites have only site screening data, which, by definition, was collected at locations where contaminants were most likely. The sampling data sets are therefore "biased" and do not represent "average" site conditions. Risk characterization of PAHs will require additional sampling at each of the subject study areas to obtain approximately five well-distributed samples per acre, including previous sample locations.

There are two of occurrences of PAHs in concentrations exceeding human health risk screening values in the subject SAs. One type involves surface runoff pathways from paved or specific drainage points to discharge areas (generally drainage ditches). This occurrence is likely to result in an elongated contaminant distribution pattern.

The second type involves distribution of PAH concentrations greater than screening criteria in areas where a "point source" could not be identified (e.g., SA 17 and SA 26 (background surface soil sample locations). The difference in the types of occurrences will be accounted for by differences in design of the sampling grids for each area.

The suggested field investigation approach involves four steps:

- Establish a preliminary sampling grid of appropriate size and node spacing at each area, taking into consideration existing sample locations.
- Collect a surface soil (0-12 inches) and a subsurface soil (2-3 ft) sample from each grid node. If a subsurface sample has PAH concentrations exceeding guidance concentrations, deeper samples may need to be collected.
- Submit samples for laboratory analysis via USEPA Method Modified 8270 - GCMS/SIMS (PAHs only).
- In some instances, PAH delineation of a "hot spot" is recommended in addition to general site characterization. In these cases, using field screening analytical methods (i.e.,

immunoassay techniques), determine the presence or absence and semiquantitative value for total PAHs in each of the samples (submit at least 10% of immunoassay samples for laboratory analysis (Modified 8270 - GCMS/SIMS] for confirmation).

The approach to PAH delineation (item 4, above) is similar to the approach used to evaluate UST sites in Florida, although the choice of screening technologies differs. Whereas a flame ionization detector (FID) is used to evaluate releases from tank sites, the use of immunoassay test kits is proposed for PAHs. An FID is an appropriate screening tool for compounds with relatively high volatility (PAHs have relatively low volatility). The immunoassay technology provides a fast, relatively inexpensive indication of the presence or absence of PAHs, and provides semi-quantitative results.

Two test kits are available. One is used to delineate total PAHs in accordance with USEPA Method 4035. The kit utilizes an enzyme which reacts with PAH compounds at a constant rate. A semi-quantitative total PAH concentration of a sample can be determined by comparing the optical absorbance of the enzyme/PAH mixture from the sample to that of a sample of known total PAH concentration. The absorbance of a minimum of three samples of known total PAH concentration is used to establish a calibration curve. The curve is then used to correlate the absorbance of the collected samples to a total PAH concentration. Immunoassay testing does not differentiate individual PAH compounds but does provide an excellent test for the presence or absence of PAHs, yielding a total PAH concentration.

The second test kit reacts only to carcinogenic PAHs, such as benzo(a)pyrene. The kit is sensitive in the range of 10 to 500 $\mu\text{g}/\text{kg}$ as benzo(a)pyrene. ABB-ES anticipates use of this kit for any future PAH immunoassay sampling in this work.

Sample patterns in potential "hot spot" areas will be comprised of a series of grid nodes oriented along the drainage axis with lateral nodes as appropriate for characterization and confirmation. The starting point for any sampling grid will be the existing data points of concern with sampling extending from there. For areas where discharge is to a drainage feature (ditch, retention pond), sampling of sediments in the ditch or pond is NOT recommended, because those sediments are not available to human exposure.

As a guideline, for each study area, five samples per acre (including existing sample locations) will be collected and used in the risk characterization, described below. This number may increase, depending on the perceived hazard of the area. Node spacing and sample depths will be modified in accordance with site conditions and existing data to meet the objectives of sampling.

Risk Characterization When data gaps have been filled, the risk characterization for each study area will be implemented. Duplicate samples will be averaged together, with those contaminants not detected set equal to one-half their sample quantitation limit. Exposure point concentrations (EPCs) will be represented by the 95% upper confidence level of the mean, or the maximum, whichever is greater, of all samples. Contaminants not detected are discussed in detail below. Because cancer risks and Hazard Index calculations theoretically evaluate risks for average concentrations, this approach is consistent with the intent of the risk assessment guidance.

Because of the strong bond that exists when PAHs adsorb to soil particles, the extraction procedure during laboratory analysis is complex and results in a higher quantitation limit than for aqueous media. The inherently higher detection limit is reflected in the contract required quantitation limit

(CRQL) for CLP-qualified vendors. The Florida SCGs and EPA risk based concentrations (RBCs) are significantly lower for several PAHs than the CRQL. The manner in which such compounds are handled during a risk characterization is complex and sometimes contradictory due to existing guidance. For example, for nondetections of benzo(a)pyrene (B[a]P), risk guidance requires that the B(a)P concentration for that sample be set equal to one-half its sample quantitation limit. The CRQL for B(a)P is 330 $\mu\text{g}/\text{kg}$. One-half the quantitation limit is 165 $\mu\text{g}/\text{kg}$. The SCG for B(a)P is 100 $\mu\text{g}/\text{kg}$, and the RBC is 88 $\mu\text{g}/\text{kg}$. Therefore, the risk assessment is required to introduce a concentration for a nondetection that is nearly twice the action level, which by definition exceeds the Florida maximum acceptable cancer risk of 1×10^{-6} .

In order to eliminate artificial risk due to the use of CRQLs, ABB-ES proposes to reevaluate the existing laboratory analytical database. We will request method detection limits (MDLs) for each PAH compound from which an MDL-based sample quantitation limit (SQL) can be calculated. The MDL-based SQL is the quantitation limit stipulated in EPA risk assessment guidance documents, and is the parameter proposed for use in the risk characterizations at NTC, Orlando.

For all additional sampling, ABB-ES proposes to use an analytical procedure (USEPA Method Modified 8270 - GCMS/SIMS) that will yield detection limits in the low parts per billion or tens of parts per billion for many PAHs.

ADDITIONAL SITE SCREENING ACTIVITIES FOR PAH EVALUATION.

SA 16 SA 16 has been transferred to the petroleum program as all contamination in this area appears to be petroleum-related. ABB-ES recommends that SA 16 not be further investigated for PAH concentrations greater than screening criteria at this time, as it is still active as a motor pool. PAH characterization could be implemented when the primary use of the parcel changes. Site screening data is as follows.

There are PAH exceedances in 6 out of 16 surface soil samples (Figure 1); no PAH exceedances in subsurface soil samples (7 samples in 7 locations); and PAH exceedances in 1 out of 2 sediment sample locations. The samples for the various media span a distance of more than 700 feet.

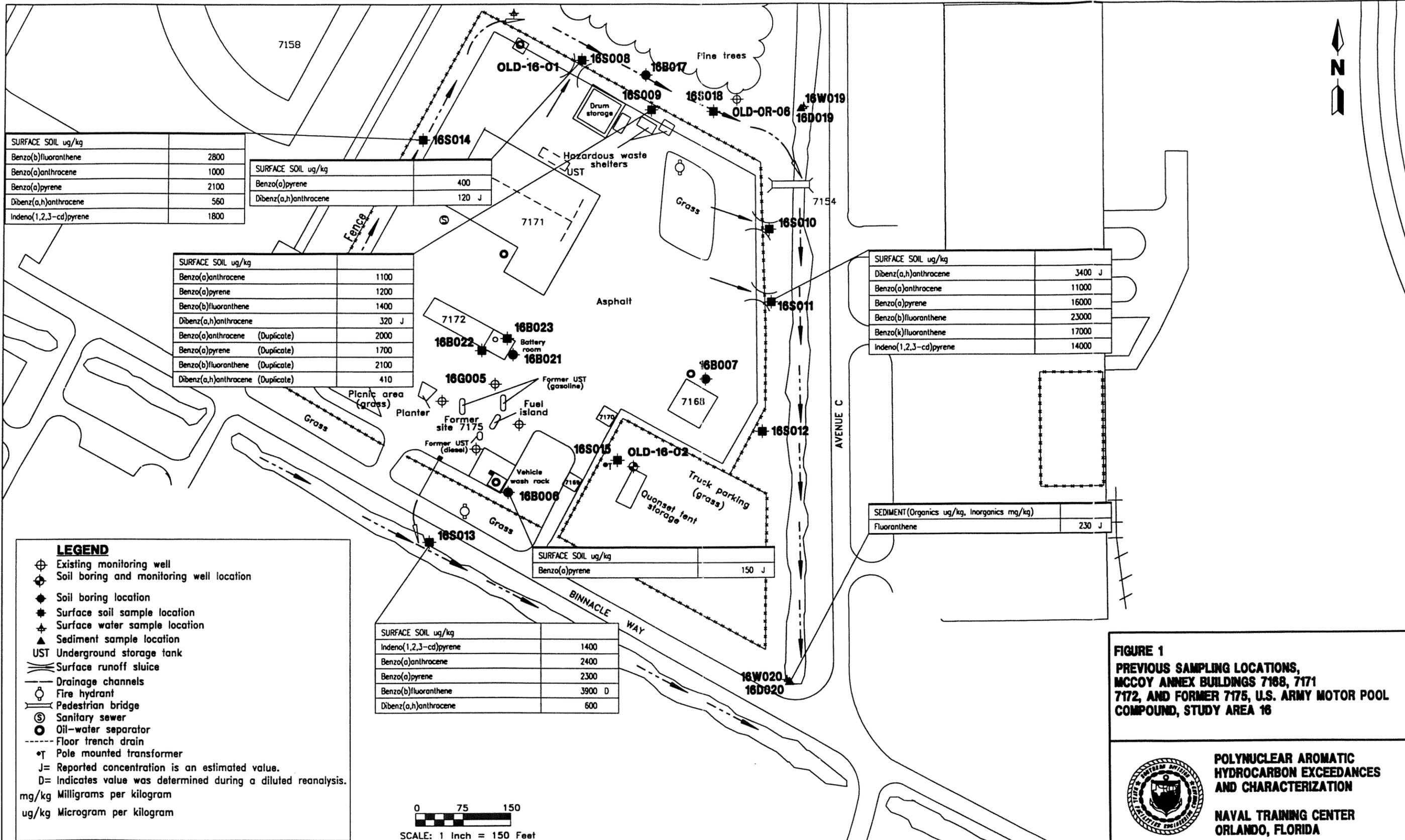
Of the 6 surface soil exceedances, 4 (16S009D, 16S011, 16S013, and 16S014) exceed industrial RBCs for one or more PAHs.

Of the 6 subsurface soil samples (16B001, 16B002, 16B006, 16B007, 16B017, and 16B021), no detections of PAHs occurred.

Of the 2 sediment samples, PAH exceedances occurred in 1 sample for a single compound, fluoranthene (detection was below CRDL).

ABB-ES concludes that multiple samples exceed industrial RBCs at SA 16 and that further characterization is appropriate. The property is currently listed in the BCP as "multimodal", consistent with a future industrial use scenario.

As stated earlier, ABB-ES recommends that SA 16 not be further investigated for PAHs at this time. However, at that time when sampling is appropriate, additional samples collected at the sampling locations shown on Figure 2 will fill existing data gaps and better characterize general site conditions.



SURFACE SOIL ug/kg	
Benzo(b)fluoranthene	2800
Benzo(a)anthracene	1000
Benzo(a)pyrene	2100
Dibenz(a,h)anthracene	560
Indeno(1,2,3-cd)pyrene	1800

SURFACE SOIL ug/kg	
Benzo(a)pyrene	400
Dibenz(a,h)anthracene	120 J

SURFACE SOIL ug/kg	
Benzo(a)anthracene	1100
Benzo(a)pyrene	1200
Benzo(b)fluoranthene	1400
Dibenz(a,h)anthracene	320 J
Benzo(a)anthracene (Duplicate)	2000
Benzo(a)pyrene (Duplicate)	1700
Benzo(b)fluoranthene (Duplicate)	2100
Dibenz(a,h)anthracene (Duplicate)	410

SURFACE SOIL ug/kg	
Dibenz(a,h)anthracene	3400 J
Benzo(a)anthracene	11000
Benzo(a)pyrene	16000
Benzo(b)fluoranthene	23000
Benzo(k)fluoranthene	17000
Indeno(1,2,3-cd)pyrene	14000

SEDIMENT (Organics ug/kg, Inorganics mg/kg)	
Fluoranthene	230 J

SURFACE SOIL ug/kg	
Benzo(a)pyrene	150 J

SURFACE SOIL ug/kg	
Indeno(1,2,3-cd)pyrene	1400
Benzo(a)anthracene	2400
Benzo(a)pyrene	2300
Benzo(b)fluoranthene	3900 D
Dibenz(a,h)anthracene	600

LEGEND

- ⊕ Existing monitoring well
- ⊙ Soil boring and monitoring well location
- Soil boring location
- ◆ Surface soil sample location
- ⊕ Surface water sample location
- ▲ Sediment sample location
- UST Underground storage tank
- Surface runoff sluice
- Drainage channels
- Fire hydrant
- Pedestrian bridge
- Sanitary sewer
- Oil-water separator
- Floor trench drain
- ⊕ Pole mounted transformer
- J= Reported concentration is an estimated value.
- D= Indicates value was determined during a diluted reanalysis.

mg/kg Milligrams per kilogram
ug/kg Microgram per kilogram

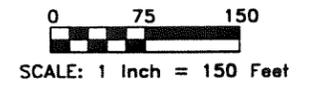
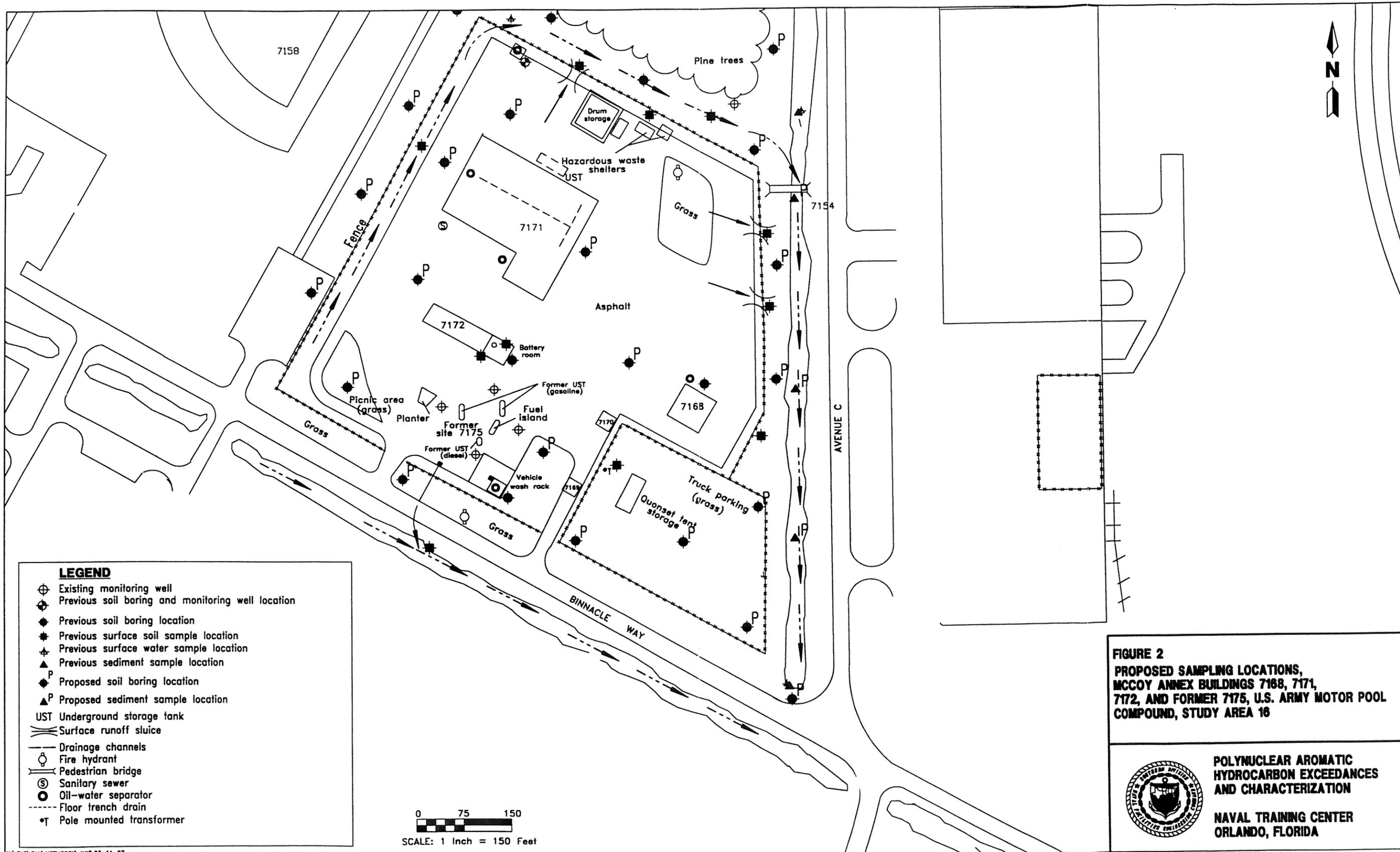


FIGURE 1
PREVIOUS SAMPLING LOCATIONS,
MCCOY ANNEX BUILDINGS 7188, 7171
7172, AND FORMER 7175, U.S. ARMY MOTOR POOL
COMPOUND, STUDY AREA 16



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LEGEND

- ⊕ Existing monitoring well
- ⊕ Previous soil boring and monitoring well location
- Previous soil boring location
- Previous surface soil sample location
- ⊕ Previous surface water sample location
- ▲ Previous sediment sample location
- ^P Proposed soil boring location
- ▲^P Proposed sediment sample location
- UST Underground storage tank
- Surface runoff sluice
- Drainage channels
- Fire hydrant
- Pedestrian bridge
- Ⓢ Sanitary sewer
- Oil-water separator
- Floor trench drain
- ⊕ Pole mounted transformer

0 75 150
 SCALE: 1 Inch = 150 Feet

FIGURE 2
PROPOSED SAMPLING LOCATIONS,
MCCOY ANNEX BUILDINGS 7168, 7171,
7172, AND FORMER 7175, U.S. ARMY MOTOR POOL
COMPOUND, STUDY AREA 16



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Samples should be submitted for TCL analysis of PAHs. Results will be used in a risk characterization for both residential and industrial future use scenarios.

SA 17 Resampling results for well OLD-17-04 indicate that the chlorinated solvent concentrations (trichloroethene, vinyl chloride, and cis-1,2-dichloroethene) have been confirmed (resampling results on 2/13/97 indicate the following concentrations: TCE at 150 $\mu\text{g}/\ell$; VC at 430 $\mu\text{g}/\ell$; DCE at 460 $\mu\text{g}/\ell$). Accordingly, ABB-ES has recently implemented a workplan for additional site screening activities to delineate a potential chlorinated solvent plume at SA 17. Although SA 17 could become an operable unit (OU), ABB-ES recommends limited additional screening at SA 17 for PAH concentrations greater than screening criteria. Additional screening is described below.

During the initial site screening there were PAH exceedances in 2 out of 9 surface soil samples locations (Figure 3), 3 out of 24 subsurface soil sample locations, and 3 out of 4 sediment sample locations. The samples for the various media are separated by more than 700 feet.

Of the two surface soil exceedances, one (17B035) is an order of magnitude more contaminated than the other (17B036). 17B036 is marginally above residential SCGs for one PAH and residential RBCs for two PAHs.

Of the 3 subsurface soil exceedances, only one (17B013) has PAH contaminants which exceed industrial RBCs (benzo[a]pyrene and dibenz[a,h]anthracene). Leachability criteria do not apply as these compounds were not detected in groundwater.

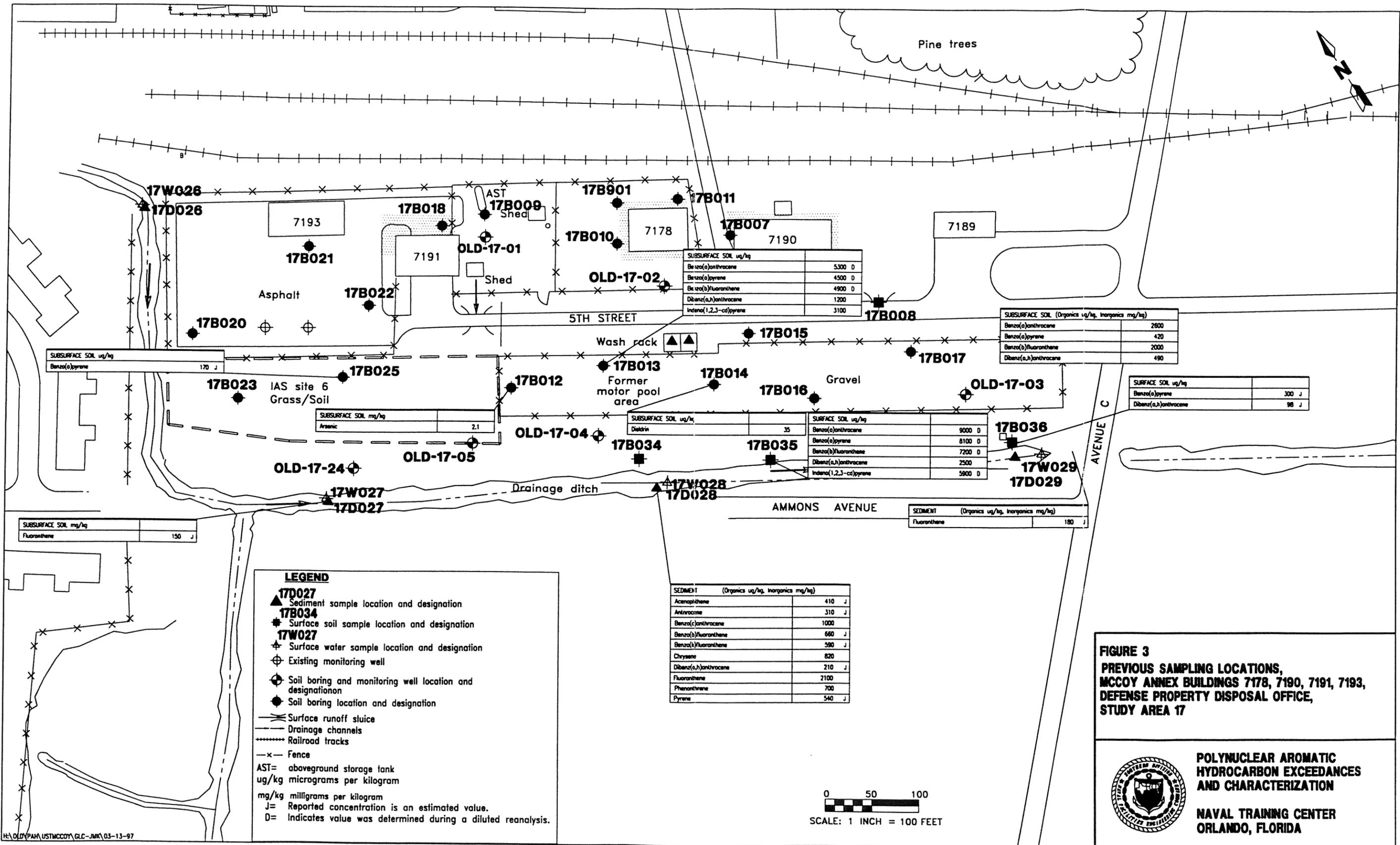
Of the 3 sediment samples, none exceed industrial RBCs.

ABB-ES concludes that one surface soil sample and one subsurface soil sample are driving overall environmental concerns at SA 17.

The collection of several additional samples is recommended in the vicinity of surface soil sample location 17B035 to delineate the nature and extent of PAHs at that location. Twelve immunoassay samples are proposed, with three samples submitted for laboratory confirmation. Samples will be submitted for PAH analysis only. With the exception of this potential "hot spot", ABB-ES concludes that the existing data base is sufficient to perform a risk characterization for both residential and industrial future use scenarios. A deed restriction limiting future use to industrial would likely change the status for this site to no further action (NFA) pending results of any additional sampling and a risk characterization. The property is currently listed in the BCP as "multimodal", consistent with a future industrial use scenario. The risk characterization may conclude that a deed restriction is not necessary at SA 17.

SA 18 In SA 18, there are PAH exceedances in 4 out of 7 surface soil sample locations, no subsurface soil samples (5 locations), and no groundwater samples (4 monitoring wells). Only one of the surface soil samples had PAH exceedances above industrial RBCs and SCGs (18S008, benzo[a]pyrene only). All surface soil samples were collected at runoff points.

ABB-ES concludes that one surface soil sample is driving overall environmental concerns for PAHs at SA 18 (Figure 5). A deed restriction limiting future use to industrial would likely make this site NFA pending results of additional sampling and a risk evaluation, below. The property is currently listed in the BRAC Cleanup Plan (BCP) as "multimodal", consistent with a future industrial use



SUBSURFACE SOIL ug/kg	
Benzo(a)anthracene	5300 D
Benzo(a)pyrene	4500 D
Benzo(b)fluoranthene	4900 D
Dibenz(a,h)anthracene	1200
Indeno(1,2,3-cd)pyrene	3100

SUBSURFACE SOIL (Organics ug/kg, Inorganics mg/kg)	
Benzo(a)anthracene	2600
Benzo(a)pyrene	420
Benzo(b)fluoranthene	2000
Dibenz(a,h)anthracene	490

SURFACE SOIL ug/kg	
Benzo(a)pyrene	300 J
Dibenz(a,h)anthracene	96 J

SUBSURFACE SOIL mg/kg	
Arsenic	2.1

SUBSURFACE SOIL ug/kg	
Dieldrin	35

SURFACE SOIL ug/kg	
Benzo(a)anthracene	9000 D
Benzo(a)pyrene	8100 D
Benzo(b)fluoranthene	7200 D
Dibenz(a,h)anthracene	2500
Indeno(1,2,3-cd)pyrene	5900 D

SEDIMENT (Organics ug/kg, Inorganics mg/kg)	
Fluoranthene	180 J

SEDIMENT (Organics ug/kg, Inorganics mg/kg)	
Acenaphthene	410 J
Anthracene	310 J
Benzo(c)anthracene	1000
Benzo(b)fluoranthene	660 J
Benzo(k)fluoranthene	590 J
Chrysene	820
Dibenz(a,h)anthracene	210 J
Fluoranthene	2100
Phenanthrene	700
Pyrene	540 J

LEGEND

- ▲ 17D027 Sediment sample location and designation
- 17B034 Surface soil sample location and designation
- ◆ 17W027 Surface water sample location and designation
- ⊕ Existing monitoring well
- ⊙ Soil boring and monitoring well location and designation
- Soil boring location and designation
- Surface runoff sluice
- Drainage channels
- Railroad tracks
- Fence
- AST= aboveground storage tank
- ug/kg micrograms per kilogram
- mg/kg milligrams per kilogram
- J= Reported concentration is an estimated value.
- D= Indicates value was determined during a diluted reanalysis.

FIGURE 3
PREVIOUS SAMPLING LOCATIONS,
MCCOY ANNEX BUILDINGS 7178, 7190, 7191, 7193,
DEFENSE PROPERTY DISPOSAL OFFICE,
STUDY AREA 17



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0 50 100
 SCALE: 1 INCH = 100 FEET

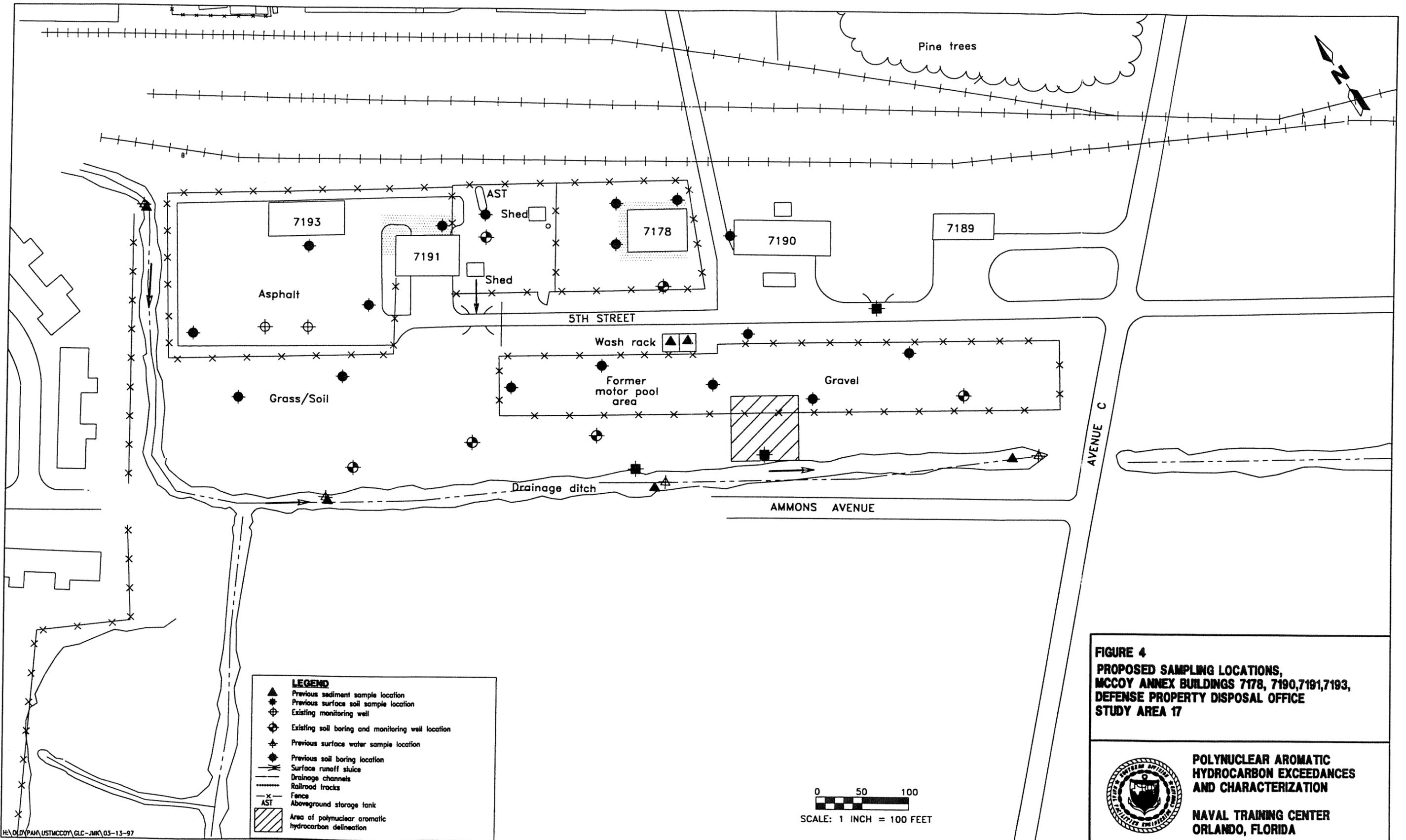
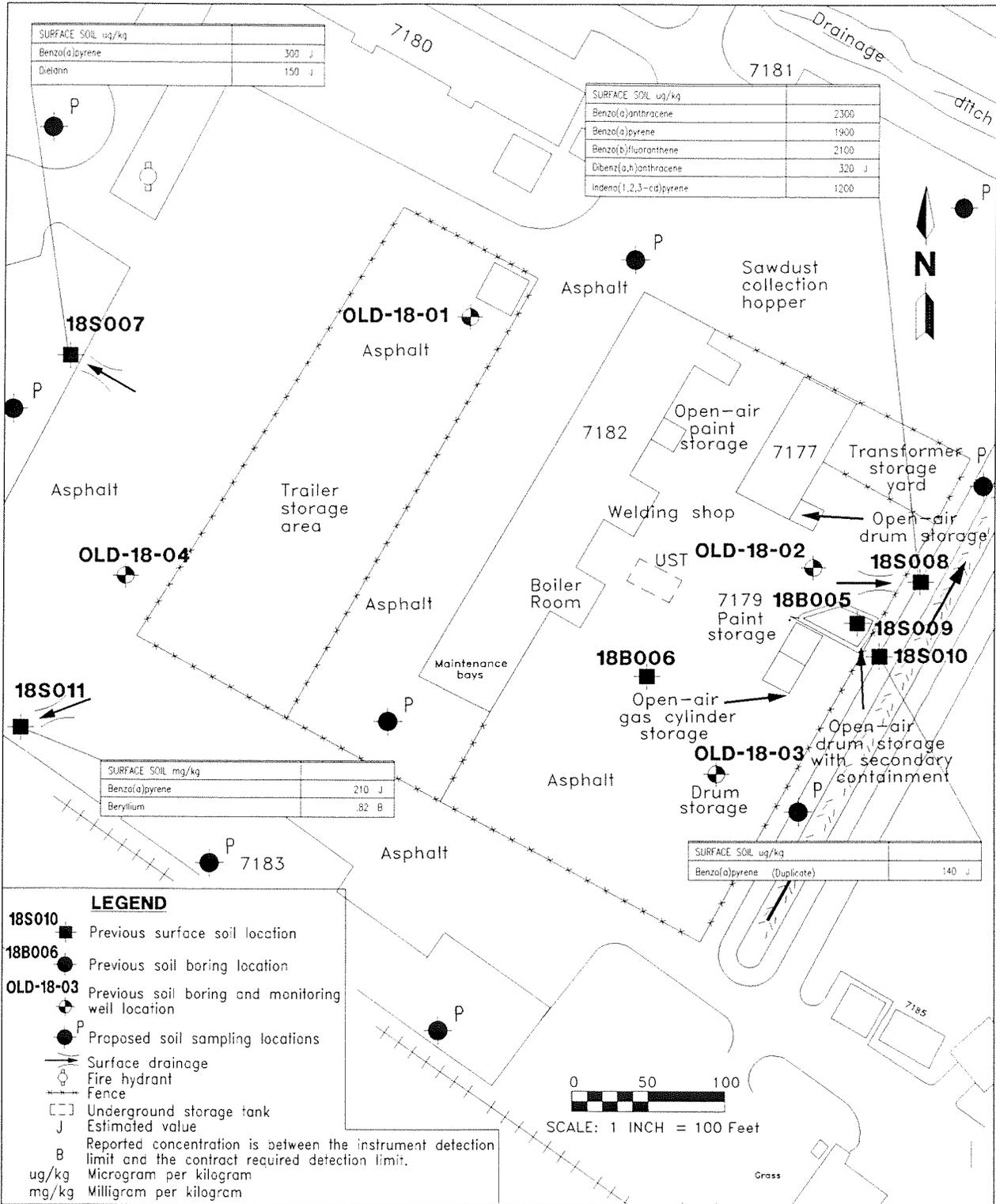


FIGURE 4
PROPOSED SAMPLING LOCATIONS,
MCCOY ANNEX BUILDINGS 7178, 7190, 7191, 7193,
DEFENSE PROPERTY DISPOSAL OFFICE
STUDY AREA 17



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**FIGURE 5
PROPOSED SAMPLING LOCATIONS,
MCCOY ANNEX,
BUILDINGS 7182, 7179, HOUSING OFFICE,
STUDY AREA 18**



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scenario.

ABB-ES concludes that additional samples collected at the sampling locations shown on Figure 5 will fill existing data gaps and better characterize general site conditions. Results will be used in a risk characterization for both residential and industrial future use scenarios. The risk characterization may conclude that a deed restriction is not necessary.

SA 21 In SA 21, there are PAH exceedances in 1 out of 9 surface soil samples (8 locations). Only one PAH compound in 21S005 (benzo[a]pyrene) exceeds industrial RBCs.

ABB-ES concludes that one compound in one surface soil sample is driving overall environmental concerns for PAHs at SA 21 (Figure 6). However, this site also has arsenic detections at concentrations up to 10 mg/kg Vs. a background screening value of 1.9 mg/kg. A deed restriction limiting future use to industrial would likely make this site NFA for PAHs pending results of additional sampling and a risk evaluation, below. The property is currently listed in the BCP as "multimodal", consistent with a future industrial use scenario.

ABB-ES concludes that additional samples collected at the sampling locations shown on Figure 6 will fill existing data gaps and better characterize general site conditions. In addition, ABB-ES will resample 21S005 to confirm PAH exceedances at that location. Samples will be submitted for PAH and arsenic analyses. Results will be used in a risk characterization for both residential and industrial future use scenarios.

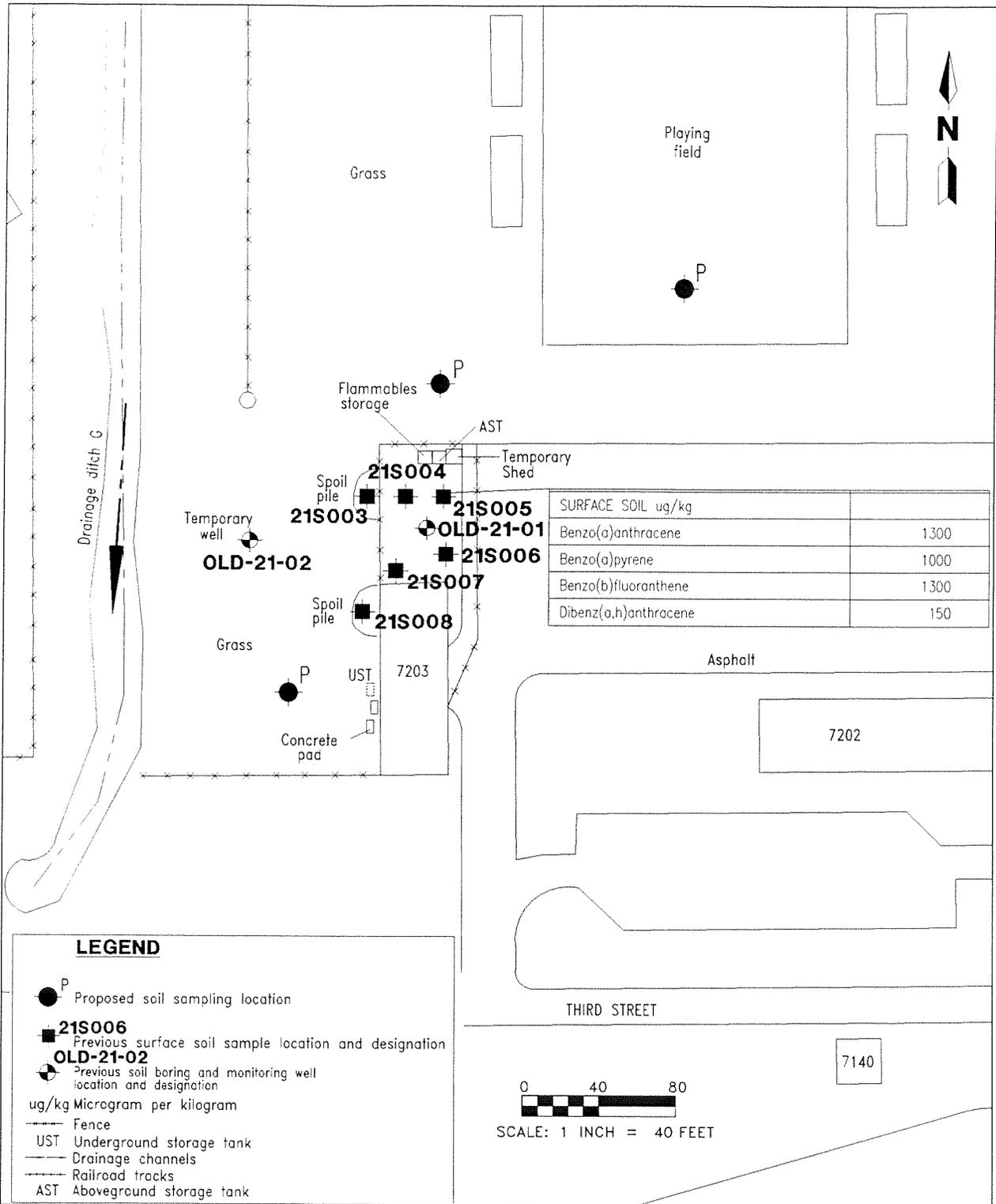
SA 23 In SA 23, there are PAH exceedances in the only surface soil sample (23S005). Five PAH compounds exceed industrial RBCs (Figure 7).

ABB-ES concludes there is insufficient data to conclude that there is not a problem with PAHs at this site. A deed restriction limiting future use to industrial would likely make this site NFA for PAHs pending results of additional sampling and a risk evaluation, below. The property is currently listed in the BCP as "multimodal", consistent with a future industrial use scenario.

ABB-ES concludes that additional samples collected at the sampling locations shown on Figure 7 will fill existing data gaps and better characterize general site conditions. In addition, ABB-ES proposes to determine the nature and extent of PAHs in the vicinity of soil sample 23S005, a potential "hot spot". Eight immunoassay soil samples are proposed along with four confirmatory samples, which will be submitted for PAH analyses. Results will be used in a risk characterization for both residential and industrial future use scenarios. The risk characterization may conclude that a deed restriction is not necessary.

SA 26 In the two background surface soil samples collected near SA 26 (ORS009 and ORS016, Figure 8), there are PAH exceedances (RBCs and Florida SCGs) in both samples for the following compounds: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene. There was also an exceedance in one sample (ORS016) for dibenz(a,h)anthracene.

ABB-ES concludes there is insufficient data to conclude that there is not a problem with PAHs at this site. A deed restriction limiting future use to industrial would likely make this site NFA for PAHs pending results of additional sampling and a risk evaluation, below. However, the property is currently listed in the BCP as residential.



LEGEND

- P Proposed soil sampling location
- 21S006 Previous surface soil sample location and designation
- OLD-21-02 Previous soil boring and monitoring well location and designation
- ug/kg Microgram per kilogram
- Fence
- UST Underground storage tank
- Drainage channels
- Railroad tracks
- AST Aboveground storage tank



SCALE: 1 INCH = 40 FEET

FIGURE 6
PROPOSED SAMPLING,
MCCOY ANNEX,
BUILDING 7203, MAINTENANCE SHOP,
STUDY AREA 21



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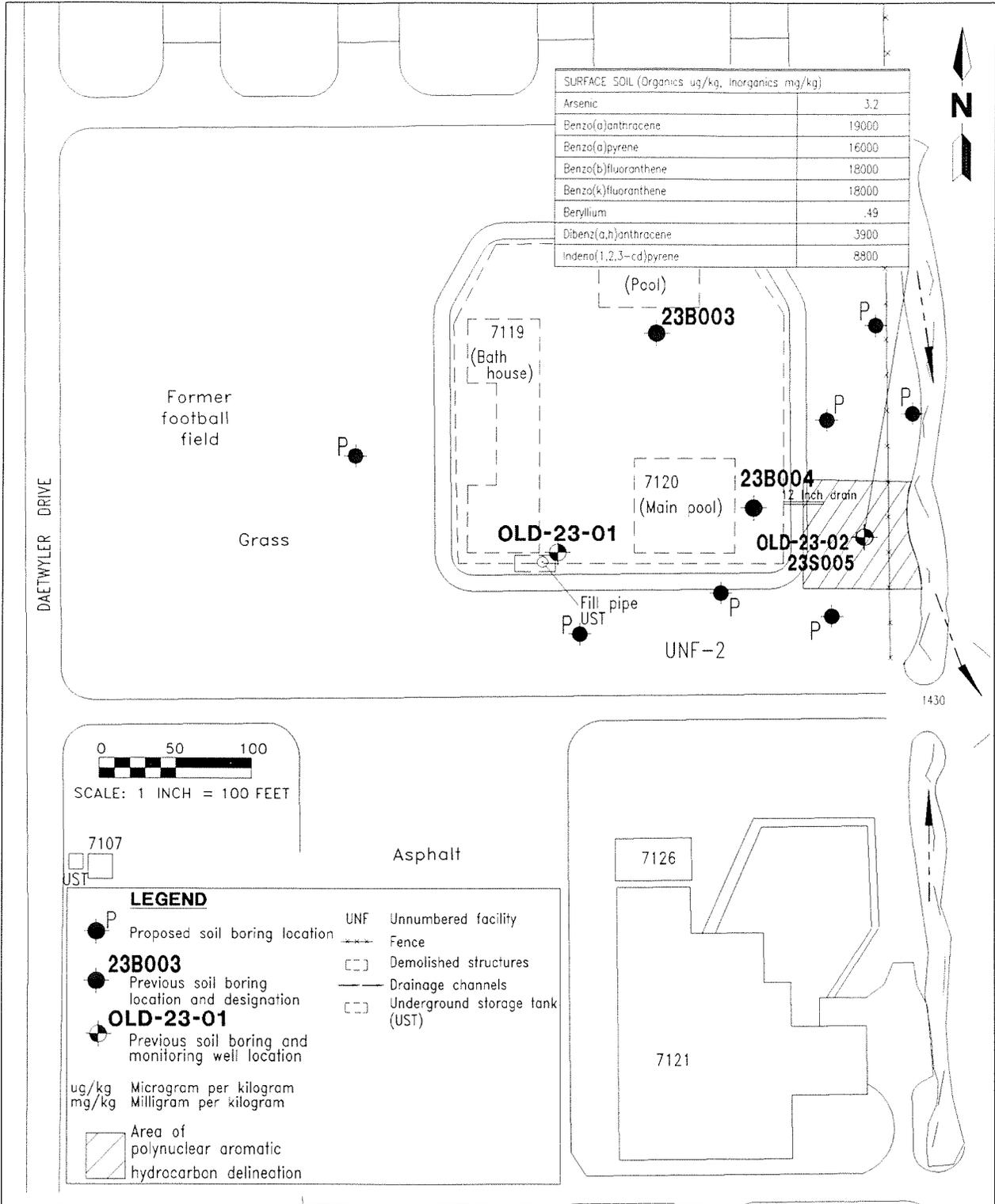


FIGURE 7
PROPOSED SAMPLING
LOCATIONS, MCCOY ANNEX UNF-2,
FORMER SWIMMING POOL COMPLEX, FACILITIES 7119
AND 7120, STUDY AREA 23



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ABB-ES recommends that delineation of PAHs be completed in the immediate vicinity of the two original background surface soil sample locations, S09 and S16 (Figure 8). These locations were resampled recently, confirming earlier results. ABB-ES proposes to collect 8 immunoassay samples in the vicinity of each of the background locations, with 2 samples from each of the two locations submitted for laboratory confirmation. Samples will be submitted for PAH analysis only.

SA 27 In SA 27, there are PAH exceedances in 1 out of 9 surface soil sample locations (Figure 9). Only one PAH compound in 27S007 (benzo[a]pyrene) exceeds industrial RBCs.

There were no detections of PAHs in subsurface soil samples (3 locations) in SA 27.

ABB-ES concludes that one compound in one surface soil sample (27S007) is driving overall environmental concerns for PAHs at SA 27, and recommends resampling that location to confirm PAH concentrations. A deed restriction limiting future use to industrial would likely make this site NFA for PAHs pending results of a risk evaluation, below. The property is currently listed in the BCP as "retail", consistent with a future industrial use scenario.

ABB-ES concludes that no additional samples other than the resampling at 27S007 will be needed to fill data gaps. The existing data base will be used in a risk characterization for both residential and industrial future use scenarios. The risk characterization may conclude that a deed restriction is not necessary.

SA 39 In SA 39 there are PAH exceedances, primarily B(a)P, in 4 out of 16 surface soil sample locations (Technical Memorandum, Site Screening Investigations, Study Areas 39, 40, and 45; ABB-ES, 1996). There are no exceedances for industrial RBCs, although the reuse plan currently calls for this area to be a combination of office and residential. There were no exceedance of PAHs (or other compounds) in any of five subsurface soil samples collected.

ABB-ES concludes that B(a)P in four surface soil samples is driving overall environmental concerns at SA 39. The property is currently listed in the BCP as "office and residential", consistent with a future residential reuse scenario. A deed restriction limiting future use to industrial would likely make this site NFA for PAHs pending results of a risk evaluation, below.

ABB-ES has recently completed a surface soil sampling program in SA 39 in which 50 samples were collected on 100-foot centers (20% laboratory confirmation). A human health risk assessment is currently in progress and results are expected in early March 1997.

SA 40 In SA 40, there is one PAH exceedance of B(a)P out of 4 surface soil sample locations (Technical Memorandum, Site Screening Investigations, Study Areas 39, 40, and 45; ABB-ES, 1996). That PAH occurrence did not exceed the industrial RBC, although the reuse plan currently calls for this area to be a combination of office and residential. There were no exceedances of other compounds in either of two subsurface soil samples collected.

ABB-ES concludes that B(a)P in the single surface soil sample is driving overall environmental concerns at SA 40. The property is currently listed in the BCP as "office and residential", consistent with a future residential reuse scenario. A deed restriction limiting future use to industrial would likely make this site NFA for PAHs pending results of a risk evaluation.

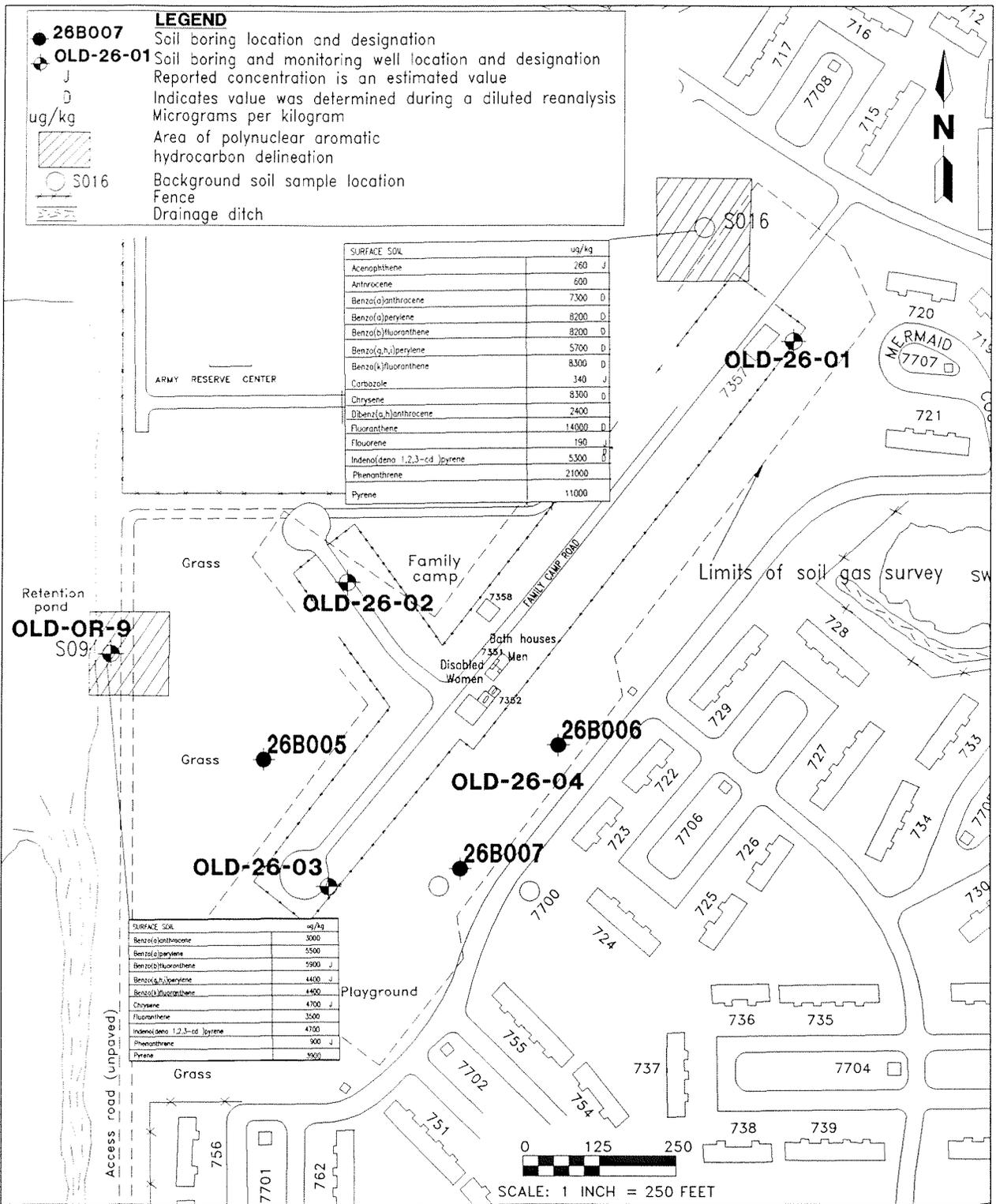


FIGURE 8
SOIL BORING AND MONITORING WELL LOCATIONS
MCCOY ANNEX BACKGROUND LOCATIONS,
AND STUDY AREA 26



POLYNUCLEAR AROMATIC
HYDROCARBON EXCEEDANCES
AND CHARACTERIZATION
NAVAL TRAINING CENTER
ORLANDO, FLORIDA

ABB-ES has recently completed a surface soil sampling program in SA 40 in which 25 samples were collected on 100-foot centers (20% laboratory confirmation). A human health risk assessment is currently in progress and the results are expected in March 1997.

SUMMARY OF ADDITIONAL SITE SCREENING ACTIVITIES FOR PAH EVALUATION.

The additional screening activities at each of the study areas, above, are summarized on Table 2. ABB-ES has proposed an additional 51 surface soil/subsurface soil pairs, 2 surface soil (resampling) samples, 4 sediment samples, approximately 36 immunoassay samples (with at least 10% laboratory confirmation). In addition, there will be an appropriate number of QA/QC samples as required.

As agreed in the December OPT meeting, "hot spots" will be considered on a case-by-case basis. However, Ted Simon of USEPA, Region IV recently (1/23/97) suggested, and ABB-ES concurs, that guidance contained in Richard O. Gilbert's statistics textbook entitled "Statistical Methods for Environmental Pollution Monitoring" (1987, Reinhold) be used when considering hot spots and sampling frequency.

Following discussions of any comments or corrections at the next scheduled OPT meeting, our intent is to plan and implement this work. Should you have any questions or comments, please call Rick Allen at (904)269-7012 or me at (407)895-8845.

Very Truly Yours,

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**Table 1.
Summary of Potential PAH-contaminated Sites**

NTC, Orlando
Site Screening Reports

Study Area	Screening Event	Nature of Occurrence	Figure/Table Reference	Proposed Land Use (from BRAC Cleanup Plan, 2/96)	
SAs where recommendations have been reviewed by the EPA and FDEP					
16	Army Motor Pool Complex Bldgs. 7168, 7171, 7172, and former 7175 McCoy Annex	Group IIISAs, Draft Report, Dec 95. Final report pending OPT signatures.	PAHs detected in several surface soil and sediment samples primarily associated with runoff points. Area had been recommended for transfer to UST program. Motor pool activity continues.	Chapter: 17 Figure: 17-2 Table: Appendix O, O-16-1, O-16-5	multi-modal transportation and related services
17	Defense Property Disposal Office, and Bldgs. 7178, 7190, 7191, and 7193 McCoy Annex	Group IIISAs, Draft Report, Dec 95	PAHs detected in one surface soil samples (17B035), two subsurface soil samples (17B013 and 17B016), and one sediment sample (17D028) collected from the motor pool area. Lesser concentrations of PAH detected in two surface soil samples (17B025 and 17B036).	Chapter: 18 Figure: 18-1 Tables: Appendix O, Tables O-17-1, O-17-2 and O-17-5	multi-modal transportation facility and related services
18	Bldgs. 7179 and 7182, and Housing Office McCoy Annex	Group IIISAs, Draft Report, Dec 95	PAHs were detected in surface soil samples at runoff points from the paved surfaces.	Chapter: 19 Figure: 19-1 Table: Appendix O, Table O-18-1	multi-modal transportation and related services
21	Maintenance Shop, Bldg. 7203 McCoy Annex	Group IIISAs, Draft Report, Dec 95	PAHs detected in one surface soil sample at concentrations exceeding residential RBCs Florida SCGs.	Chapter: 22 Figure: 22-1 Table: Appendix O, Table O-21-1	recreation

**Table 1.
Summary of Potential PAH-contaminated Sites**

NTC, Orlando
Site Screening Reports

Study Area	Screening Event	Nature of Occurrence	Figure/Table Reference	Proposed Land Use (from BRAC Cleanup Plan, 2/96)
23 Former Swimming Pool, UNF-2 McCoy Annex	Group IIISAs, Draft Report, Dec 95	PAHs detected in one surface soil sample collected from immediately below the effluent pipe for the swimming pool. Drain pipe may have been for the swimming pool, and may now continue to function as a drain for rainwater that accumulates within the mound during rain events. Source of PAHs may be present within the mound.	Chapter: 24 Figure: 24-1 Table: Appendix O, Table O-23-1	National Guard - training and education
26 Family Camp, Former Airstrip McCoy Annex	Group IIISAs, Draft Report, December 1995 and Background Sampling Report, Final, August 95	Elevated concentrations of PAHs were detected in background surface soil samples (samples S09 and S16), which were collected near this study area.	<u>Group III Report:</u> Chapter: 27, Figure: 27-1, Tables: Appendix O, Table O-26-1 <u>Background Report:</u> Chapter: 5, Figure: 3-3, Tables: 5-2	Army Reserve - training and education
Study Areas where recommendations have not been formally reviewed by EPA and DEP				
27 Bldgs. 111, 2010, and 2073, Main Base	Technical Memorandum, SA 27, Sept 96	PAHs detected in one surface soil sample and its duplicate.	<u>Tech Memo:</u> Figure 3	retail
39 Main Base, Coal Storage Yard and Contractor Maintenance Yard	Technical Memorandum, SAs 39, 40, and 45, June 96	PAHs with exceedances of regulatory criteria in 4 of 16 surface soil locations	<u>Tech Memo</u> Attachment B-1	office and residential
40 Main Base, Bottle Landfill	Technical Memorandum, SAs 39, 40, and 45, June 96	PAHs with exceedances of regulatory criteria in one of four surface soil locations	<u>Tech Memo</u> Attachment B-1	office and residential

**Table 2.
Summary of Additional Site Screening Activities**

NTC, Orlando
Site Screening Reports

Study Area	Surface/Subsurface Soil Samples (S/B)	Sediment Samples (D)	Immunoassay Samples	
SAs where recommendations have been reviewed by the EPA and FDEP				
16	Army Motor Pool Complex, McCoy Annex	19(S)/19(B) ¹	4(D) ¹	--
17	DPDO, and Bldgs. 7178, 7190, 7191, and 7193 McCoy Annex	4(S)/3(B) ¹	--	12 ¹
18	Bldgs. 7179 and 7182, and Housing Office McCoy Annex	18(S)/18(B)	--	--
21	Maintenance Shop, Bldg. 7203 McCoy Annex	3(S)/3(B)	--	--
23	Former Swimming Pool, UNF-2 McCoy Annex	11(S)/7(B)	--	8
26	Family Camp, Former Airstrip McCoy Annex	4(S)	--	16
Study Areas where recommendations have <i>not</i> been formally reviewed by EPA and DEP				
27	Bldgs. 111, 2010, and 2073, Main Base	1(S)	--	--
39	Main Base, Coal Storage Yard and Contractor Maintenance Yard	--	--	--
40	Main Base, Bottle Landfill	--	--	--
TOTALS		60(S)/50(B)	4(D)	36

¹ Sampling not recommended at this time