Northrop Grumman Systems Corporation

LNAPL INVESTIGATION AND SUPPLEMENTAL VOC DELINEATION REPORT

Operable Unit 3 (Former Grumman Settling Ponds)

Bethpage, New York

NYSDEC Site # 1-30-003A

May 2, 2019

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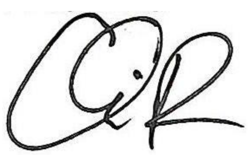

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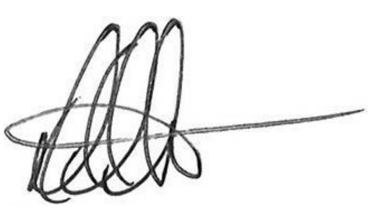

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ACRONYMS AND ABBREVIATIONS

Arcadis	Arcadis of New York, Inc.
ASP	Analytical Services Protocol
bls	below land surface
DRO	diesel range organics
DTI	Dakota Technologies, Inc.
DUSR	Data Usability Summary Report
EVS	Earth Volumetric Studio
ft	feet
GPS	Global Positioning System
GRO	gasoline range organics
HP	hydraulic profiling
IDW	investigation-derived waste
LIF	laser-induced fluorescence
LNAPL	light non-aqueous phase liquid
LPZ	low permeability zone
mg/kg	milligrams per kilogram
Northrop Grumman	Northrop Grumman Systems Corporation
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
ORO	oil range organics
PCBs	polychlorinated biphenyls
PID	photoionization detector
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
ROD	Record of Decision
Park	Bethpage Community Park
SVOCs	semi-volatile organic compounds
TCL	Target Compound List
TPH	total petroleum hydrocarbons
TVOCs	total volatile organic compounds
µg/kg	micrograms per kilogram
UVOST®	ultra-violet optical screening tool
VOCs	volatile organic compounds

1 INTRODUCTION

Arcadis of New York, Inc. (Arcadis) has prepared this report on behalf of Northrop Grumman Systems Corporation (Northrop Grumman) to summarize the results of: 1) the light non-aqueous phase liquid (LNAPL) investigation in the area surrounding Piezometer I-4-PZ (northeast portion of the ball field); and 2) the supplemental delineation of volatile organic compounds (VOCs) in deep soil in the ball field, collectively referred to hereinafter as the "investigation area". The ball field is a fenced area located in the southwest region of the Bethpage Community Park, Bethpage, New York (Park) that has not been publicly accessible since 2002. This work was performed in support of the upcoming thermal remedial action specified in the Operable Unit 3 Record of Decision (ROD) to address the deep soil within the VOC source area. The general site location is shown on **Figure 1**. Park features are shown on **Figure 2**.

The work was performed in accordance with the New York State Department of Environmental Conservation (NYSDEC)-approved Work Plan for Delineation of Perched LNAPL and to Supplement the Delineation of VOCs in Soil, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York (Arcadis 2018a).

In accordance with the Work Plan, the general objectives of the work were to:

1. Delineate the extent of and determine the distribution of LNAPL previously observed in Piezometer I-4-PZ, which is screened from 38 to 48 feet below land surface (ft bls).
2. Further refine the physical properties of the low permeability zone (LPZ) at and around Piezometer I-4-PZ.
3. Refine the vertical extent of VOCs in soil in the investigation area.

Previous investigations and historical data are provided and summarized in the following reports:

- Remedial Investigation Report (Site Area) dated February 8, 2011 (Arcadis 2011)
- Pre-Design Sampling and Remedial Technology Evaluation Report for VOC Source Area dated October 16, 2015 (Arcadis 2015)
- Addendum to Pre-Design Sampling and Remedial Technology Evaluation Report for VOC Source Area dated February 2, 2018 (Arcadis 2018b)

2 SCOPE OF WORK

The LNAPL investigation was performed in three phases (Phases I through III) as described below. As described in the Work Plan, the LNAPL investigation activities were performed using an adaptive approach that allowed flexibility based on evaluation of multiple lines of evidence (i.e., laboratory analytical data, ultra-violet optical screening tool [UVOST®], photoionization detector [PID] screening, and field observations). A fourth phase of soil borings were drilled to refine the delineation of VOCs in soil in the investigation area (see Phase IV below).

In preparation for the field work, vegetation was cleared from the investigation area. Prior to intrusive work, utility maps provided by the Town of Oyster Bay were reviewed and a private utility locating company performed a survey to locate and mark subsurface utilities. Proposed boring locations within 5 feet of any identified underground utilities were re-located. The boring locations were also cleared of utilities to a depth of 5 ft bls using a hand auger.

The borings were field located using a hand-held Global Positioning System (GPS) unit. **Table 1** provides a summary of the soil borings and sampling details. **Figure 3** shows the soil boring locations. The soil core/sample logs are provided in **Appendix A**. After each soil boring was drilled to its completion depth, the boring was grouted from the bottom up to land surface. Investigation derived waste (IDW) generated during sampling activities was containerized, characterized, and disposed at approved facilities. The soil, plastic debris, and LNAPL/groundwater mixture was transported to the Clean Harbors Spring Grove Resource Recovery, Inc. facility in Cincinnati, Ohio. The soil and plastic debris will then be transported to the Clean Harbors Lone Mountain, LLC facility in Waynoka, Oklahoma for final disposal, and the LNAPL/groundwater mixture will be transported to the Clean Harbors Deer Park, LLC facility in Deer Park, Texas for final disposal. The soil IDW characterization data are provided in **Appendix B**. The LNAPL IDW characterization data were provided in Attachment 2 of the Work Plan.

2.1 Phase I – Ultra Violet Optical Screening Tool (UVOST®)-Hydraulic Profiling (HP) Borings

The UVOST® system uses a sapphire window in the side of a direct push probe to measure front-face fluorescence of petroleum LNAPL as the probe is advanced into the soil. Prior to mobilization, an LNAPL sample collected from Piezometer I-4-PZ was bench tested by Dakota Technologies, Inc. (DTI) to determine whether the UVOST® system would be a viable tool for the site-specific LNAPL. The bench test was performed by DTI to evaluate UVOST® response to increasing quantities of site-specific LNAPL that were added to a fixed volume of clean sand. DTI concluded that the LNAPL in Piezometer I-4-PZ was detectable by UVOST®, and that the UVOST® was sensitive to a small amount of NAPL (the low emulation UVOST® response was 89.5% reference emitter [RE]) (see **Appendix C**).

A total of twenty-two (22) borings (LIF-HPT-1 through LIF-HPT-22) were drilled using direct push drilling techniques during the Phase I activities. The investigation techniques that were employed at Borings LIF-HPT-1 through LIF-HPT-22 included laser-induced fluorescence (LIF), specifically the UVOST®, and Hydraulic Profiling (HP). In conjunction, the UVOST® and HP systems allowed for simultaneous mapping of LNAPL distribution and stratigraphy. DTI provided UVOST® and HP services, and Cascade Technical Services provided direct push drilling services.

As stated in the Work Plan, the specific objectives of the Phase I activities were to:

- Delineate the three-dimensional extent of the LNAPL that was observed in Piezometer I-4-PZ;
- Define the vertical distribution of the LNAPL relative to the geologic framework;
- Map the local hydrostratigraphy; and
- Further understand the local thickness and morphology of the LPZ.

The UVOST®-HP borings data were continuously collected from 5 ft bls to depths ranging from approximately 43 to 51 ft bls. The terminal depth of the borings was based on UVOST® response (i.e., at least 2 feet of UVOST® response below site-specific cutoff value for background sources [see Section 3.2.1]) or when refusal was encountered.

Eight (8) UVOST®-HP borings (LIF-HPT-1 through LIF-HPT-8) were drilled as proposed in the Work Plan. An additional fourteen (14) borings (LIF-HPT-9 through LIF-HPT-22) were drilled based on data obtained from the initial eight borings to meet the investigation objectives. Previous analytical data and soil boring information were also used to guide the placement of additional UVOST®-HP borings. Due to technical issues with the UVOST®-HP systems at the LIF-HPT-14 (laser energy issue) and LIF-HPT-17 (fiber optic failure) locations, these borings had to be re-drilled and were replaced by borings LIF-HPT-14a and LIF-HPT-17b, which were drilled approximately 2 ft away from the initial locations. LIF-HPT-01a was drilled approximately 5.5 feet deeper within the same boring, and LIF-HPT-20a was drilled approximately 4 feet deeper and 2 feet away from the initial location to complement the data collected at the LIF-HPT-01 and LIF-HPT-20 locations, respectively. The UVOST®-HP logs are provided in **Appendix C**.

2.2 Phase II – Soil Borings

A total of ten (10) soil borings were drilled adjacent to select Phase 1 UVOST®-HP borings based on UVOST® responses to collect soil samples for laboratory analysis. As there were elevated UVOST® responses in the soil column above the LPZ at LIF-HPT-1SB, LIF-HPT-2SB, and LIF-HPT-15SB, continuous soil cores were collected from 5 ft bls to the bottom of the boring at these locations to compare field observations (e.g., lithology, visual evidence of impacts or staining, odors, PID readings) to the responses from the associated Phase I UVOST®-HP borings. As the soil cores shallower than 35 ft bls did not exhibit significant visual impacts at soil borings LIF-HPT-1SB, LIF-HPT-2SB, and LIF-HPT-15SB, soil cores from the remaining seven borings were collected starting at 35 ft bls to the bottom of the boring. The soil cores were screened for VOCs in the field using a PID, and soil samples were collected from targeted intervals based on field observations (i.e., visual indication of discoloration, odor, or other evidence of LNAPL impacts) and PID readings. Soil samples were collected from depths greater than 25 ft bls. The soil core/sample logs are provided in **Appendix A**. Photograph logs of select soil cores are provided in **Appendix D**.

The soil cores were vertically split so that UVOST® responses could be compared to soil sampling analytical results. At specific intervals of interest, one portion of the soil core was used for UVOST® ex-situ field testing and the other portion was collected for laboratory analysis. Soil samples were analyzed for Target Compound List (TCL) VOCs, semi-volatile organic compounds (SVOCs), 1,4-dioxane, polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH) gasoline range organics (GRO [carbon range C6-C10]), TPH diesel range organics (DRO [carbon range C10-C28]), and TPH oil range organics (ORO [carbon range C28-40]) by New York State Department of Health (NYSDOH) accredited laboratories (Pace Analytical Services, LLC and Katahdin Analytical Services). The Phase II soil core UVOST® ex-situ tests results are provided in **Appendix C**. NYSDEC Analytical Services Protocol (ASP) Category B laboratory reports are provided in **Appendix E**.

2.3 Phase III – Low Permeability Zone Soil Borings

A total of five (5) soil borings (LPZ-1 through LPZ-5) were drilled to further characterize the lithology (field description/visual inspection of soil cores) and determine the thickness of the LPZ at these locations. Four of the five proposed Phase III soil borings (LPZ-1 through LPZ-4) were co-located with Phase II soil borings. Continuous soil cores were collected starting at 35 ft bls to the bottom of the boring. The soil cores were screened in the field using a PID, and soil samples were collected and analyzed following the protocols identified in Phase II (with the exception that soil cores were not vertically split for UVOST® ex-situ field testing). The soil core/sample logs are provided in **Appendix A**.

2.4 Phase IV – Supplemental VOC Soil Delineation

A total of seven (7) soil borings were drilled to supplement the delineation of VOCs in soil in the investigation area. Three (3) of the soil borings proposed in the Work Plan were not drilled or completed for the following reasons:

- R-9-18 was not drilled due to underground utilities conflict and the presence of a mature tree in the area. R-9-18 could not be relocated because a safe offset location would have been too far away from the planned location to achieve the objective of the boring.
- I-6-18 and nR-8-18 were not completed due to refusal encountered prior to reaching the planned sampling depth. The proposed sampling intervals in I-6-18 were 48-50 ft and 50-52 ft; refusal was encountered at 45 ft. The proposed sampling intervals in nR-8-18 were 50-52 ft and 52-54 ft; refusal was encountered at 49 ft.

The soil core/sample logs are provided in **Appendix A**. The soil samples were collected at the sampling intervals identified in the Work Plan and analyzed for the same parameters as the Phase II soil samples.

3 RESULTS AND INTERPRETATION

This section summarizes the results of the LNAPL investigation and supplemental delineation of VOCs in soil. **Table 2** provides the analytical results of soil samples collected from the Phase II and Phase III soil borings. **Table 3** provides the analytical results of the soil samples collected from the Phase IV soil borings.

Data validation was performed in accordance with the project Quality Assurance Project Plan (QAPP). Data usability summary reports (DUSR) are provided in **Appendix F**. The overall data quality objectives were met for the intended use of the data.

3.1 TVOC Distribution

Earth Volumetric Studio (EVS) software was used to map the total VOC (TVOC) data in three dimensions. The previous EVS model discussed in the <u>Pre-Design Sampling and Remedial Technology Evaluation Report for VOC Source Area</u> (Arcadis 2015) was updated with TVOC data from the 2017 Supplemental Pre-Design investigation and the 2018 investigation program. **Figure 4** shows a plan view (areal extent) and a vertical side view (vertical extent) of the updated distribution of TVOCs in soil below 30 ft bls. The data collected between 2014 and 2018 and presented in **Figure 4** delineates TVOCs in soil above 10 milligrams per kilogram (mg/kg), with limited exceptions (i.e., soil borings LPZ-5 [**Table 2**] and nG-6-18 [**Table 3**], which exhibited TVOC concentrations above 10 mg/kg). Additional borings will be advanced during installation of the upcoming thermal remedy treatment wells to refine the delineation of TVOCs near borings nG-6-18 and LPZ-5. The observed subsurface distribution of TVOCs in soil below 30 ft bls has the following additional characteristics:

1. The highest concentrations (above 1,000 mg/kg) were identified within the central portion of the former rag pit area (known area of impact) (see **Figure 4**). The highest concentrations in the Phase II soil borings samples (see **Table 2**) were detected in LIF-HPT-1SB (1,800 mg/kg [46-48 ft]), LIF-HPT-7SB (2,500 mg/kg [45.5-47.5 ft]), LIF-HPT-8SB (2,900 mg/kg [45-47 ft]), and LIF-HPT-19SB (6,600 mg/kg [43-45 ft]). These soil borings are located in the area where LNAPL migrated vertically through the unsaturated zone based on UVOST® data (see Section 3.2), and the TVOC concentrations in these four soil samples are generally consistent in magnitude with elevated TVOC concentrations that were identified in historical soil borings (e.g., O-8-14, nN-9-14, and VP-27-14) in the central portion of the former rag pit area. The highest concentrations were generally detected in the vertical interval from approximately 43 to 48 ft bls (within the LPZ), which coincides with the screened interval (38 to 48 ft bls) of Piezometer I-4-PZ in which LNAPL was observed.
2. The distribution of TVOCs above 100 mg/kg is generally limited to the former rag pit area but extends slightly east and west of this area.

3.2 UVOST® Results

3.2.1 Delineation and Distribution of LNAPL

EVS was used to visualize the distribution of the UVOST® data in three dimensions. **Figure 5** shows a vertical side view of the UVOST® response above 2% RE (UVOST® signal relative to the RE), which DTI recommended as a site-specific cutoff value for background sources (e.g., soil, biota, and other non-NAPL sources) (see DTI report in **Appendix C** for further discussion). The reference emitter is a standard used to calibrate and/or check the response of the UVOST® system. The site-specific 2% RE response represents the lowest residual LNAPL saturation that could be detected.

Figure 5 also shows the approximate air/LNAPL interface (depth to the top of the in-well LNAPL) of 43 ft bls (where perched water is present) in Piezometer I-4-PZ. The LNAPL detected via the UVOST® responses in the unsaturated zone above this approximate depth is residual (i.e., immobile) LNAPL. Residual LNAPL will remain immobile and hydraulically unrecoverable under prevailing conditions and will not flow into a well (ITRC 2018). The residual saturation within the unsaturated zone is the LNAPL saturation attained after an initially saturated soil is allowed to drain by gravity to equilibrium. Mobile LNAPL is present near Piezometer I-4-PZ as demonstrated by the LNAPL that has been observed to flow into this well. The LNAPL body is stable (not migrating) because it does not contain the driving forces (LNAPL pressure head) to exceed the resistive forces (capillary entry pressure for the adjacent groundwater saturated aquifer) due to the age of the release (greater than 50 years). LNAPL migration tends to occur over the relatively early stages of a release, when the LNAPL head pressures and LNAPL saturations are greatest. Following the termination of an active release, the LNAPL pressure head may decrease rapidly, which ultimately limits the overall volume of LNAPL available to migrate laterally.

The UVOST® data, in conjunction with other lines of evidence (i.e., laboratory analytical data), provide delineation of the LNAPL. The UVOST® data distribution shown on **Figure 5** indicates that the LNAPL migrated vertically through the unsaturated zone within the former rag pit area, as evidenced by the

UVOST® data collected at LIF-HPT-1, LIF-HPT-2, LIF-HPT-3, LIF-HPT-7, LIF-HPT-8, LIF-HPT-15, and LIF-HPT-19, until it encountered the LPZ at approximately 41 ft bls. These UVOST®-HP borings generally show UVOST® responses from shallow depths (e.g., 10 to 15 ft bls) to the LPZ. Upon encountering the LPZ, the data indicate that the LNAPL spread laterally near the top of and within the LPZ. The UVOST®-HP borings that were drilled near or outside the perimeter of the former rag pit area (LIF-HPT-4, LIF-HPT-5, LIF-HPT-6, LIF-HPT-9, LIF-HPT-10, LIF-HPT-11, LIF-HPT-13, LIF-HPT-14a, LIF-HPT-16, LIF-HPT-17b, LIF-HPT-18, LIF-HPT-21, and LIF-HPT-22) indicate that LNAPL is generally limited to the top of or within the LPZ (i.e., responses generally deeper than 40 ft bls) and provide lateral bounding information for where the LNAPL migrated vertically.

As discussed in Section 2.1, the pre-mobilization bench test indicated that the UVOST® was sensitive to a small amount of NAPL (the low emulation UVOST® response was 89.5% RE) (see **Appendix C**). One-half of this response, approximately 45%, was used as a conservative indicator of LNAPL that may be present at higher saturations. When used in combination with the other lines of evidence, areas where potentially mobile LNAPL may exist can be inferred. **Figure 6** shows the distribution of UVOST® responses above 45% RE below a depth of 43 ft bls along with the updated distribution of TVOCs in soil below 30 ft bls. The distribution of UVOST® responses above 45% RE below a depth of 43 ft bls were observed to occur within the area where TVOCs are present above 10 mg/kg, which have been used to define the extent of the upcoming VOC source area remedy.

As discussed previously, multiple lines of evidence were reviewed to evaluate the data (i.e., UVOST®, laboratory analytical data, PID screening, and visual observations). The soil samples containing the highest TVOC concentrations (2,500 to 6,600 mg/kg) (see **Table 2**) generally exhibited the highest PID readings (3,477 to 15,000 ppm) (PID readings provided in **Appendix A**). Similarly, LNAPL was visually observed (within the LPZ) in the soil sample (see **Appendix D**) containing the highest TVOC concentration (LIF-HPT-19SB [43-45 ft]). The soil cores that were used for UVOST® field testing (Phase II soil core UVOST® ex-situ field testing) exhibited a range of UVOST® responses that are likely a function of soil heterogeneities. A specific concentration of petroleum hydrocarbon compounds in sandy soils generally yields a correspondingly higher fluorescence response than an equivalent concentration in clay-rich soils (Bujewski and Rutherford 1997). Fine-grained soil, especially clay, can “hide” the NAPL from the laser/optics, causing up to a factor of 10 reduction of fluorescence response in clays than in sand/gravel (St. Germain 2011).

LNAPL and/or a sheen were observed in the soil cores collected from Phase II soil borings LIF-HPT-8SB, LIF-HPT-15SB, LIF-HPT-18SB, and LIF-HPT-19SB at depths ranging from approximately 38.5 to 46 ft bls (**Appendix A**). The UVOST® responses for Phase I borings at the above locations represent some of the highest responses observed (ranging from 88% RE to 168% RE at depths ranging from approximately 39 to 44 ft bls). Overall, the visually observed LNAPL and highest Phase I UVOST® readings were generally found within or immediately near the estimated limit of the former rag pit area boundary. The non-linear response of UVOST® to progressively higher levels of NAPL pore saturation during the pre-mobilization bench test UVOST® emulation indicates there is limited ability to infer the relative degree of NAPL pore saturation from the UVOST® data at the Park. However, larger %RE signals likely represent higher saturation than small 2-3%RE signals (see **Appendix C**).

3.2.2 UVOST® Waveform Analysis

Waveform analysis involves examination of the overall shape of the four UVOST® fluorescence channels or "peaks" – the height (intensity) and width (lifetime) of the peaks. The waveform analysis is described in the DTI report (**Appendix C**). Waveform analysis of the UVOST® data suggests that the LNAPL is relatively uniform chemically amongst the different locations based on the clustering diagram for the waveforms (relatively compact clustering [see **Appendix C**]), is in varying degrees of weathering, and is similar to the LNAPL that is present in Piezometer I-4-PZ (the dominant waveform observed for the in-situ data is similar to the Piezometer I-4-PZ LNAPL waveform). The UVOST® data suggest that LNAPL in the unsaturated zone soil, above the LPZ, is likely more weathered, while the LNAPL within the LPZ is likely less weathered.

3.3 HP Results

The LPZ was encountered in all HP borings that were drilled during the Phase I activities, indicating that the LPZ is continuous throughout the investigation area. In all HP data, there is an increase in pressure and a decrease in flow when reaching the LPZ, which is characteristic of a transition from a higher to a lower permeability zone (see **Appendix C**). The HP data also indicate that there are seams of more permeable soil (e.g., sand) within the LPZ (interbedding) as evidenced by an increase in flow and a decrease in pressure over relatively small vertical intervals.

The upper surface of the LPZ was encountered in HP borings at depths ranging from approximately 39 to 44 ft bls. EVS was used to map the LPZ surface using the 2018 HP data (**Figure 7**). The thickness of the LPZ could not be determined via the HP borings due to refusal at depths of approximately 50 ft bls.

Figure 8 shows a vertical side view of the upper surface of the LPZ along with the updated distribution of TVOCs in soil below 30 ft bls and the distribution of UVOST® responses above 45% RE (i.e., the conservative indicator of LNAPL that may be present at higher saturations) below a depth of 43 ft bls. As discussed in Section 3.1 and shown on **Figure 8**, the highest TVOC concentrations were generally detected in the vertical interval from approximately 43 to 48 ft bls (within the LPZ). As discussed in Section 3.2.1 and shown on **Figure 8**, LNAPL has penetrated into the LPZ in some areas.

The Phase II and III soil boring soil core observations corroborated the Remedial Investigation (RI) and pre-design findings. The unsaturated soil above the LPZ primarily consists of fine to coarse sand and pebbles. The LPZ was previously identified during the RI as consisting predominantly of clay with thin seams of silt and sand. The Phase II and III soil boring soil core observations indicate that the LPZ primarily consists of high plasticity, moist clay, mixed with trace sand and silt. At some locations, the clay is also interbedded with thin seams of very fine sand, which is consistent with observations made during prior investigations.

3.4 Additional Analytical Parameter Results

In accordance with the Work Plan, soil samples from Phase II, III and IV soil borings were also analyzed for SVOCs, PCBs, TPH GRO, TPH DRO, TPH ORO, and 1,4-dioxane. As discussed previously, soil samples were collected from depths greater than 25 ft bls. The potential effect of these constituents on the remedy will be evaluated in the pending revised Remedial Action Work Plan. **Tables 2 and 3** provide the additional analytical results. The following ranges of concentrations were detected:

1. TPH concentrations (sum of TPH GRO, TPH DRO, and TPH ORO) range from not detected to 13,369 mg/kg.
2. Total PCB concentrations range from not detected to 12.04 mg/kg.
3. 1,4-dioxane concentrations range from not detected to 120 micrograms per kilogram (µg/kg).
4. Total SVOC concentrations range from not detected to 3,048 µg/kg.

4 REFINED CONCEPTUAL SITE MODEL

A conceptual site model (CSM) was presented in the RI Report (Arcadis 2011) and indicated that concentrations of VOCs in soil in the southwest Park region increased with increasing depth below land surface, with the highest concentrations immediately above and within the LPZ. The area referred to as the former rag pit area is located in the southwest Park region. The RI Report documented that approximately 3 inches of LNAPL was observed in Piezometer I-4-PZ (located within the former rag pit area) in July 2007. Further, the CSM indicated that the LPZ and perched water contained most of the VOC mass above the water table.

Based on the 2018 data, the CSM was refined to reflect the distribution and extent of LNAPL and its relationship to the known area of VOC-impacted soil. The LNAPL migrated vertically within the former rag pit area through the underlying unsaturated zone to the LPZ and perched water. The LNAPL then spread laterally near the top of and within the LPZ. The LNAPL detected via the UVOST® responses in the unsaturated zone above the perched water is residual (i.e., immobile) LNAPL that does not have the ability to migrate under present ambient conditions and will not flow into a well.

The fluid-level gauging data collected from Piezometer I-4-PZ in 2018 indicated that mobile LNAPL exists within the LPZ. The depth-to-water (perched water) in Piezometer I-4-PZ (screened interval from 38 to 48 ft bls) in July 2007 was approximately 43 ft bls, which is consistent with the depth of the air/LNAPL interface (depth to the top of the in-well LNAPL) in this piezometer in 2018. The fluid-level gauging data collected in July 2007 (depth to water of approximately 43.5 ft bls) and between March and October 2018 (the depth of the air/LNAPL interface ranging from approximately 42.5 to 43.5 ft bls) in Piezometer I-4-PZ suggests that the perched water elevation was relatively constant during this period and suggests that there has not been vertical redistribution of the LNAPL in the perched water zone in the Piezometer I-4-PZ area over time.

The analytical data for the LNAPL sample collected from Piezometer I-4-PZ in May 2018 indicate that the LNAPL contains VOCs including, but not limited to, trichloroethene, cis-1,2-dichloroethene, vinyl chloride, toluene, ethylbenzene, and xylenes; these constituents were also the primary constituents found in soil in the former rag pit area. Furthermore, the highest TVOC concentrations in soil were generally detected in the vertical interval from approximately 43 to 48 ft bls (within the LPZ), which coincides with the portion of the Piezometer I-4-PZ screen interval in which LNAPL was observed.

Higher UVOST® responses below the top of the perched water zone (approximately 43 ft bls) are interpreted as potentially mobile LNAPL (i.e., LNAPL may be able flow into a well) but without the ability to migrate under present ambient conditions. The 2018 data (i.e., UVOST®, analytical, and visual observations) suggests that the potentially mobile LNAPL appears to be limited to isolated areas within the extent of TVOCs above 10 mg/kg and in the LPZ.

Based on the LNAPL investigation and historical investigation data, the extent of LNAPL has been defined. The laboratory analytical data are the primary line of evidence to support the upcoming remedial action to address VOCs in deep soil at the Park.

5 CONCLUSIONS

The following conclusions are made based on the data provided in this Report:

1. The extent and distribution of LNAPL were defined.
2. Pre-design investigations performed between 2014 and 2017, along with the investigation work performed in 2018, have delineated TVOC concentrations in soil above 10 mg/kg with limited exceptions. Additional borings will be advanced during installation of the upcoming thermal remedy treatment wells to refine delineation of TVOCs near borings nG-6-18 and LPZ-5.
3. The 2018 data (i.e., UVOST®, analytical, and visual observations) suggests that the potentially mobile LNAPL appears to be limited to isolated areas within the extent of TVOCs above 10 mg/kg and in the LPZ.
4. The LPZ was determined to be continuous in the area investigated in 2018.

6 REFERENCES

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TABLES

Table 1
Summary of Soil Borings
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

BORING ID	COORDINATES [1]		BORING DEPTH (ft bls)	SOIL SAMPLING INTERVAL (ft bls)
	EASTING	NORTHING		
Phase I				
LIF-HPT-01	1126270.0245	214797.1748	42.90	NA [2]
LIF-HPT-01a	1126270.0245	214797.1748	48.58	NA [2]
LIF-HPT-02	1126273.0734	214787.5284	43.42	NA [2]
LIF-HPT-03	1126246.7400	214795.8300	48.10	NA [2]
LIF-HPT-04	1126247.7947	214809.6463	49.04	NA [2]
LIF-HPT-05	1126275.8986	214807.9680	45.83	NA [2]
LIF-HPT-06	1126294.8836	214797.9461	47.79	NA [2]
LIF-HPT-07	1126277.2213	214764.1279	49.26	NA [2]
LIF-HPT-08	1126261.6648	214745.0030	46.07	NA [2]
LIF-HPT-09	1126212.4122	214790.3408	48.06	NA [2]
LIF-HPT-10	1126217.1200	214821.8100	46.10	NA [2]
LIF-HPT-11	1126248.0686	214826.6926	47.06	NA [2]
LIF-HPT-12	1126287.6980	214822.1238	45.04	NA [2]
LIF-HPT-13	1126315.6074	214799.2798	45.04	NA [2]
LIF-HPT-14a	1126311.5200	214769.9500	46.14	NA [2]
LIF-HPT-15	1126298.2680	214740.5791	46.07	NA [2]
LIF-HPT-16	1126291.0733	214712.0062	45.09	NA [2]
LIF-HPT-17b	1126245.6696	214723.0988	48.68	NA [2]
LIF-HPT-18	1126218.2680	214751.1303	50.97	NA [2]
LIF-HPT-19	1126259.2129	214775.9334	48.44	NA [2]
LIF-HPT-20	1126344.7247	214725.1460	44.87	NA [2]
LIF-HPT-20a	1126344.7247	214725.1460	49.09	NA [2]
LIF-HPT-21	1126204.9600	214722.5500	49.79	NA [2]
LIF-HPT-22	1126198.5042	214742.8626	50.79	NA [2]
Phase II [5]				
LIF-HPT-1SB [3]	1126270.0245	214797.1748	50	25-27, 30-32, 40-42, 42-44, 44-46, 46-48, 48-50
LIF-HPT-2SB (LPZ-1) [3]	1126273.0734	214787.5284	40	25-27, 30-32, 35-37, 38-40
LIF-HPT-3SB [4]	1126246.7400	214795.8300	48	36-38, 41-43, 46-48
LIF-HPT-5SB [4]	1126275.8986	214807.9680	45	40-42, 42-44
LIF-HPT-7SB [4]	1126277.2213	214764.1279	47.5	36.5-38.5, 41-43, 45.5-47.5
LIF-HPT-8SB [4]	1126261.6648	214745.0030	47	40-42, 45-47
LIF-HPT-15SB [3]	1126298.2680	214740.5791	49	31-33, 38-40, 42-44, 45-47, 47-49
LIF-HPT-17SB (LPZ-4) [4]	1126245.6696	214723.0988	45	36.5-38.5, 41-43
LIF-HPT-18SB (LPZ-3) [4]	1126218.2680	214751.1303	50	43-45, 45-47
LIF-HPT-19SB (LPZ-2) [4]	1126259.2129	214775.9334	45	43-45

See footnotes on last page.

Table 1
Summary of Soil Borings
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

BORING ID	COORDINATES [1]		BORING DEPTH (ft bls)	SOIL SAMPLING INTERVAL (ft bls)
	EASTING	NORTHING		
Phase III [5]				
LPZ-5 [3]	1126321.8326	214817.3946	44.5	40-42
Phase IV [5]				
G-5-18	1126118.6000	214875.2300	50	46-48, 48-50
I-7-18	1126157.5637	214829.1028	50	46-48, 48-50
J-5-18	1126192.4400	214871.1800	50	46-48, 48-50
K-8-18	1126194.8361	214804.3890	48	42-44, 44-46, 46-48
nG-6-18	1126118.1700	214849.1200	50	46-48, 48-50
nK-11-18	1126186.3888	214735.4353	48	42-44, 44-46, 46-48
nS-8-18	1126342.9910	214796.5396	52	48-50, 50-52

Notes and Abbreviations:
1. Coordinates refer to New York State Plane Coordinate System, Long Island Zone, North American Datum of 1983 (NAD 83).
2. Borings were drilled using UVOST® and HP investigation techniques and soil cores were not collected.
3. Continuous soil cores were collected from 5 ft bls to the bottom of the boring.
4. Continuous soil cores were collected from 35 ft bls to the bottom of the boring.
5. Soil boring logs are provided in Appendix A.

ft bls feet below land surface
NA Not applicable
UVOST® Ultra-violet optical screening tool
HP Hydraulic profiling

Table 2
Concentrations of Constituents in Phase II and Phase III Soil Samples
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

	Location ID:	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-2SB	LIF-HPT-2SB	LIF-HPT-2SB	LIF-HPT-2SB
	Sample ID:	LIF-HPT-1SB (25-27)	LIF-HPT-1SB (30-32)	LIF-HPT-1SB (40-42)	LIF-HPT-1SB (42-44)	LIF-HPT-1SB (44-46)	LIF-HPT-1SB (46-48)	LIF-HPT-1SB (48-50)	LIF-HPT-2SB (25-27)	LIF-HPT-2SB (30-32)	LIF-HPT-2SB (35-37)	LIF-HPT-2SB (38-40)
	Sample Date:	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018
Constituents	Sample Depth (ft bls):	25-27	30-32	40-42	42-44	44-46	46-48	48-50	25-27	30-32	35-37	38-40
VOCs (ug/kg)												
1,1,1-Trichloroethane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
1,1,2,2-Tetrachloroethane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
1,1,2-trichloro-1,2,2-trifluoroethane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
1,1,2-Trichloroethane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
1,1-Dichloroethane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
1,1-Dichloroethene		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
1,2,4-Trichlorobenzene		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
1,2-Dibromo-3-chloropropane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
1,2-Dibromoethane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
1,2-Dichlorobenzene		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
1,2-Dichloroethane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
1,2-Dichloropropane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
1,3-Dichlorobenzene		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
1,4-Dichlorobenzene		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
2-Butanone (MEK)		**4.5**	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
4-Methyl-2-Pentanone		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Acetone		**45.3**	**8.8**	< 153	< 56.1	< 7720	< 7280	< 106	**17.9**	**9.3**	**4.0**	< 768
Benzene		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Bromodichloromethane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Bromoform		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Bromomethane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Carbon Disulfide		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Carbon Tetrachloride		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
CFC-11		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
CFC-12		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Chlorobenzene		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Chlorodibromomethane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Chloroethane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Chloroform		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Chloromethane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
cis-1,2-Dichloroethene		< 2.3	< 2.0	< 153	< 56.1	**42800**	< 7280	< 106	< 1.8	< 1.2	**8.2**	**1360**
cis-1,3-Dichloropropene		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Cyclohexane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Dichloromethane		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	**4.0**	< 1.2	< 2.8	< 768
Ethylbenzene		< 2.3	< 2.0	**3330**	**1240**	**47500**	**49100**	**3070**	< 1.8	< 1.2	**4.5**	**6110**
Isopropylbenzene		< 2.3	< 2.0	**1760**	**144**	< 7720	< 7280	**428**	< 1.8	< 1.2	< 2.8	< 768
m&p-Xylenes		< 4.5	< 4.1	< 306	**3500**	**153000**	**149000**	**11100**	< 3.7	< 2.4	**6.0**	**20600**
Methyl Acetate		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Methyl N-Butyl Ketone (2-Hexanone)		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Methylcyclohexane		< 2.3	< 2.0	**2700**	**2900**	**31700**	**40100**	**577**	< 1.8	**2.7**	< 2.8	**9420**
Methyl-tert-butylether		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
o-Xylene		< 2.3	< 2.0	< 153	**1230**	**49200**	**58600**	**4910**	< 1.8	< 1.2	**3.1**	**7850**
Styrene (Monomer)		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Tetrachloroethene		--	--	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Toluene		< 2.3	< 2.0	< 153	**20900**	**426000**	**1480000**	**18900**	< 1.8	< 1.2	**21.2**	**53000**

See footnotes on last page.

Table 2
Concentrations of Constituents in Phase II and Phase III Soil Samples
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

	Location ID:	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-2SB	LIF-HPT-2SB	LIF-HPT-2SB	LIF-HPT-2SB
	Sample ID:	LIF-HPT-1SB (25-27)	LIF-HPT-1SB (30-32)	LIF-HPT-1SB (40-42)	LIF-HPT-1SB (42-44)	LIF-HPT-1SB (44-46)	LIF-HPT-1SB (46-48)	LIF-HPT-1SB (48-50)	LIF-HPT-2SB (25-27)	LIF-HPT-2SB (30-32)	LIF-HPT-2SB (35-37)	LIF-HPT-2SB (38-40)
	Sample Date:	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018
Constituents	Sample Depth (ft bls):	25-27	30-32	40-42	42-44	44-46	46-48	48-50	25-27	30-32	35-37	38-40
trans-1,2-Dichloroethene		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
trans-1,3-Dichloropropene		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Trichloroethene		< 2.3	< 2.0	< 153	< 56.1	< 7720	< 7280	< 106	< 1.8	< 1.2	**10.5**	< 768
Vinyl chloride		< 2.3	< 2.0	< 153	**440**	< 7720	< 7280	< 106	< 1.8	< 1.2	< 2.8	< 768
Total VOCs		**50**	**8.8**	**7800**	**30000**	**750000**	**1800000**	**39000**	**22**	**12**	**58**	**98000**
PCBs (ug/kg)												
Aroclor 1016		< 33.6	< 38.7	< 186	< 73.0	< 38.9	< 38.9	< 108	< 69.6	< 35.1	< 38.8	< 33.7
Aroclor 1221		< 68.1	< 78.5	< 377	< 148	< 78.9	< 79.0	< 219	< 141	< 71.3	< 78.9	< 68.4
Aroclor 1232		< 33.6	< 38.7	< 186	< 73.0	< 38.9	< 38.9	< 108	< 69.6	< 35.1	< 38.8	< 33.7
Aroclor 1242		< 33.6	< 38.7	**1250**	**578**	**226**	**279**	**780**	**564**	**189**	< 38.8	< 33.7
Aroclor 1248		< 33.6	< 38.7	< 186	< 73.0	< 38.9	< 38.9	< 108	< 69.6	< 35.1	< 38.8	< 33.7
Aroclor 1254		**34.5**	< 38.7	**1680**	**727**	**288**	**392**	**964**	**677**	**309**	< 38.8	< 33.7
Aroclor 1260		< 33.6	< 38.7	< 186	< 73.0	< 38.9	< 38.9	< 108	< 69.6	< 35.1	< 38.8	< 33.7
Aroclor 1262		--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268		--	--	--	--	--	--	--	--	--	--	--
Total PCBs		**34.5**	0	**2930**	**1305**	**514**	**671**	**1744**	**1241**	**498**	0	0
1,4-Dioxane (ug/kg)												
1,4-Dioxane		< 88	< 93	< 110	< 110	< 110	< 120	< 110	< 98	< 100	< 110	< 120
SVOCs (ug/kg)												
1,1-Biphenyl		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
1,2,4-Trichlorobenzene		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
1,2-Dichlorobenzene		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
1,3-Dichlorobenzene		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
1,4-Dichlorobenzene		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
2,2-Oxybis(1-Chloropropane)		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
2,4,5-Trichlorophenol		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
2,4,6-Trichlorophenol		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
2,4-Dichlorophenol		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
2,4-Dimethylphenol		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
2,4-Dinitrophenol		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
2,4-Dinitrotoluene		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
2,6-Dinitrotoluene		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
2-Chloronaphthalene		< 67.5	< 67.1	< 74.1	< 38.2	< 75.4	< 40.2	< 42.0	< 168	< 170	< 38.7	< 38.2
2-Chlorophenol		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
2-Methyl-4,6-dinitrophenol		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
2-Methylnaphthalene		< 67.5	< 67.1	< 74.1	**114**	**255**	**213**	**183**	< 168	< 170	< 38.7	< 38.2
2-Methylphenol		< 681	< 677	< 747	< 386	< 761	**255 J**	< 424	< 1710	< 1720	< 391	**15.6 J**
2-Nitroaniline		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
2-Nitrophenol		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
3,3-Dichlorobenzidine		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
3-Methylphenol, 4-Methylphenol		< 681	< 677	< 747	< 386	< 761	**284 J**	< 424	< 1710	< 1720	< 391	**11.6 J**
3-Nitroaniline		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
4-Bromophenyl phenyl ether		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
4-Chloro-3-Methylphenol		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
4-Chlorophenyl phenyl ether		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
4-Nitroaniline		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
4-Nitrophenol		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Acenaphthene		< 67.5	< 67.1	< 74.1	< 38.2	< 75.4	< 40.2	< 42.0	< 168	< 170	< 38.7	< 38.2

See footnotes on last page.

Table 2
Concentrations of Constituents in Phase II and Phase III Soil Samples
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

	Location ID:	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-1SB	LIF-HPT-2SB	LIF-HPT-2SB	LIF-HPT-2SB	LIF-HPT-2SB
	Sample ID:	LIF-HPT-1SB (25-27)	LIF-HPT-1SB (30-32)	LIF-HPT-1SB (40-42)	LIF-HPT-1SB (42-44)	LIF-HPT-1SB (44-46)	LIF-HPT-1SB (46-48)	LIF-HPT-1SB (48-50)	LIF-HPT-2SB (25-27)	LIF-HPT-2SB (30-32)	LIF-HPT-2SB (35-37)	LIF-HPT-2SB (38-40)
	Sample Date:	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/29/2018	8/30/2018	8/30/2018	8/30/2018	8/30/2018
Constituents	Sample Depth (ft bls):	25-27	30-32	40-42	42-44	44-46	46-48	48-50	25-27	30-32	35-37	38-40
Acenaphthylene		< 67.5	< 67.1	< 74.1	< 38.2	< 75.4	< 40.2	< 42.0	< 168	< 170	< 38.7	< 38.2
Acetophenone		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Anthracene		< 67.5	< 67.1	< 74.1	< 38.2	< 75.4	< 40.2	< 42.0	< 168	< 170	< 38.7	< 38.2
Atrazine		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Azobenzene		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Benz(a)anthracene		< 67.5	< 67.1	< 74.1	< 38.2	< 75.4	< 40.2	< 42.0	< 168	< 170	< 38.7	< 38.2
Benzaldehyde		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Benzidine		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Benzo(a)pyrene		< 67.5	< 67.1	< 74.1	< 38.2	< 75.4	< 40.2	< 42.0	< 337	< 170	< 38.7	< 38.2
Benzo(b)fluoranthene		< 67.5	< 67.1	< 74.1	< 38.2	< 75.4	< 40.2	< 42.0	< 337	< 170	< 38.7	< 38.2
Benzo(g,h,i)perylene		< 67.5	< 67.1	< 74.1	< 38.2	< 75.4	< 40.2	< 42.0	< 337	< 170	< 38.7	< 38.2
Benzo(k)fluoranthene		< 67.5	< 67.1	< 74.1	< 38.2	< 75.4	< 40.2	< 42.0	< 337	< 170	< 38.7	< 38.2
Benzyl Alcohol		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
bis(2-Chloroethoxy)methane		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
bis(2-Chloroethyl)ether		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
bis(2-Ethylhexyl)phthalate		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	**33.2 J**	**22.6 J**
Butyl benzyl phthalate		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Caprolactam		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Carbazole		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Chrysene		< 67.5	< 67.1	< 74.1	< 38.2	< 75.4	< 40.2	< 42.0	< 168	< 170	< 38.7	< 38.2
Dibenz(a,h)anthracene		< 33.8	< 33.5	< 37.0	< 38.2	< 37.7	< 40.2	< 42.0	< 337	< 170	< 38.7	< 38.2
Dibenzofuran		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Diethyl phthalate		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Dimethyl phthalate		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Di-n-butyl phthalate		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Di-n-octyl phthalate		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Fluoranthene		< 67.5	< 67.1	< 74.1	< 38.2	< 75.4	< 40.2	< 42.0	< 168	< 170	< 38.7	< 38.2
Fluorene		< 67.5	< 67.1	< 74.1	< 38.2	< 75.4	< 40.2	< 42.0	< 168	< 170	< 38.7	< 38.2
Hexachloro-1,3-butadiene		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Hexachlorobenzene		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Hexachlorocyclopentadiene		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Hexachloroethane		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Indeno(1,2,3-cd)pyrene		< 33.8	< 33.5	< 37.0	< 38.2	< 37.7	< 40.2	< 42.0	< 337	< 170	< 38.7	< 38.2
Isophorone		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Naphthalene		< 67.5	< 67.1	< 74.1	< 38.2	**257**	**213**	**171**	< 168	< 170	< 38.7	< 38.2
Nitrobenzene		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
N-Nitrosodimethylamine		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
N-Nitrosodi-n-propylamine		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
N-Nitrosodiphenylamine		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
p-Chloroaniline		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Pentachlorophenol		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Phenanthrene		< 67.5	< 67.1	< 74.1	**93.6**	**216**	**135**	**159**	< 168	< 170	< 38.7	**7.93 J**
Phenol		< 681	< 677	< 747	< 386	< 761	< 406	< 424	< 1710	< 1720	< 391	< 386
Pyrene		< 67.5	< 67.1	< 74.1	< 38.2	< 75.4	< 40.2	< 42.0	< 168	< 170	< 38.7	< 38.2
TPH (ug/kg)												
TPH GRO (C6-C10)		< 132	< 102	**50500**	**510000**	**671000**	**1230000**	**56000**	**172**	**211**	< 117	**371**
TPH DRO (C10-C28)		**1280000**	**1100000**	**6400000**	**822000**	**892000**	**382000**	**363000**	**2160000**	**1930000**	< 4690	**9070**
TPH ORO (C28-C40)		**725000**	**695000**	**2410000**	**264000**	**293000**	**134000**	**153000**	**1500000**	**1430000**	**697 J**	**3100 J**
Total Petroleum Hydrocarbons		**2005000**	**1795000**	**8860500**	**1596000**	**1856000**	**1746000**	**572000**	**3660172**	**3360211**	**697**	**12541**

See footnotes on last page.

Table 2
Concentrations of Constituents in Phase II and Phase III Soil Samples
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

	Location ID:	LIF-HPT-3SB	LIF-HPT-3SB	LIF-HPT-3SB	LIF-HPT-5SB	LIF-HPT-5SB	LIF-HPT-7SB	LIF-HPT-7SB	LIF-HPT-7SB	LIF-HPT-7SB	LIF-HPT-8SB	LIF-HPT-8SB
	Sample ID:	LIF-HPT-3SB (36-38)	LIF-HPT-3SB (41-43)	LIF-HPT-3SB (46-48)	LIF-HPT-5SB (40-42)	LIF-HPT-5SB (42-44)	LIF-HPT-7SB (36.5-38.5)	LIF-HPT-7SB (41-43)	REP090718MM1	LIF-HPT-7SB (45.5-47.5)	LIF-HPT-8SB (40-42)	LIF-HPT-8SB (45-47)
	Sample Date:	9/12/2018	9/12/2018	9/12/2018	9/7/2018	9/7/2018	9/7/2018	9/7/2018	9/7/2018	9/7/2018	9/10/2018	9/10/2018
Constituents	Sample Depth (ft bls):	36-38	41-43	46-48	40-42	42-44	36.5-38.5	41-43	41-43	45.5-47.5	40-42	45-47
VOCs (ug/kg)												
1,1,1-Trichloroethane		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	**1480**	< 502	**7240**	< 111	< 6470
1,1,2,2-Tetrachloroethane		< 67.7	< 71.8	< 1.1 J	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
1,1,2-trichloro-1,2,2-trifluoroethane		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
1,1,2-Trichloroethane		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
1,1-Dichloroethane		< 67.7	< 71.8	**2.5**	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
1,1-Dichloroethene		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
1,2,4-Trichlorobenzene		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
1,2-Dibromo-3-chloropropane		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
1,2-Dibromoethane		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
1,2-Dichlorobenzene		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
1,2-Dichloroethane		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
1,2-Dichloropropane		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
1,3-Dichlorobenzene		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
1,4-Dichlorobenzene		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
2-Butanone (MEK)		< 67.7	< 71.8 J	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
4-Methyl-2-Pentanone		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Acetone		< 67.7	< 71.8	**1.5 J**	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Benzene		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Bromodichloromethane		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Bromoform		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Bromomethane		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Carbon Disulfide		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Carbon Tetrachloride		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
CFC-11		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
CFC-12		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Chlorobenzene		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Chlorodibromomethane		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Chloroethane		< 67.7 J	< 71.8 J	< 1.1	< 63.0 J	< 596 J	< 100 J	< 564 J	< 502 J	< 927 J	< 111	< 6470
Chloroform		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Chloromethane		< 67.7 J	< 71.8 J	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
cis-1,2-Dichloroethene		< 67.7	**10900 D**	**460 EJ**	< 63.0	< 596	< 100	**5280 J**	**2830 J**	**107000 D**	**465**	**26100**
cis-1,3-Dichloropropene		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Cyclohexane		< 67.7	< 71.8	< 1.1	< 63.0	**1190**	< 100	< 564	< 502	**2550**	< 111	< 6470
Dichloromethane		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Ethylbenzene		**111**	**166**	**25.2**	< 63.0	**12100**	**17700 D**	**3710**	**667**	**79500**	**313**	**62600**
Isopropylbenzene		< 67.7	< 71.8	< 1.1	< 63.0	**1450**	**816**	< 564	< 502	**5230**	< 111	< 6470
m&p-Xylenes		**163**	**524**	**68.0**	**203**	**36100**	**64400 D**	**12400 J**	**2140 J**	**327000 D**	**1350**	**202000**
Methyl Acetate		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Methyl N-Butyl Ketone (2-Hexanone)		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Methylcyclohexane		**171**	< 71.8	**9.9**	**138**	**17800**	**3430**	**2930 J**	< 502 J	**42700**	< 111	**45700**
Methyl-tert-butylether		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
o-Xylene		< 67.7	**188**	**28.8**	**86.2**	**12600**	**15200 D**	**4560 J**	**832 J**	**92000**	**470**	**74000**
Styrene (Monomer)		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Tetrachloroethene		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	**1480**	< 502	**1120**	< 111	**7760**
Toluene		< 67.7	**5310 J**	**292 EJ**	**253**	**94400 D**	**548**	**114000 DJ**	**21600 J**	**1840000 D**	**4620**	**2140000**

See footnotes on last page.

Table 2
Concentrations of Constituents in Phase II and Phase III Soil Samples
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

	Location ID:	LIF-HPT-3SB	LIF-HPT-3SB	LIF-HPT-3SB	LIF-HPT-5SB	LIF-HPT-5SB	LIF-HPT-7SB	LIF-HPT-7SB	LIF-HPT-7SB	LIF-HPT-7SB	LIF-HPT-8SB	LIF-HPT-8SB
	Sample ID:	LIF-HPT-3SB (36-38)	LIF-HPT-3SB (41-43)	LIF-HPT-3SB (46-48)	LIF-HPT-5SB (40-42)	LIF-HPT-5SB (42-44)	LIF-HPT-7SB (36.5-38.5)	LIF-HPT-7SB (41-43)	REP090718MM1	LIF-HPT-7SB (45.5-47.5)	LIF-HPT-8SB (40-42)	LIF-HPT-8SB (45-47)
	Sample Date:	9/12/2018	9/12/2018	9/12/2018	9/7/2018	9/7/2018	9/7/2018	9/7/2018	9/7/2018	9/7/2018	9/10/2018	9/10/2018
Constituents	Sample Depth (ft bls):	36-38	41-43	46-48	40-42	42-44	36.5-38.5	41-43	41-43	45.5-47.5	40-42	45-47
trans-1,2-Dichloroethene		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
trans-1,3-Dichloropropene		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Trichloroethene		< 67.7	< 71.8	< 1.1	< 63.0	< 596	< 100	**248000 DJ**	**42700 J**	< 927	< 111	**347000**
Vinyl chloride		< 67.7	**523**	**205 EJ**	< 63.0	< 596	< 100	< 564	< 502	< 927	< 111	< 6470
Total VOCs		**450**	**18000**	**1100**	**680**	**180000**	**100000**	**390000**	**71000**	**2500000**	**7200**	**2900000**
PCBs (ug/kg)												
Aroclor 1016		< 35.5	< 39.9	< 37.8	< 38.0	< 37.2	< 706	< 39.3	< 38.6	< 113	< 39.7	< 199
Aroclor 1221		< 72.1	< 81.0	< 76.7	< 77.1	< 75.5	< 1430	< 79.8	< 78.3	< 229	< 80.6	< 404
Aroclor 1232		< 35.5	< 39.9	< 37.8	< 38.0	< 37.2	< 706	< 39.3	< 38.6	< 113	< 39.7	< 199
Aroclor 1242		**259**	**438**	< 37.8	**115**	**291**	**3400**	**43.2 J**	**292 J**	**708**	< 39.7	**988**
Aroclor 1248		< 35.5	< 39.9	< 37.8	< 38.0	< 37.2	< 706	< 39.3	< 38.6	< 113	< 39.7	< 199
Aroclor 1254		**435**	**594**	< 37.8	**147**	**369**	**4380**	< 39.3 J	**235 J**	**864**	< 39.7	**1240**
Aroclor 1260		< 35.5	< 39.9	< 37.8	< 38.0	< 37.2	< 706	< 39.3	< 38.6	< 113	< 39.7	< 199
Aroclor 1262		--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268		--	--	--	--	--	--	--	--	--	--	--
Total PCBs		**694**	**1032**	0	**262**	**660**	**7780**	**43.2**	**527**	**1572**	0	**2228**
1,4-Dioxane (ug/kg)												
1,4-Dioxane		< 120	< 110	< 93	< 110	< 110	< 100	**2.2 J**	**3.0 J**	< 110	**4.2 J**	< 120
SVOCs (ug/kg)												
1,1-Biphenyl		< 815	< 812	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
1,2,4-Trichlorobenzene		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
1,2-Dichlorobenzene		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
1,3-Dichlorobenzene		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
1,4-Dichlorobenzene		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
2,2-Oxybis(1-Chloropropane)		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
2,4,5-Trichlorophenol		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500 J	< 397	< 834
2,4,6-Trichlorophenol		< 815	< 812	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
2,4-Dichlorophenol		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500 J	< 397	< 834
2,4-Dimethylphenol		< 815 J	< 812 J	< 404 J	< 382	< 393	< 722	< 396	< 400	< 19500 J	< 397	< 834
2,4-Dinitrophenol		< 815	< 812	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
2,4-Dinitrotoluene		< 815	< 812 J	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
2,6-Dinitrotoluene		< 815	< 812 J	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
2-Chloronaphthalene		< 80.7	< 80.5	< 40.0	< 37.9	< 38.9	< 71.6	< 39.2	< 39.6	< 1920	< 39.4	< 82.6
2-Chlorophenol		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500 J	< 397	< 834
2-Methyl-4,6-dinitrophenol		< 815	< 812	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
2-Methylnaphthalene		**66.5 J**	**311 J**	< 40.0	**141**	**51.7**	**196**	< 39.2	**20.3 J**	< 1920	< 39.4	**81.2 J**
2-Methylphenol		< 815	< 812	< 404	**98.2 J**	**39.3 J**	< 722	**26.7 J**	< 400	< 19500 J	< 397	**104 J**
2-Nitroaniline		< 815	< 812	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
2-Nitrophenol		< 815	< 812 J	< 404	< 382	< 393	< 722	< 396	< 400	< 19500 J	< 397	< 834
3,3-Dichlorobenzidine		< 815	< 812	< 404	< 382	< 393	< 3610	< 396	< 400	< 19500	< 397	< 834
3-Methylphenol, 4-Methylphenol		< 815	< 812	< 404	**118 J**	**33.6 J**	< 722	**26.7 J**	< 400	< 19500 J	**10.9 J**	**120 J**
3-Nitroaniline		< 815	< 812	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
4-Bromophenyl phenyl ether		< 815	< 812 J	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
4-Chloro-3-Methylphenol		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500 J	< 397	< 834
4-Chlorophenyl phenyl ether		< 815	< 812 J	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
4-Nitroaniline		< 815	< 812	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
4-Nitrophenol		< 815	< 812	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
Acenaphthene		< 80.7	< 80.5	< 40.0	< 37.9 J	< 38.9 J	< 71.6 J	< 39.2 J	< 39.6 J	< 1920 J	< 39.4	**18.8 J**

See footnotes on last page.

	Location ID:	LIF-HPT-3SB	LIF-HPT-3SB	LIF-HPT-3SB	LIF-HPT-5SB	LIF-HPT-5SB	LIF-HPT-7SB	LIF-HPT-7SB	LIF-HPT-7SB	LIF-HPT-7SB	LIF-HPT-8SB	LIF-HPT-8SB
	Sample ID:	LIF-HPT-3SB (36-38)	LIF-HPT-3SB (41-43)	LIF-HPT-3SB (46-48)	LIF-HPT-5SB (40-42)	LIF-HPT-5SB (42-44)	LIF-HPT-7SB (36.5-38.5)	LIF-HPT-7SB (41-43)	REP090718MM1	LIF-HPT-7SB (45.5-47.5)	LIF-HPT-8SB (40-42)	LIF-HPT-8SB (45-47)
	Sample Date:	9/12/2018	9/12/2018	9/12/2018	9/7/2018	9/7/2018	9/7/2018	9/7/2018	9/7/2018	9/7/2018	9/10/2018	9/10/2018
Constituents	Sample Depth (ft bls):	36-38	41-43	46-48	40-42	42-44	36.5-38.5	41-43	41-43	45.5-47.5	40-42	45-47
Acenaphthylene		< 80.7	< 80.5	< 40.0	< 37.9 J	< 38.9 J	< 71.6 J	< 39.2 J	< 39.6 J	< 1920 J	< 39.4	< 82.6
Acetophenone		< 815	< 812 J	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
Anthracene		< 80.7	< 80.5	< 40.0	< 37.9	< 38.9	< 71.6	< 39.2	< 39.6	< 1920	< 39.4	< 82.6
Atrazine		< 815	< 812	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
Azobenzene		< 815	< 812 J	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
Benz(a)anthracene		< 80.7	< 80.5	< 40.0	< 37.9	< 38.9	< 358	< 39.2	< 39.6	< 1920	< 39.4	< 82.6
Benzaldehyde		< 815	< 812 J	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
Benzidine		R	R	R	R	R	R	R	R	R	< 397	< 834
Benzo(a)pyrene		< 80.7	< 80.5	< 40.0	< 37.9 J	< 38.9 J	< 358 J	< 39.2 J	< 39.6 J	< 1920 J	< 39.4	< 82.6
Benzo(b)fluoranthene		< 80.7	< 80.5 J	< 40.0	< 37.9 J	< 38.9 J	< 358 J	< 39.2 J	< 39.6 J	< 1920 J	< 39.4	< 82.6
Benzo(g,h,i)perylene		< 80.7	< 80.5	< 40.0	< 37.9	< 38.9	< 358	< 39.2	< 39.6	< 1920	< 39.4	< 82.6
Benzo(k)fluoranthene		< 80.7	< 80.5	< 40.0	< 37.9	< 38.9	< 358	< 39.2	< 39.6	< 1920	< 39.4	< 82.6
Benzyl Alcohol		< 815 J	R	< 404 J	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
bis(2-Chloroethoxy)methane		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
bis(2-Chloroethyl)ether		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
bis(2-Ethylhexyl)phthalate		< 815	**145 J**	**19.6 J**	**63.9 J**	**45.3 J**	**724 JD**	**17.1 J**	**88.1 J**	< 19500 J	**89.2 J**	**104 J**
Butyl benzyl phthalate		< 815	R	< 404	< 382 J	< 393 J	< 3610 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
Caprolactam		< 815	< 812 J	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
Carbazole		< 815	< 812	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
Chrysene		< 80.7	< 80.5 J	< 40.0	< 37.9	< 38.9	< 358	< 39.2	< 39.6	< 1920	< 39.4	< 82.6
Dibenz(a,h)anthracene		< 80.7	< 80.5 J	< 40.0	< 37.9	< 38.9	< 358	< 39.2	< 39.6	< 1920	< 39.4	< 82.6
Dibenzofuran		< 815	< 812 J	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	**13.9 J**
Diethyl phthalate		< 815	< 812	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
Dimethyl phthalate		< 815	< 812	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
Di-n-butyl phthalate		< 815	< 812	< 404	**42.7 J**	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	**50.1 J**
Di-n-octyl phthalate		< 815	< 812 J	< 404	< 382 J	< 393 J	< 3610 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
Fluoranthene		< 80.7	< 80.5	< 40.0	< 37.9	< 38.9	< 71.6	< 39.2	< 39.6	< 1920	< 39.4	**15.9 J**
Fluorene		**63.0 J**	**83.9 J**	< 40.0	**26.6 J**	< 38.9	< 71.6	< 39.2	< 39.6	< 1920	< 39.4	**25.0 J**
Hexachloro-1,3-butadiene		< 815	< 812 J	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
Hexachlorobenzene		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
Hexachlorocyclopentadiene		< 815 J	< 812 J	< 404 J	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
Hexachloroethane		< 815	< 812 J	< 404	< 382 J	< 393 J	< 722 J	< 396	< 400 J	< 19500 J	< 397	< 834
Indeno(1,2,3-cd)pyrene		< 80.7	< 80.5 J	< 40.0	< 37.9	< 38.9	< 358	< 39.2	< 39.6	< 1920	< 39.4	< 82.6
Isophorone		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
Naphthalene		**51.3 J**	**350 J**	< 40.0	**152**	**48.0**	**245**	< 39.2	**27.8 J**	< 1920	< 39.4	**79.5 J**
Nitrobenzene		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
N-Nitrosodimethylamine		< 815 J	R	< 404 J	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
N-Nitrosodi-n-propylamine		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
N-Nitrosodiphenylamine		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500	< 397	< 834
p-Chloroaniline		< 815	R	< 404	< 382	< 393	< 722	< 396 J	< 400	< 19500	< 397	< 834
Pentachlorophenol		< 815	< 812	< 404	< 382 J	< 393 J	< 722 J	< 396 J	< 400 J	< 19500 J	< 397	< 834
Phenanthrene		**191**	**271 J**	< 40.0	**101**	**47.0**	**517**	< 39.2	**31.8 J**	< 1920	< 39.4	**91.4**
Phenol		< 815	< 812	< 404	< 382	< 393	< 722	< 396	< 400	< 19500 J	< 397	< 834
Pyrene		< 80.7	< 80.5 J	< 40.0	< 37.9	< 38.9	< 358	< 39.2	< 39.6	< 1920	< 39.4	< 82.6
TPH (ug/kg)												
TPH GRO (C6-C10)		**147000**	**22200 J**	**1500 J**	**1430**	**483000**	**389000**	**3220000 J**	**59800 J**	**374000**	**10800**	**5140000**
TPH DRO (C10-C28)		**811000**	**587000**	**5980**	**1040000 J**	**171000**	**7730000 J**	**19000 J**	**144000 J**	**3400000 J**	**2290 J**	**116000**
TPH ORO (C28-C40)		**324000 J**	**245000 J**	**2170 J**	**321000 J**	**78400**	**5250000 J**	**12200 J**	**96500 J**	**1550000 J**	**1960 J**	**71700**
Total Petroleum Hydrocarbons		**1282000**	**854200**	**9650**	**1362430**	**732400**	**13369000**	**3251200**	**300300**	**5324000**	**15050**	**5327700**

See footnotes on last page.

Table 2
Concentrations of Constituents in Phase II and Phase III Soil Samples
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

	Location ID:	LIF-HPT-15SB	LIF-HPT-15SB	LIF-HPT-15SB	LIF-HPT-15SB	LIF-HPT-15SB	LIF-HPT-17SB	LIF-HPT-17SB	LIF-HPT-18SB	LIF-HPT-18SB	LIF-HPT-19SB	LPZ-5
	Sample ID:	LIF-HPT-15SB (31-33)	LIF-HPT-15SB (38-40)	LIF-HPT-15SB (42-44)	LIF-HPT-15SB (45-47)	LIF-HPT-15SB (47-49)	LIF-HPT-17SB (36.5-38.5)	LIF-HPT-17SB (41-43)	LIF-HPT-18SB (43-45)	LIF-HPT-18SB (45-47)	LIF-HPT-19SB (43-45)	LPZ-5 (40-42)
	Sample Date:	8/31/2018	8/31/2018	8/31/2018	8/31/2018	8/31/2018	9/12/2018	9/12/2018	9/6/2018	9/6/2018	9/11/2018	9/14/2018
Constituents	Sample Depth (ft bls):	31-33	38-40	42-44	45-47	47-49	36.5-38.5	41-43	43-45	45-47	43-45	40-42
VOCs (ug/kg)												
1,1,1-Trichloroethane		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	21600 J	146
1,1,2,2-Tetrachloroethane		< 1.7	< 147	< 164	< 132	< 138	< 2.2 J	< 71.3	< 96.0	< 63.8	< 925	< 69.2
1,1,2-trichloro-1,2,2-trifluoroethane		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
1,1,2-Trichloroethane		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
1,1-Dichloroethane		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
1,1-Dichloroethene		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	1340	< 69.2
1,2,4-Trichlorobenzene		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
1,2-Dibromo-3-chloropropane		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
1,2-Dibromoethane		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
1,2-Dichlorobenzene		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
1,2-Dichloroethane		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
1,2-Dichloropropane		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
1,3-Dichlorobenzene		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
1,4-Dichlorobenzene		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
2-Butanone (MEK)		34.2	< 147	< 164	< 132	< 138	13.1	< 71.3	< 96.0	< 63.8	< 925	< 69.2
4-Methyl-2-Pentanone		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Acetone		385 EJ	< 147	< 164	291	< 138	61.0	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Benzene		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Bromodichloromethane		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Bromoform		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Bromomethane		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Carbon Disulfide		< 1.7	< 147	< 164	< 132	< 138	13.4	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Carbon Tetrachloride		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
CFC-11		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
CFC-12		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Chlorobenzene		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Chlorodibromomethane		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Chloroethane		< 1.7	< 147	< 164	< 132	< 138	< 2.2 J	< 71.3 J	< 96.0	< 63.8	< 925 J	< 69.2
Chloroform		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Chloromethane		< 1.7	< 147	< 164	< 132	< 138	< 2.2 J	< 71.3 J	< 96.0	< 63.8	< 925 J	< 69.2
cis-1,2-Dichloroethene		< 1.7	< 147	5640	522	171	< 2.2	< 71.3	< 96.0	< 63.8	151000 D	7080
cis-1,3-Dichloropropene		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Cyclohexane		< 1.7	< 147	< 164	< 132	< 138	< 2.2 J	< 71.3	223	< 63.8	2760	< 69.2
Dichloromethane		< 1.7	< 147	< 164	< 132	< 138	< 2.2 J	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Ethylbenzene		< 1.7	13700	352	< 132	8400	< 2.2	206	2720	290	91500	< 69.2
Isopropylbenzene		3.0	1510	< 164	< 132	1310	< 2.2	< 71.3	332	< 63.8	5020	< 69.2
m&p-Xylenes		< 3.5	19200	1150	< 264	37800	< 4.3	877	10200	1020	461000 D	< 138
Methyl Acetate		< 1.7	< 147	< 164	< 132	< 138	< 2.2 J	< 71.3	< 96.0	< 63.8	< 925	74.6
Methyl N-Butyl Ketone (2-Hexanone)		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Methylcyclohexane		< 1.7	2570	181	< 132	1400	< 2.2	< 71.3	3900	< 63.8	44500	< 69.2
Methyl-tert-butylether		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
o-Xylene		< 1.7	< 147	450	< 132	13000	< 2.2	297	296	401	160000 D	< 69.2
Styrene (Monomer)		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Tetrachloroethene		8.2	< 147	< 164	< 132	604	< 2.2	< 71.3	< 96.0	< 63.8	5840	< 69.2
Toluene		< 1.7	306	12100	179	23800	< 2.2	1690	316	< 63.8	3410000 D	< 69.2

See footnotes on last page.

Table 2
Concentrations of Constituents in Phase II and Phase III Soil Samples
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

	Location ID:	LIF-HPT-15SB	LIF-HPT-15SB	LIF-HPT-15SB	LIF-HPT-15SB	LIF-HPT-15SB	LIF-HPT-17SB	LIF-HPT-17SB	LIF-HPT-18SB	LIF-HPT-18SB	LIF-HPT-19SB	LPZ-5
	Sample ID:	LIF-HPT-15SB (31-33)	LIF-HPT-15SB (38-40)	LIF-HPT-15SB (42-44)	LIF-HPT-15SB (45-47)	LIF-HPT-15SB (47-49)	LIF-HPT-17SB (36.5-38.5)	LIF-HPT-17SB (41-43)	LIF-HPT-18SB (43-45)	LIF-HPT-18SB (45-47)	LIF-HPT-19SB (43-45)	LPZ-5 (40-42)
	Sample Date:	8/31/2018	8/31/2018	8/31/2018	8/31/2018	8/31/2018	9/12/2018	9/12/2018	9/6/2018	9/6/2018	9/11/2018	9/14/2018
Constituents	Sample Depth (ft bls):	31-33	38-40	42-44	45-47	47-49	36.5-38.5	41-43	43-45	45-47	43-45	40-42
trans-1,2-Dichloroethene		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	**115**
trans-1,3-Dichloropropene		< 1.7	< 147	< 164	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	< 925	< 69.2
Trichloroethene		**4.4**	< 147	**1250**	< 132	< 138	< 2.2	< 71.3	< 96.0	< 63.8	**2210000 D**	**60300**
Vinyl chloride		< 1.7	< 147	**189**	< 132	< 138	< 2.2 J	< 71.3	< 96.0	< 63.8	**2030**	< 69.2
Total VOCs		**430**	**37000**	**21000**	**990**	**86000**	**88**	**3100**	**18000**	**1700**	**6600000**	**68000**
PCBs (ug/kg)												
Aroclor 1016		< 170	< 703	< 40.9	< 40.5	< 40.0	< 34.2	< 38.8	< 37.1	< 39.5	< 77.4	< 40.9
Aroclor 1221		< 346	< 1430	< 83.0	< 82.3	< 81.3	< 69.4	< 78.7	< 75.4	< 80.1	< 157	< 83.0
Aroclor 1232		< 170	< 703	< 40.9	< 40.5	< 40.0	< 34.2	< 38.8	< 37.1	< 39.5	< 77.4	< 40.9
Aroclor 1242		**1100**	**6040**	< 40.9	**50.5**	< 40.0	**108**	< 38.8	**424**	< 39.5	**721**	< 40.9
Aroclor 1248		< 170	< 703	< 40.9	< 40.5	< 40.0	< 34.2	< 38.8	< 37.1	< 39.5	< 77.4	< 40.9
Aroclor 1254		**1880**	**6000**	< 40.9	**44.2**	< 40.0	**138**	< 38.8	**581**	< 39.5	**970**	< 40.9
Aroclor 1260		< 170	< 703	< 40.9	< 40.5	< 40.0	< 34.2	< 38.8	< 37.1	< 39.5	< 77.4	< 40.9
Aroclor 1262		< 170 U	--	--	--	--	--	--	--	--	--	--
Aroclor 1268		< 170 U	--	--	--	--	--	--	--	--	--	--
Total PCBs		**2980**	**12040**	0	**94.7**	0	**246**	0	**1005**	0	**1691**	0
1,4-Dioxane (ug/kg)												
1,4-Dioxane		< 100	< 98	**48 J**	**120 J**	**90 J**	< 87	**1.8 J**	< 110	< 120	**7.3 J**	**2.9 J**
SVOCs (ug/kg)												
1,1-Biphenyl		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	**105 J**	< 387	< 849	< 4120
1,2,4-Trichlorobenzene		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
1,2-Dichlorobenzene		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
1,3-Dichlorobenzene		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
1,4-Dichlorobenzene		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
2,2-Oxybis(1-Chloropropane)		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
2,4,5-Trichlorophenol		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
2,4,6-Trichlorophenol		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
2,4-Dichlorophenol		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
2,4-Dimethylphenol		< 13800	< 14000	< 410	< 828	< 408	< 342 J	< 391 J	< 3790	< 387	< 849	< 4120
2,4-Dinitrophenol		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
2,4-Dinitrotoluene		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
2,6-Dinitrotoluene		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
2-Chloronaphthalene		< 1370	< 1390	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	< 376	< 38.4	< 84.1	< 408
2-Chlorophenol		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
2-Methyl-4,6-dinitrophenol		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
2-Methylnaphthalene		< 1370	< 1390	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	**736**	< 38.4	**127**	< 408
2-Methylphenol		< 13800	< 14000	**26.8 J**	< 828	**30.2 J**	< 342	< 391	< 3790	< 387	< 849	< 4120
2-Nitroaniline		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
2-Nitrophenol		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
3,3-Dichlorobenzidine		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849 J	< 4120
3-Methylphenol, 4-Methylphenol		< 13800	< 14000	**93.1 J**	< 828	**45.7 J**	< 342	< 391	< 3790	< 387	< 849	< 4120
3-Nitroaniline		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
4-Bromophenyl phenyl ether		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
4-Chloro-3-Methylphenol		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
4-Chlorophenyl phenyl ether		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
4-Nitroaniline		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
4-Nitrophenol		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Acenaphthene		< 1370	< 1390	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	< 376	< 38.4	< 84.1	< 408

See footnotes on last page.

Table 2
Concentrations of Constituents in Phase II and Phase III Soil Samples
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

	Location ID:	LIF-HPT-15SB	LIF-HPT-15SB	LIF-HPT-15SB	LIF-HPT-15SB	LIF-HPT-15SB	LIF-HPT-17SB	LIF-HPT-17SB	LIF-HPT-18SB	LIF-HPT-18SB	LIF-HPT-19SB	LPZ-5
	Sample ID:	LIF-HPT-15SB (31-33)	LIF-HPT-15SB (38-40)	LIF-HPT-15SB (42-44)	LIF-HPT-15SB (45-47)	LIF-HPT-15SB (47-49)	LIF-HPT-17SB (36.5-38.5)	LIF-HPT-17SB (41-43)	LIF-HPT-18SB (43-45)	LIF-HPT-18SB (45-47)	LIF-HPT-19SB (43-45)	LPZ-5 (40-42)
	Sample Date:	8/31/2018	8/31/2018	8/31/2018	8/31/2018	8/31/2018	9/12/2018	9/12/2018	9/6/2018	9/6/2018	9/11/2018	9/14/2018
Constituents	Sample Depth (ft bls):	31-33	38-40	42-44	45-47	47-49	36.5-38.5	41-43	43-45	45-47	43-45	40-42
Acenaphthylene		< 1370	< 1390	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	< 376	< 38.4	< 84.1	< 408
Acetophenone		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Anthracene		< 1370	< 1390	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	< 376	< 38.4	< 84.1	< 408
Atrazine		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849 J	< 4120
Azobenzene		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Benz(a)anthracene		< 1370	< 1390	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	< 376	< 38.4	< 84.1	< 408
Benzaldehyde		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Benzidine		< 13800	< 14000	< 410	< 828	< 408	R	R	< 3790	< 387	R	< 4120
Benzo(a)pyrene		< 1370	< 1390	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	< 376	< 38.4	< 84.1	< 408
Benzo(b)fluoranthene		< 1370	< 1390	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	< 376	< 38.4	< 84.1	< 408
Benzo(g,h,i)perylene		< 1370	< 1390	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	< 376	< 38.4	< 84.1	< 408
Benzo(k)fluoranthene		< 1370	< 1390	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	< 376	< 38.4	< 84.1	< 408
Benzyl Alcohol		< 13800	< 14000	< 410	< 828	< 408	< 342 J	< 391 J	< 3790	< 387	R	< 4120
bis(2-Chloroethoxy)methane		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
bis(2-Chloroethyl)ether		< 13800	< 14000	**50.6 J**	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
bis(2-Ethylhexyl)phthalate		< 13800	< 14000	< 410	< 828	**40.2 J**	**99.7 J**	**447**	**427 J**	**29.8 J**	**139 J**	< 4120
Butyl benzyl phthalate		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Caprolactam		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Carbazole		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Chrysene		< 1370	< 1390	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	< 376	< 38.4	< 84.1	< 408
Dibenz(a,h)anthracene		< 686	< 695	< 40.6	< 41.0	< 40.4	< 33.9	< 38.7	< 376	< 38.4	< 84.1	< 408
Dibenzofuran		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Diethyl phthalate		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Dimethyl phthalate		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Di-n-butyl phthalate		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	**364 J**	< 387	< 849 B	< 4120
Di-n-octyl phthalate		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Fluoranthene		< 1370	< 1390	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	< 376	< 38.4	< 84.1	< 408
Fluorene		< 1370	< 1390	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	**171 J**	< 38.4	< 84.1	< 408
Hexachloro-1,3-butadiene		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Hexachlorobenzene		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Hexachlorocyclopentadiene		< 13800	< 14000	< 410	< 828	< 408	< 342 J	< 391 J	< 3790	< 387	< 849	< 4120
Hexachloroethane		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Indeno(1,2,3-cd)pyrene		< 686	< 695	< 40.6	< 41.0	< 40.4	< 33.9	< 38.7	< 376	< 38.4	< 84.1	< 408
Isophorone		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Naphthalene		< 1370	**653 J**	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	**739**	**10.6 J**	**191**	< 408
Nitrobenzene		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
N-Nitrosodimethylamine		< 13800	< 14000	< 410	< 828	< 408	< 342 J	< 391 J	< 3790	< 387	< 849	< 4120
N-Nitrosodi-n-propylamine		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
N-Nitrosodiphenylamine		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
p-Chloroaniline		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Pentachlorophenol		< 13800	< 14000	< 410	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Phenanthrene		< 1370	**1090 J**	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	**506**	< 38.4	**126**	< 408
Phenol		< 13800	< 14000	**135 J**	< 828	< 408	< 342	< 391	< 3790	< 387	< 849	< 4120
Pyrene		< 1370	< 1390	< 40.6	< 82.1	< 40.4	< 33.9	< 38.7	< 376	< 38.4	**33.8 J**	< 408
TPH (ug/kg)												
TPH GRO (C6-C10)		**1860**	**329000**	**37700**	**803**	**47.8 J**	**3000**	**1840**	**29500**	**2760**	**83600**	**2030**
TPH DRO (C10-C28)		**3730000**	**6810000**	**21500**	**14000**	**10800**	**72300**	**2900 J**	**3840000**	**4090 J**	**210000**	**3910 J**
TPH ORO (C28-C40)		**1560000**	**3170000**	**11200**	**10600**	**2510 J**	**57200 J**	< 4690 J	**1900000**	**2120 J**	**74700**	**5900**
Total Petroleum Hydrocarbons		**5291860**	**10309000**	**70400**	**25403**	**13357.8**	**132500**	**4740**	**5769500**	**8970**	**368300**	**11840**

See footnotes on last page.

Table 2
Concentrations of Constituents in Phase II and Phase III Soil Samples
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

Notes and Abbreviations:

1.	Results validated following protocols specified in March 2006 RI/FS Work Plan (ARCADIS G&M, Inc. 2006).
2.	Results are reported on dry weight basis.
3.	Samples were analyzed for VOCs using USEPA Method 8260C. Samples were analyzed for SVOCs using USEPA Method 8270D. Samples were analyzed for PCBs using USEPA Method 8082A. Samples were analyzed for TPH using USEPA Method 8015. Samples were analyzed for 1,4-Dioxane using USEPA Method 8270D SIM.
4.	Total VOCs are rounded to two significant figures.
ft bls	feet below land surface
Bold	Constituent detected
B	Constituent considered non-detect at the listed value due to associated blank contamination
D	Concentration is based on a diluted sample analysis
E	Constituent concentration exceeded the calibration range. The reported result is estimated.
J	Constituent value is estimated
R	The sample results are rejected
ug/kg	micrograms per kilogram
DRO	diesel range organics
GRO	gasoline range organics
ORO	oil range organics
PCBs	polychlorinated biphenyls
SVOCs	semi-volatile organic compounds
TPH	total petroleum hydrocarbons
VOCs	volatile organic compounds
<408	Compound not detected above its laboratory reporting limit.

Table 3
Concentrations of Constituents in Phase IV Soil Samples
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

	Location ID:	G-5-18	G-5-18	I-7-18	I-7-18	J-5-18	J-5-18	J-5-18	K-8-18	K-8-18	K-8-18	nG-6-18	nG-6-18	nK-11-18	nK-11-18	nK-11-18	nS-8-18	nS-8-18
	Sample ID:	G-5-18 (46-48)	G-5-18 (48-50)	I-7-18 (46-48)	I-7-18 (48-50)	J-5-18 (46-48)	J-5-18 (48-50)	REP092018MM1	K-8-18 (42-44)	K-8-18 (44-46)	K-8-18 (46-48)	nG-6-18 (46-48)	nG-6-18 (48-50)	nK-11-18 (42-44)	nK-11-18 (44-46)	nK-11-18 (46-48)	nS-8-18 (48-50)	nS-8-18 (50-52)
	Sample Date:	9/17/2018	9/17/2018	9/14/2018	9/14/2018	9/20/2018	9/20/2018	9/20/2018	9/13/2018	9/13/2018	9/13/2018	9/19/2018	9/19/2018	9/17/2018	9/17/2018	9/17/2018	9/21/2018	9/21/2018
Constituents	Sample Depth (ft bls):	46-48	48-50	46-48	48-50	46-48	48-50	48-50	42-44	44-46	46-48	46-48	48-50	42-44	44-46	46-48	48-50	50-52
VOCs (ug/kg)																		
1,1,1-Trichloroethane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
1,1,2,2-Tetrachloroethane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
1,1,2-trichloro-1,2,2-trifluoroethane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
1,1,2-Trichloroethane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
1,1-Dichloroethane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
1,1-Dichloroethene		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
1,2,4-Trichlorobenzene		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
1,2-Dibromo-3-chloropropane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
1,2-Dibromoethane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
1,2-Dichlorobenzene		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
1,2-Dichloroethane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
1,2-Dichloropropane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
1,3-Dichlorobenzene		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
1,4-Dichlorobenzene		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
2-Butanone (MEK)		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
4-Methyl-2-Pentanone		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Acetone		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	**6.2**	< 1.9	< 2.2	**11.0**	< 1.2
Benzene		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Bromodichloromethane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Bromoform		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Bromomethane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Carbon Disulfide		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Carbon Tetrachloride		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
CFC-11		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
CFC-12		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Chlorobenzene		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Chlorodibromomethane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Chloroethane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Chloroform		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Chloromethane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
cis-1,2-Dichloroethene		< 90.1	**120**	**15.0**	**36.9**	**157**	**1180**	**459**	< 61.3	< 109	**233**	**3900**	**6720**	**2.6**	< 1.9	< 2.2	< 1.1	**11.2**
cis-1,3-Dichloropropene		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Cyclohexane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Dichloromethane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	**2.0**	< 1.2
Ethylbenzene		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	**336**	< 109	**294**	< 586	< 60.8	**3.9**	< 1.9	< 2.2	< 1.1	< 1.2
Isopropylbenzene		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
m&p-Xylenes		< 180	< 22.5	< 3.2	< 2.5	**409**	< 130	< 161	**1010**	< 218	**1030**	< 1170	< 122	< 2.4	< 3.7	< 4.3	< 2.3	< 2.4
Methyl Acetate		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Methyl N-Butyl Ketone (2-Hexanone)		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Methylcyclohexane		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	**1.6**	< 1.9	**7.5**	< 1.1	< 1.2
Methyl-tert-butylether		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
o-Xylene		< 90.1	< 11.2	< 1.6	**2.5**	**293**	**119**	< 80.7	**412**	< 109	**372**	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Styrene (Monomer)		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Tetrachloroethene		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Toluene		< 90.1	< 11.2	< 1.6	**1.6**	**99.4**	< 64.9	< 80.7	**4420**	**361**	**509**	**1450**	**999**	< 1.2	< 1.9	< 2.2	< 1.1	**2.1**

See footnotes on last page.

Table 3
Concentrations of Constituents in Phase IV Soil Samples
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

	Location ID:	G-5-18	G-5-18	I-7-18	I-7-18	J-5-18	J-5-18	J-5-18	K-8-18	K-8-18	K-8-18	nG-6-18	nG-6-18	nK-11-18	nK-11-18	nK-11-18	nS-8-18	nS-8-18
	Sample ID:	G-5-18 (46-48)	G-5-18 (48-50)	I-7-18 (46-48)	I-7-18 (48-50)	J-5-18 (46-48)	J-5-18 (48-50)	REP092018MM1	K-8-18 (42-44)	K-8-18 (44-46)	K-8-18 (46-48)	nG-6-18 (46-48)	nG-6-18 (48-50)	nK-11-18 (42-44)	nK-11-18 (44-46)	nK-11-18 (46-48)	nS-8-18 (48-50)	nS-8-18 (50-52)
	Sample Date:	9/17/2018	9/17/2018	9/14/2018	9/14/2018	9/20/2018	9/20/2018	9/20/2018	9/13/2018	9/13/2018	9/13/2018	9/19/2018	9/19/2018	9/17/2018	9/17/2018	9/17/2018	9/21/2018	9/21/2018
Constituents	Sample Depth (ft bls):	46-48	48-50	46-48	48-50	46-48	48-50	48-50	42-44	44-46	46-48	46-48	48-50	42-44	44-46	46-48	48-50	50-52
trans-1,2-Dichloroethene		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
trans-1,3-Dichloropropene		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	< 1.2	< 1.9	< 2.2	< 1.1	< 1.2
Trichloroethene		**844**	**463**	**35.0**	**83.0**	**1630**	**4870**	**2040**	< 61.3	< 109	< 94.4	**38100**	**56400**	**1.8**	< 1.9	< 2.2	**3.4**	**22.4**
Vinyl chloride		< 90.1	< 11.2	< 1.6	< 1.3	< 77.2	< 64.9	< 80.7	< 61.3	< 109	< 94.4	< 586	< 60.8	**2.4**	**2.7**	**17.0**	< 1.1	< 1.2
Total VOCs		**840**	**580**	**50**	**120**	**2600**	**6200**	**2500**	**6200**	**360**	**2400**	**43000**	**64000**	**19**	**2.7**	**25**	**16**	**36**
PCBs (ug/kg)																		
Aroclor 1016		< 41.2	< 47.1	< 41.1	< 38.2	< 40.6	< 39.5	< 40.0	< 39.0	< 40.4	< 40.0	< 40.1	< 41.8	< 39.6	< 37.6	< 36.0	< 41.1	< 39.7
Aroclor 1221		< 83.7	< 95.6	< 83.4	< 77.5	< 82.4	< 80.1	< 81.2	< 79.2	< 81.9	< 81.1	< 81.4	< 84.9	< 80.4	< 76.4	< 73.0	< 83.4	< 80.6
Aroclor 1232		< 41.2	< 47.1	< 41.1	< 38.2	< 40.6	< 39.5	< 40.0	< 39.0	< 40.4	< 40.0	< 40.1	< 41.8	< 39.6	< 37.6	< 36.0	< 41.1	< 39.7
Aroclor 1242		< 41.2	**80.8**	< 41.1	< 38.2	< 40.6	< 39.5	< 40.0	< 39.0	< 40.4	< 40.0	< 40.1	< 41.8	**49.0**	< 37.6	< 36.0	< 41.1	< 39.7
Aroclor 1248		< 41.2	< 47.1	< 41.1	< 38.2	< 40.6	< 39.5	< 40.0	< 39.0	< 40.4	< 40.0	< 40.1	< 41.8	< 39.6	< 37.6	< 36.0	< 41.1	< 39.7
Aroclor 1254		< 41.2	< 47.1	< 41.1	< 38.2	< 40.6	< 39.5	< 40.0	< 39.0	< 40.4	< 40.0	< 40.1	< 41.8	< 39.6	< 37.6	< 36.0	< 41.1	< 39.7
Aroclor 1260		< 41.2	< 47.1	< 41.1	< 38.2	< 40.6	< 39.5	< 40.0	< 39.0	< 40.4	< 40.0	< 40.1	< 41.8	< 39.6	< 37.6	< 36.0	< 41.1	< 39.7
Aroclor 1262		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Aroclor 1268		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total PCBs		0	**80.8**	0	0	0	0	0	0	0	0	0	0	**49**	0	0	0	0
1,4-Dioxane (ug/kg)																		
1,4-Dioxane		< 58	< 51	< 120	< 100	< 110	< 120	< 110	< 120	< 120	< 120	< 110	**5.0 J**	< 45	< 50	< 55	**4.5 J**	**2.0 J**
SVOCs (ug/kg)																		
1,1-Biphenyl		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
1,2,4-Trichlorobenzene		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
1,2-Dichlorobenzene		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
1,3-Dichlorobenzene		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
1,4-Dichlorobenzene		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
2,2-Oxybis(1-Chloropropane)		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
2,4,5-Trichlorophenol		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
2,4,6-Trichlorophenol		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
2,4-Dichlorophenol		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
2,4-Dimethylphenol		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
2,4-Dinitrophenol		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
2,4-Dinitrotoluene		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
2,6-Dinitrotoluene		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
2-Chloronaphthalene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
2-Chlorophenol		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
2-Methyl-4,6-dinitrophenol		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
2-Methylnaphthalene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
2-Methylphenol		< 443	< 409	< 421	< 397	**20.5 J**	< 404	**31.2 J**	**15.7 J**	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
2-Nitroaniline		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
2-Nitrophenol		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
3,3-Dichlorobenzidine		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
3-Methylphenol, 4-Methylphenol		< 443	< 409	< 421	< 397	**17.5 J**	**14.0 J**	**25.8 J**	**22.2 J**	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
3-Nitroaniline		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
4-Bromophenyl phenyl ether		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
4-Chloro-3-Methylphenol		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
4-Chlorophenyl phenyl ether		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
4-Nitroaniline		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
4-Nitrophenol		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Acenaphthene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2

See footnotes on last page.

Table 3
Concentrations of Constituents in Phase IV Soil Samples
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

	Location ID:	G-5-18	G-5-18	I-7-18	I-7-18	J-5-18	J-5-18	J-5-18	K-8-18	K-8-18	K-8-18	nG-6-18	nG-6-18	nK-11-18	nK-11-18	nK-11-18	nS-8-18	nS-8-18
	Sample ID:	G-5-18 (46-48)	G-5-18 (48-50)	I-7-18 (46-48)	I-7-18 (48-50)	J-5-18 (46-48)	J-5-18 (48-50)	REP092018MM1	K-8-18 (42-44)	K-8-18 (44-46)	K-8-18 (46-48)	nG-6-18 (46-48)	nG-6-18 (48-50)	nK-11-18 (42-44)	nK-11-18 (44-46)	nK-11-18 (46-48)	nS-8-18 (48-50)	nS-8-18 (50-52)
	Sample Date:	9/17/2018	9/17/2018	9/14/2018	9/14/2018	9/20/2018	9/20/2018	9/20/2018	9/13/2018	9/13/2018	9/13/2018	9/19/2018	9/19/2018	9/17/2018	9/17/2018	9/17/2018	9/21/2018	9/21/2018
Constituents	Sample Depth (ft bls):	46-48	48-50	46-48	48-50	46-48	48-50	48-50	42-44	44-46	46-48	46-48	48-50	42-44	44-46	46-48	48-50	50-52
Acenaphthylene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
Acetophenone		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Anthracene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
Atrazine		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Azobenzene		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Benz(a)anthracene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
Benzaldehyde		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Benzidine		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Benzo(a)pyrene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
Benzo(b)fluoranthene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
Benzo(g,h,i)perylene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
Benzo(k)fluoranthene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
Benzyl Alcohol		< 443	< 409	< 421	< 397	< 451	< 404	**32.7 J**	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
bis(2-Chloroethoxy)methane		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
bis(2-Chloroethyl)ether		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	**46.3 J**	**182 J**	< 390	< 381	< 410	< 419	< 432
bis(2-Ethylhexyl)phthalate		< 443	**36.7 J**	< 421	**199 J**	< 451	**28.8 J**	**50.1 J**	**131 J**	**118 J**	**157 J**	< 399	**58.7 J**	**126 J**	< 381	**145 J**	**47.5 J**	**29.2 J**
Butyl benzyl phthalate		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Caprolactam		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Carbazole		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Chrysene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
Dibenz(a,h)anthracene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
Dibenzofuran		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Diethyl phthalate		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Dimethyl phthalate		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Di-n-butyl phthalate		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Di-n-octyl phthalate		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Fluoranthene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
Fluorene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	**9.11 J**	< 37.7	< 40.6	< 41.9	< 43.2
Hexachloro-1,3-butadiene		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Hexachlorobenzene		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Hexachlorocyclopentadiene		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Hexachloroethane		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Indeno(1,2,3-cd)pyrene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
Isophorone		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Naphthalene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	**11.4 J**	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
Nitrobenzene		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
N-Nitrosodimethylamine		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
N-Nitrosodi-n-propylamine		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
N-Nitrosodiphenylamine		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
p-Chloroaniline		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Pentachlorophenol		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	**231 J**	< 428	< 390	< 381	< 410	< 419	< 432
Phenanthrene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	**8.80 J**	< 37.7	< 40.6	< 41.9	< 43.2
Phenol		< 443	< 409	< 421	< 397	< 451	< 404	< 403	< 389	< 385	< 403	< 399	< 428	< 390	< 381	< 410	< 419	< 432
Pyrene		< 43.9	< 40.5	< 41.7	< 39.3	< 45.1	< 40.4	< 40.3	< 38.6	< 38.2	< 39.9	< 39.6	< 42.4	< 38.6	< 37.7	< 40.6	< 41.9	< 43.2
TPH (ug/kg)																		
TPH GRO (C6-C10)		**196**	**199**	**373**	**87.7 J**	**4060**	**1480**	**3520**	**4640**	**880**	**3530**	**17100**	**33400**	**55.5 J**	< 114	**89.8 J**	**1390 J**	< 3240
TPH DRO (C10-C28)		< 5320	< 4910	< 5050	< 4760	< 5420	< 4860	< 4840	**12500**	**2880 J**	**3080 J**	< 4800	**16400**	**165000**	< 4570	< 4920	< 5030	< 5190
TPH ORO (C28-C40)		< 5320	< 4910	< 5050	< 4760	< 5420	< 4860	< 4840	**4810**	**925 J**	**926 J**	**914 J**	**16400**	**90900**	< 4570	< 4920	**980 J**	< 5190
Total Petroleum Hydrocarbons		**196**	**199**	**373**	**87.7**	**4060**	**1480**	**3520**	**21950**	**4685**	**7536**	**18014**	**66200**	**255955.5**	**0**	**89.8**	**2370**	**0**

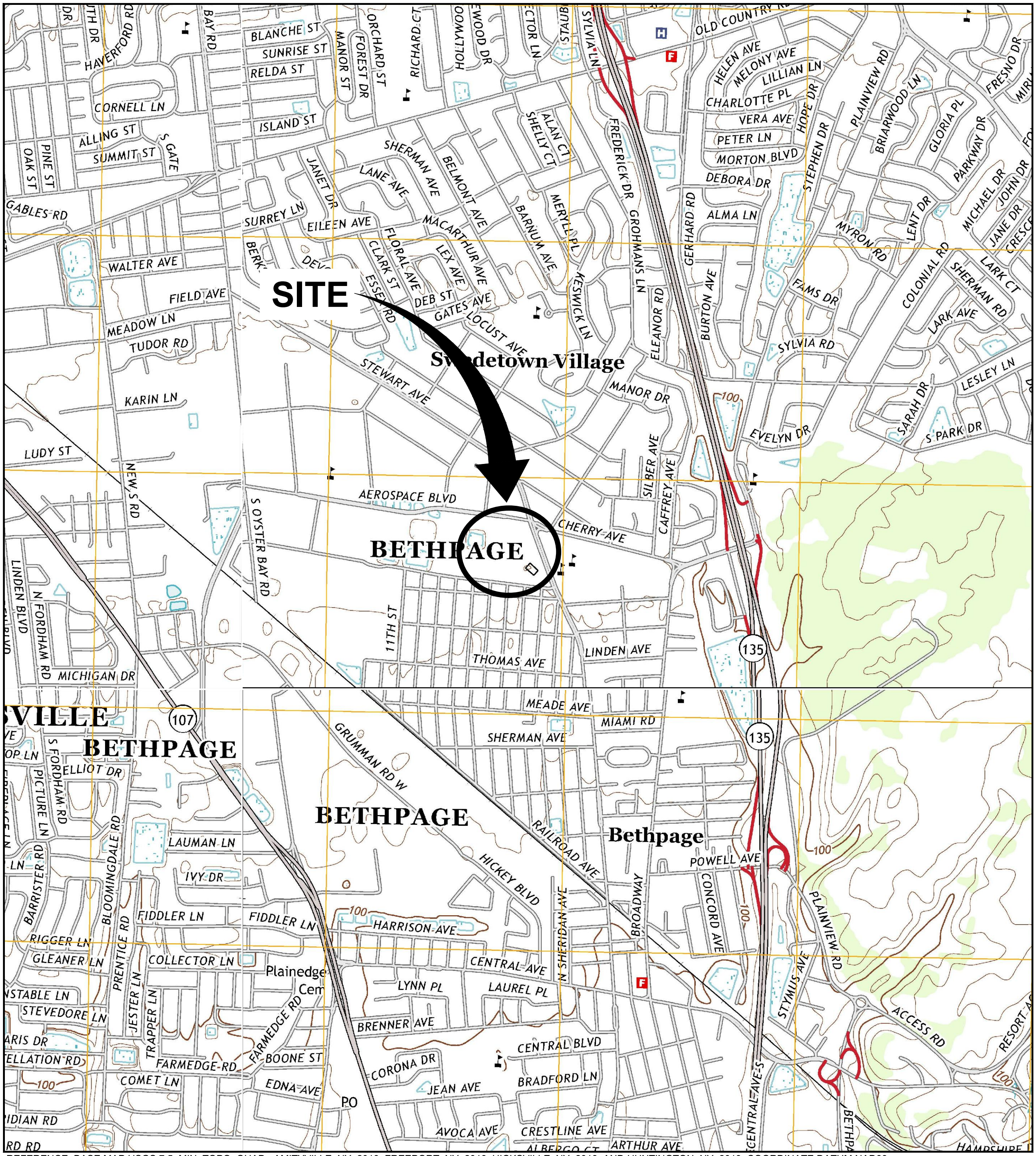
See footnotes on last page.

Table 3
Concentrations of Constituents in Phase IV Soil Samples
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman Systems Corporation
Bethpage, New York

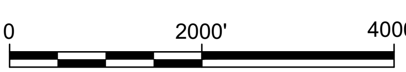
Notes and Abbreviations:

1.	Results validated following protocols specified in March 2006 RI/FS Work Plan (ARCADIS G&M, Inc. 2006).
2.	Results are reported on dry weight basis.
3.	Samples were analyzed for VOCs using USEPA Method 8260C. Samples were analyzed for SVOCs using USEPA Method 8270D. Samples were analyzed for PCBs using USEPA Method 8082A. Samples were analyzed for TPH using USEPA Method 8015. Samples were analyzed for 1,4-Dioxane using USEPA Method 8270D SIM.
4.	Total VOCs are rounded to two significant figures.
ft bls	feet below land surface
Bold	Constituent detected
J	Constituent value is estimated
ug/kg	micrograms per kilogram
DRO	diesel range organics
GRO	gasoline range organics
ORO	oil range organics
PCBs	polychlorinated biphenyls
SVOCs	semi-volatile organic compounds
TPH	total petroleum hydrocarbons
VOCs	volatile organic compounds
<443	Compound not detected above its laboratory reporting limit.

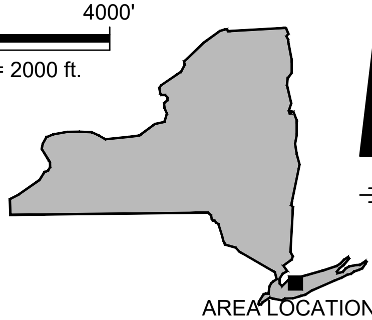
FIGURES



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., AMITYVILLE, NY, 2013, FREEPORT, NY, 2013, HICKSVILLE, NY, 2013, AND HUNTINGTON, NY, 2013, COORDINATE DATUM NAD83.



Approximate Scale: 1 in. = 2000 ft.



NORTHROP GRUMMAN SYSTEMS CORPORATION
OPERABLE UNIT 3
BETHPAGE, NEW YORK

SITE LOCATION

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

CITY:SYRACUSE-NY DIV/GROUP:ENV DB:A.SANCHEZ LD:ALS PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF* SAVED: 4/3/2019 9:54 AM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 4/3/2019 9:57 AM BY: SANCHEZ, ADRIAN
C:\BIM\OneDrive - ARCADIS\BIM 360 Docs\NORTHROP GRUMMAN\NGC-BETHPAGE PARK\SITE LOCATION MAP.dwg LAYOUT: OU3
XREFS: IMAGES: PROJECTNAME: ----
2013Amityville.jpg
2013Freeport.jpg
2013Hicksville.jpg
2013Huntington.jpg

AREA LIMITS

PARK - BALL FIELD

APPROXIMATE PARK BOUNDARY

0 150' 300'

APPROXIMATE SCALE IN FEET

SOURCE:
SITE AERIAL PHOTOGRAPH ADOPTED FROM GOOGLE EARTH PRO WITH AN IMAGERY DATE OF 06/19/2014.

NORTHROP GRUMMAN SYSTEMS CORPORATION
OPERABLE UNIT 3
BETHPAGE, NEW YORK

PARK FEATURES

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2

CITY:SYRACUSE-NY DIV/GROUP:ENV DB:A.SANCHEZ LD:ALS PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF* C:\BIM\OneDrive - ARCADIS\BIM 360 Docs\NORTHROP GRUMMAN\OU3 SUBPROJECT 7 PARK SOILS V\2019\NY001496.37TM01-DWG\NGC-PS-LNAPL02-SITE AREA.dwg LAYOUT: 2 SAVED: 4/3/2019 9:54 AM ACADVER: 23.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 4/3/2019 9:57 AM BY: SANCHEZ, ADRIAN

XREFS: X-PS-BDR-BL

LEGEND:

- HISTORICAL (2004-2017) VOC SAMPLE LOCATIONS
- EXISTING PERCHED WATER PIEZOMETER LOCATION
- 2018 PHASE I LIF-HPT BORING LOCATION
- 2018 PHASE I LIF-HPT/ PHASE II SOIL BORING LOCATION
- 2018 PHASE III SOIL BORING LOCATION
- 2018 PHASE IV SUPPLEMENTAL VOC DELINEATION SAMPLE LOCATION
- PROPOSED 2018 PHASE IV SUPPLEMENTAL VOC DELINEATION SAMPLE LOCATION (NOT DRILLED OR COMPLETED)

0 40' 80'

APPROXIMATE SCALE IN FEET

NOTES:

1. THE BORINGS WERE FIELD LOCATED USING A HAND-HELD GLOBAL POSITIONING SYSTEM (GPS) UNIT.
2. COORDINATES REFER TO NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).

VOC VOLATILE ORGANIC COMPOUND

LIF LASER-INDUCED FLUORESCENCE

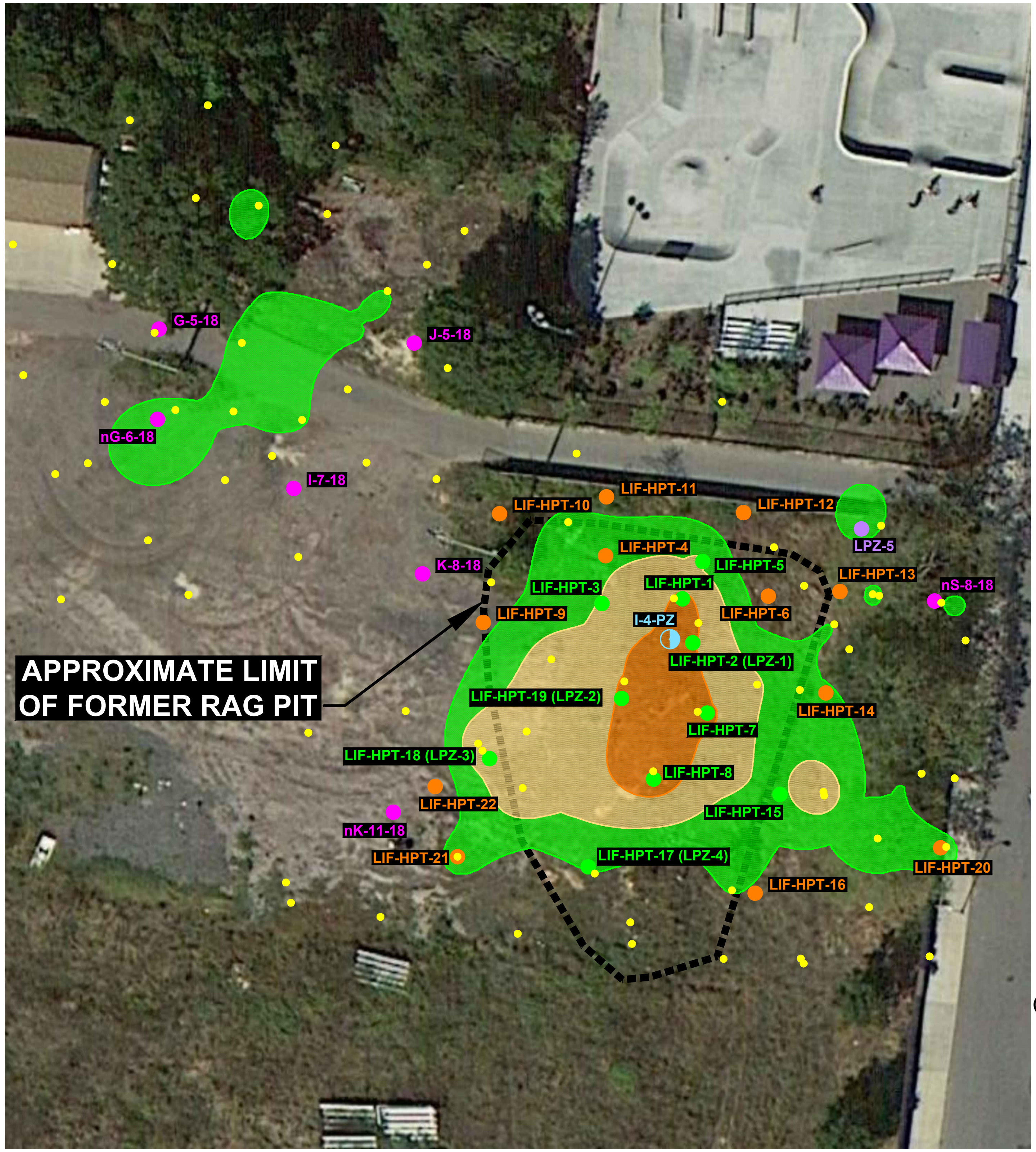
HPT HYDRAULIC PROFILING TOOL

NORTHROP GRUMMAN SYSTEMS CORPORATION
OPERABLE UNIT 3
BETHPAGE, NEW YORK

LOCATION OF SOIL BORINGS

ARCADIS Design & Consultancy for natural and built assets

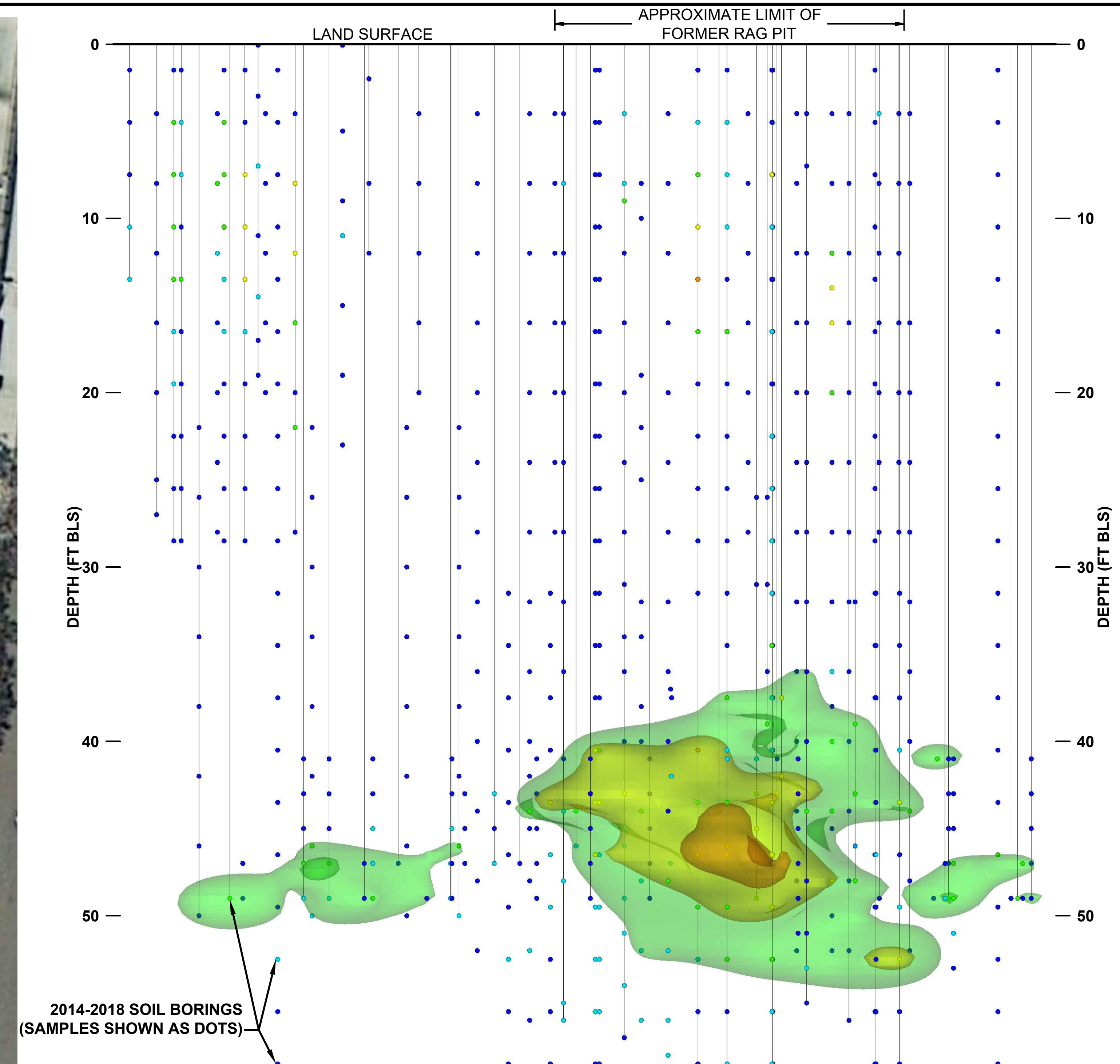
FIGURE 3



PLAN VIEW

0 40' 80'

APPROXIMATE SCALE IN FEET



VERTICAL SIDE VIEW (LOOKING NORTH)

LEGEND:

- HISTORICAL (2004-2017) VOC SAMPLE LOCATIONS
- EXISTING PERCHED WATER PIEZOMETER LOCATION
- 2018 PHASE I LIF-HPT BORING LOCATION
- 2018 PHASE I LIF-HPT/PHASE II SOIL BORING LOCATION
- 2018 PHASE III SOIL BORING LOCATION
- 2018 PHASE IV SUPPLEMENTAL VOC DELINEATION SAMPLE LOCATION

TOTAL VOCs

- 1,000 mg/kg
- 100 mg/kg
- 10 mg/kg

NOTES:

1. THE BORINGS WERE FIELD LOCATED USING A HAND-HELD GLOBAL POSITIONING SYSTEM (GPS) UNIT.
2. COORDINATES REFER TO NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
3. VOC CONTOURING GENERATED BY EARTH VOLUMETRIC STUDIO (EVS).
4. TVOCs SHALLOWER THAN 30 FT BLS NOT SHOWN.
5. VERTICAL EXAGGERATION 5X.

VOC VOLATILE ORGANIC COMPOUND

LIF LASER-INDUCED FLUORESCENCE

HPT HYDRAULIC PROFILING TOOL

NORTHROP GRUMMAN SYSTEMS CORPORATION
OPERABLE UNIT 3
BETHPAGE, NEW YORK

DISTRIBUTION OF TVOCS IN SOIL BELOW 30 FEET

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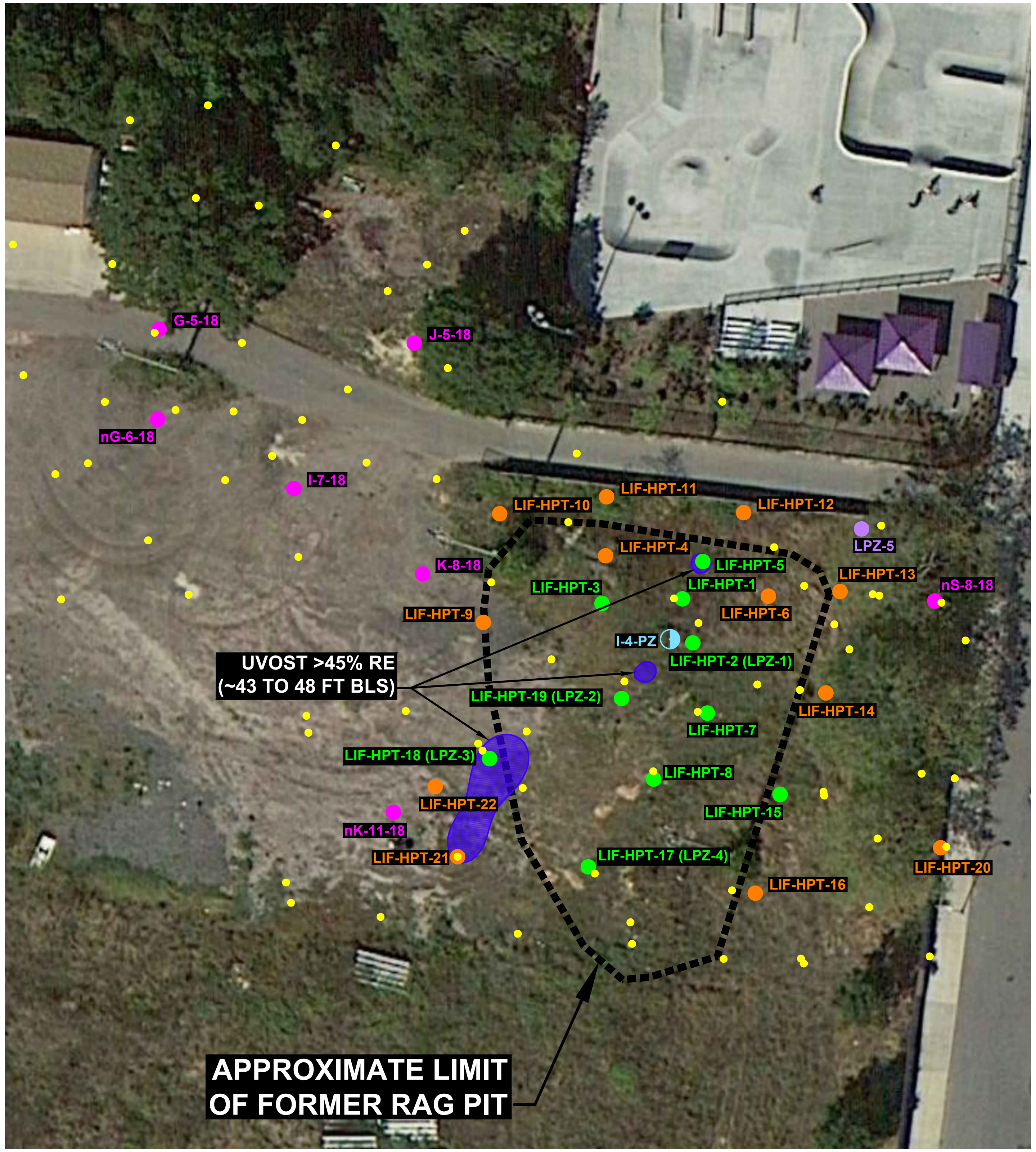
FIGURE 4



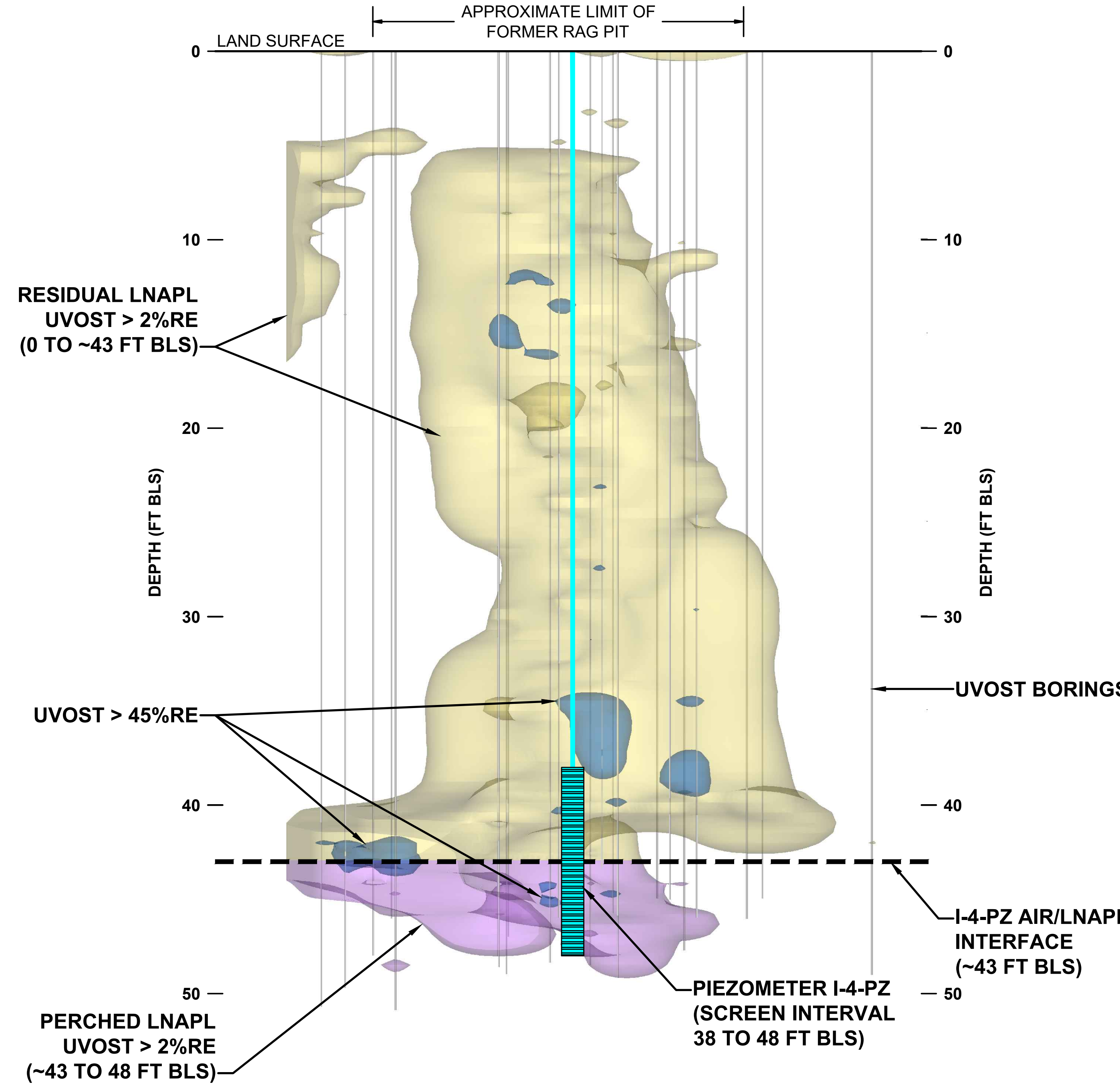
PLAN VIEW

0 40' 80'

APPROXIMATE SCALE IN FEET

LEGEND:

- HISTORICAL (2004-2017) VOC SAMPLE LOCATIONS
- EXISTING PERCHED WATER PIEZOMETER LOCATION
- 2018 PHASE I LIF-HPT BORING LOCATION
- 2018 PHASE I LIF-HPT/PHASE II SOIL BORING LOCATION
- 2018 PHASE III SOIL BORING LOCATION
- 2018 PHASE IV SUPPLEMENTAL VOC DELINEATION SAMPLE LOCATION



VERTICAL SIDE VIEW (LOOKING NORTH)

NOTES:

1. THE BORINGS WERE FIELD LOCATED USING A HAND-HELD GLOBAL POSITIONING SYSTEM (GPS) UNIT.
2. COORDINATES REFER TO NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
3. UVOST RESPONSE DISTRIBUTION GENERATED BY EARTH VOLUMETRIC STUDIO (EVS). UVOST SERVICES PROVIDED BY DAKOTA TECHNOLOGIES, INC.
4. VERTICAL EXAGGERATION 5X.

LNAPL LIGHT NON-AQUEOUS PHASE LIQUID

UVOST ULTRA-VIOLET OPTICAL SCREENING TOOL

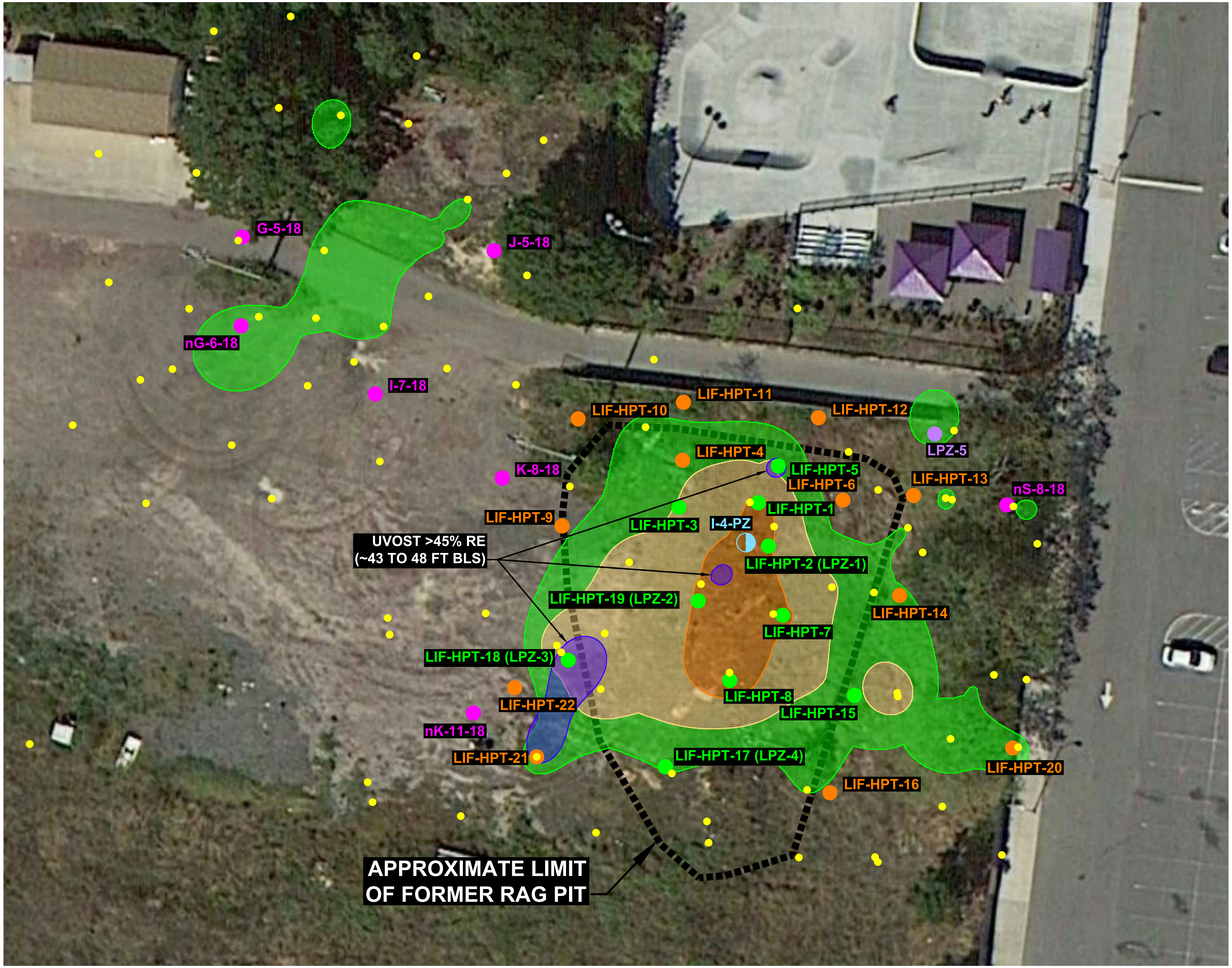
RE REFERENCE EMITTER

NORTHROP GRUMMAN SYSTEMS CORPORATION
OPERABLE UNIT 3
BETHPAGE, NEW YORK

UVOST RESPONSE

ARCADIS Design & Consultancy for natural and built assets

FIGURE 5



LEGEND:

- HISTORICAL (2004-2017) VOC SAMPLE LOCATIONS
- EXISTING PERCHED WATER PIEZOMETER LOCATION
- 2018 PHASE I LIF-HPT BORING LOCATION
- 2018 PHASE I LIF-HPT/ PHASE II SOIL BORING LOCATION
- 2018 PHASE III SOIL BORING LOCATION
- 2018 PHASE IV SUPPLEMENTAL VOC DELINEATION SAMPLE LOCATION

TOTAL VOCs

- 1,000 mg/kg
- 100 mg/kg
- 10 mg/kg

NOTES:

1. THE BORINGS WERE FIELD LOCATED USING A HAND-HELD GLOBAL POSITIONING SYSTEM (GPS) UNIT.
2. COORDINATES REFER TO NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
3. VOC CONTOURING GENERATED BY EARTH VOLUMETRIC STUDIO (EVS).
4. UVOST RESPONSE DISTRIBUTION GENERATED BY EARTH VOLUMETRIC STUDIO (EVS). UVOST SERVICES PROVIDED BY DAKOTA TECHNOLOGIES, INC.
5. TVOCS SHALLOWER THAN 30 FT BLS NOT SHOWN.

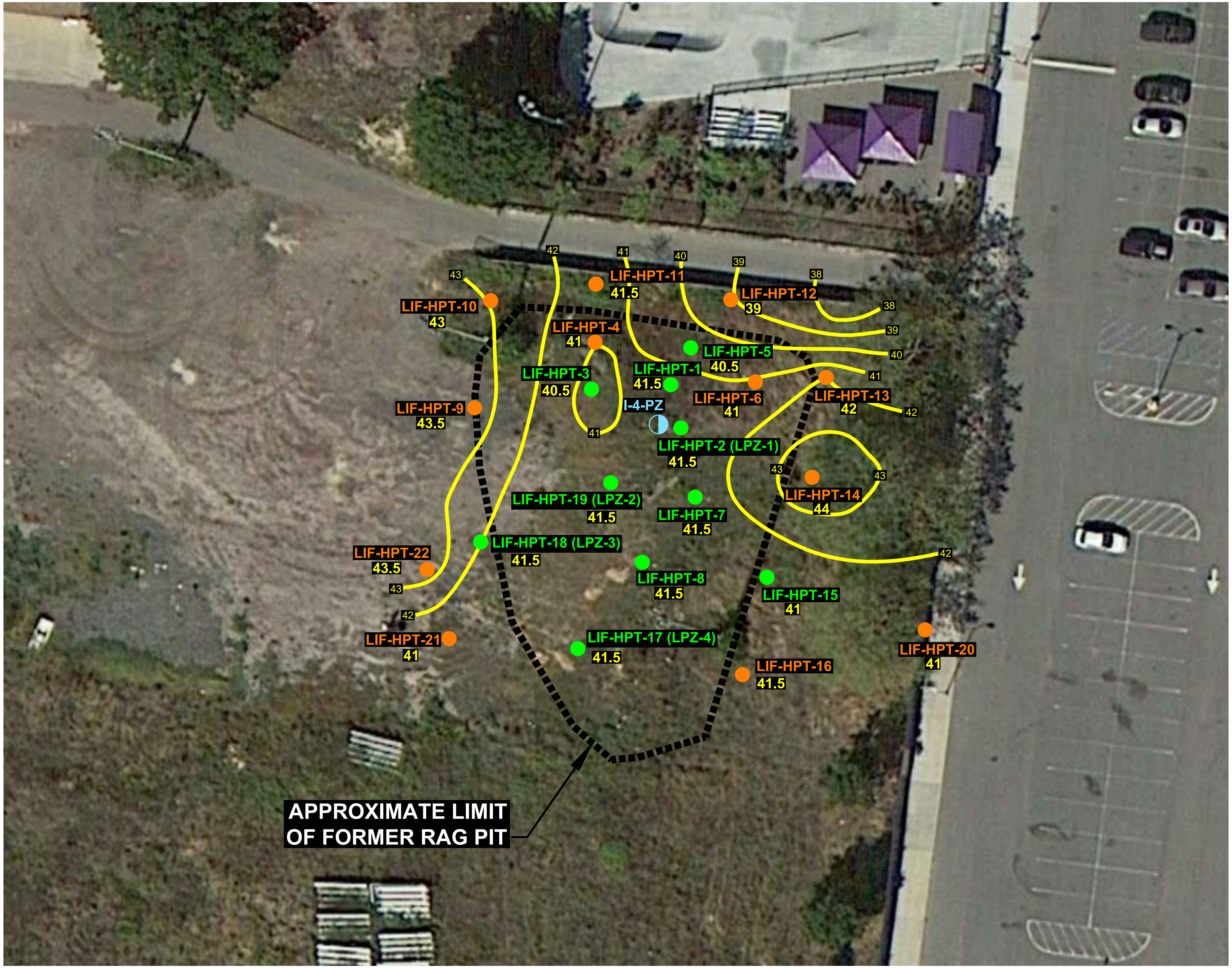
VOC	VOLATILE ORGANIC COMPOUND
LIF	LASER-INDUCED FLUORESCENCE
HPT	HYDRAULIC PROFILING TOOL
UVOST	ULTRA-VIOLET OPTICAL SCREENING TOOL
RE	REFERENCE EMITTER

NORTHROP GRUMMAN SYSTEMS CORPORATION
OPERABLE UNIT 3
BETHPAGE, NEW YORK

UVOST RESPONSE BELOW 43 FEET AND DISTRIBUTION OF TVOCS IN SOIL BELOW 30 FEET

ARCADIS Design & Consultancy for natural and built assets

FIGURE
6



LEGEND:

- EXISTING PERCHED WATER PIEZOMETER LOCATION
- 2018 PHASE I LIF-HPT BORING LOCATION
- 2018 PHASE I LIF-HPT/ PHASE II SOIL BORING LOCATION
- LPZ CONTOUR (FT BLS)

NOTES:

1. THE BORINGS WERE FIELD LOCATED USING A HAND-HELD GLOBAL POSITIONING SYSTEM (GPS) UNIT.
2. COORDINATES REFER TO NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
3. DEPTH IN FT BLS DETERMINED FROM HPT DATA.
4. CONTOURING GENERATED BY EARTH VOLUMETRIC STUDIO (EVS).

LIF LASER-INDUCED FLUORESCENCE

HPT HYDRAULIC PROFILING TOOL

LPZ LOW PERMEABILITY ZONE

0 30' 60'

APPROXIMATE SCALE IN FEET

NORTHROP GRUMMAN SYSTEMS CORPORATION
OPERABLE UNIT 3
BETHPAGE, NEW YORK

DEPTH TO UPPER SURFACE OF LPZ WITHIN LNAPL ASSESSMENT AREA

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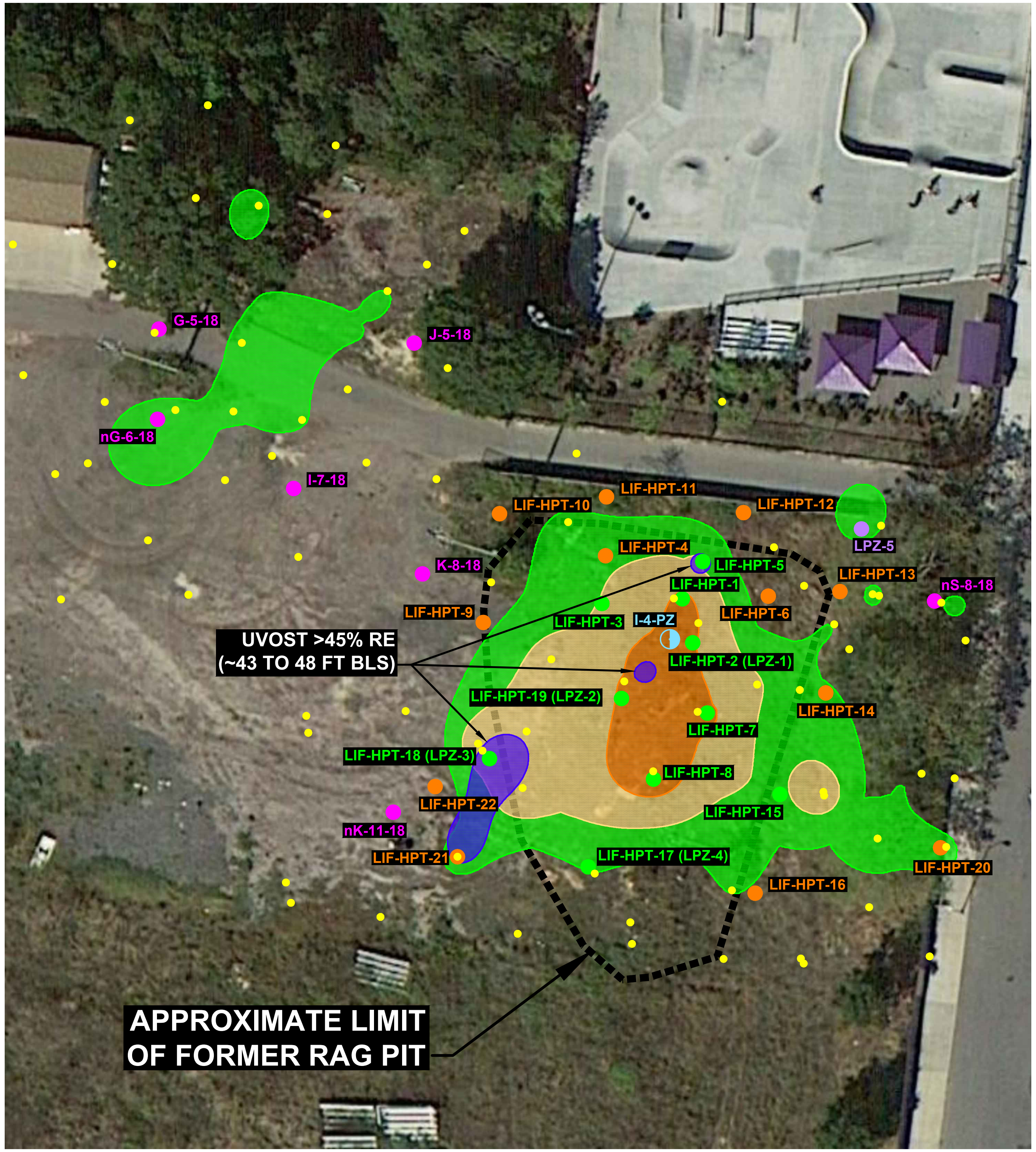
FIGURE 7



PLAN VIEW

0 40' 80'

APPROXIMATE SCALE IN FEET

LEGEND:

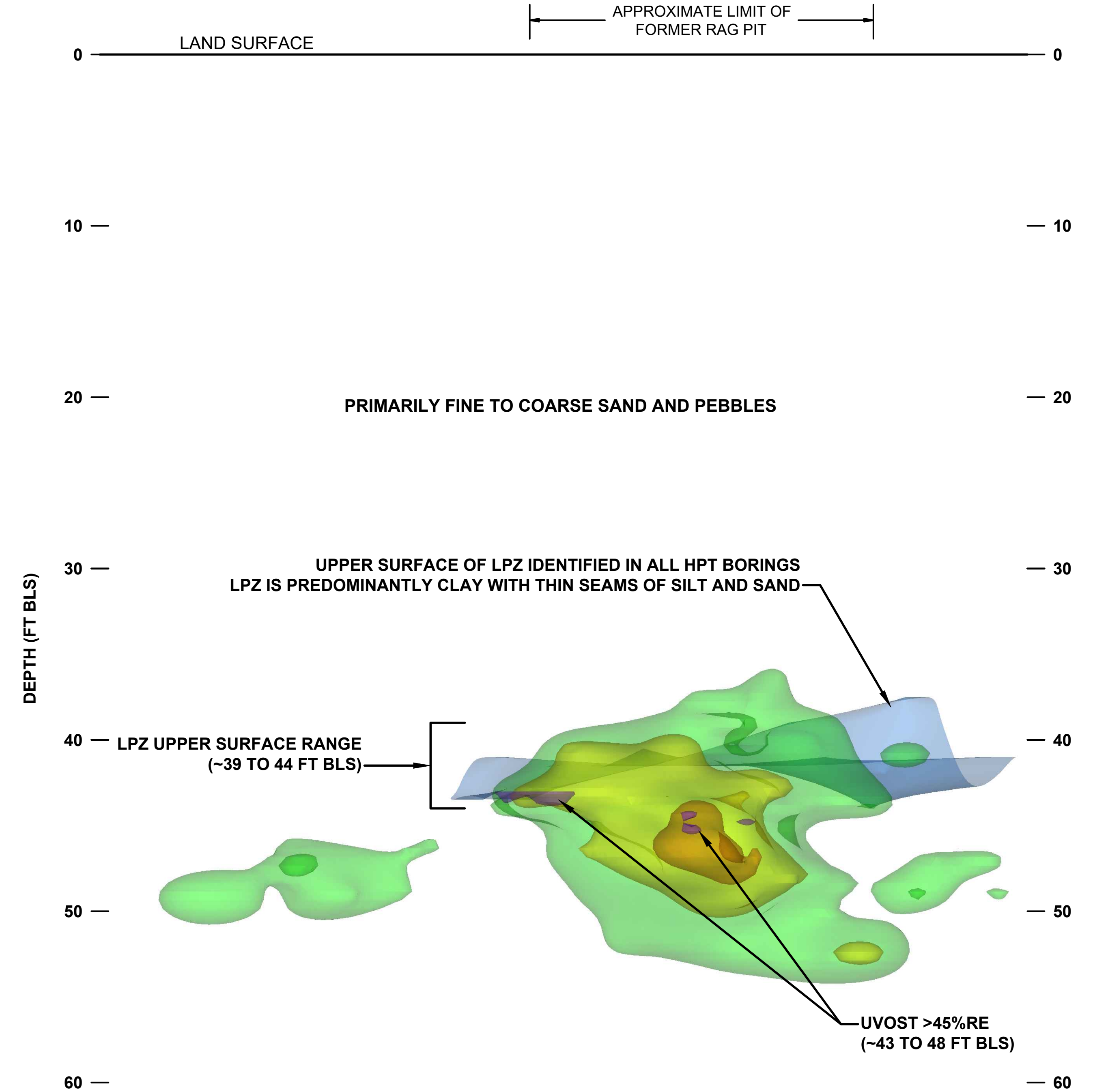
- HISTORICAL (2004-2017) VOC SAMPLE LOCATIONS
- EXISTING PERCHED WATER PIEZOMETER LOCATION
- 2018 PHASE I LIF-HPT BORING LOCATION
- 2018 PHASE I LIF-HPT/PHASE II SOIL BORING LOCATION
- 2018 PHASE III SOIL BORING LOCATION
- 2018 PHASE IV SUPPLEMENTAL VOC DELINEATION SAMPLE LOCATION

TOTAL VOCs

1,000 mg/kg

100 mg/kg

10 mg/kg



VERTICAL SIDE VIEW (LOOKING NORTH)

NOTES:

1. THE BORINGS WERE FIELD LOCATED USING A HAND-HELD GLOBAL POSITIONING SYSTEM (GPS) UNIT.
2. COORDINATES REFER TO NEW YORK STATE PLANE COORDINATE SYSTEM, LONG ISLAND ZONE, NORTH AMERICAN DATUM OF 1983 (NAD 83).
3. TVOCS SHALLOWER THAN 30 FT BLS NOT SHOWN.
4. VERTICAL EXAGGERATION 5X.
5. VOC AND LPZ CONTOURING GENERATED BY EARTH VOLUMETRIC STUDIO (EVS).
6. UVOST RESPONSE DISTRIBUTION GENERATED BY EARTH VOLUMETRIC STUDIO (EVS). UVOST SERVICES PROVIDED BY DAKOTA TECHNOLOGIES, INC.

VOC	VOLATILE ORGANIC COMPOUND
LIF	LASER-INDUCED FLUORESCENCE
HPT	HYDRAULIC PROFILING TOOL
UVOST	ULTRA-VIOLET OPTICAL SCREENING TOOL
LPZ	LOW PERMEABILITY ZONE
RE	REFERENCE EMITTER

NORTHROP GRUMMAN SYSTEMS CORPORATION
OPERABLE UNIT 3
BETHPAGE, NEW YORK

UVOST RESPONSE, DISTRIBUTION OF TVOCS, AND LPZ

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FIGURE 8

XREFS: X-PS-BDR-BL X-PLUME

APPENDIX A

Soil Boring Logs

APPENDIX B

IDW Waste Characterization Data

APPENDIX C

Dakota Technologies, Inc. Report

APPENDIX D

Photograph Logs

APPENDIX E

Laboratory Reports

APPENDIX F

Data Usability Summary Reports

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