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Infrastructure, environment, buildings

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Mr. Steven Scharf, P.E.
New York State Department of Environmental Conservation
Remedial Action, Bureau A
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7015

ENVIRONMENTAL

Subject:
Phase 2 (Off-Site) Remedial Investigation Work Plan,
Bethpage Community Park, Operable Unit 3 - Former Grumman Settling Ponds
Bethpage, New York.

Date:
27 June 2005

Contact:
Carlo San Giovanni

Phone:
(631) 391-5259

Email:
csangiovanni@arcadis-us.com

Our ref:
NY001348.0705.00002

Dear Mr. Scharf:

As previously discussed and agreed to, until such time as a full-scale Remedial Investigation/Feasibility Study (RI/FS) Work Plan for the Bethpage Community Park (Park), Operable Unit 3 (OU3) – Former Grumman Settling Ponds site (Site) is submitted and approved, the initial scope of work for the RI is being proposed, approved, and conducted in phases based on submitted letter form work plans. At the present time, Phases 1, 1A, and 1B are complete as of June 24, 2005. Therefore, in an attempt to keep the RI moving forward while the full-scale RI/FS Work Plan is being prepared, ARCADIS is submitting this work plan, on behalf of the Northrop Grumman Corporation (NGC), for approval of the next phase (Phase 2) of the RI. In accordance with the OU3 Order on Consent (Order) (which has been executed by the New York State Department of Environmental Conservation [NYSDEC]), the full-scale RI/FS Work Plan will be prepared and submitted to NYSDEC within 60 days of the effective Order date, and will incorporate the previously approved/completed work scope and methodologies. Additionally, the results from the Phase 1, 1A, and 1B investigations will be appended to the RI/FS Work Plan.

This Phase 2 RI Work Plan, summarizes the initial scope of work proposed for the investigation of groundwater in the off-site areas south/southeast of the Site. Similar to the previous Phase 1 work plans, this work plan is intended to be dynamic in nature to allow flexibility in scope (based on findings), and includes the proposed data collection, analysis, and evaluation methodologies to be used, as well as a tentative schedule. Table 1 summarizes the proposed field activities and laboratory analyses. Figure 1 is a site plan showing the proposed work activity locations. This Phase 2 Work Plan incorporates the investigation methods that were described in the Phase 1 Work Plan, dated June 7, 2004 and approved by the NYSDEC.

In summary, ARCADIS proposes the following Phase 2 RI work scope:

1. **Site Access and Utility Markouts:** Drilling locations proposed for the Phase 2 investigation (see Figure 1) are located in the Town of Oyster Bay (TOB) along residential street right-of-ways. Prior to mobilizing for drilling, New York State One-Call will be contacted to arrange and conduct utility mark-outs for the area(s) to be investigated. If determined to be necessary, utility markouts may also be conducted using geophysical means. In either case, the top 5 ft (from land surface to 5 feet below land surface [ft bls]) at each of the proposed drilling locations will be hand dug.

2. **Vertical Profile Borings (VPBs):** Fourteen VPBs (VP-100 to VP-113) are proposed to investigate the groundwater quality off-site, generally south/southeast of the Site. The locations of the VPBs are based on preliminary particle tracking modeling, which incorporates the Phase 1, 1A, and 1B data. Based on the results of these VPBs, additional VPBs may be proposed and drilled either during a subsequent phase of work, or during the Phase 2 mobilization. Conversely, some of the proposed 14 VPBs may not be drilled or their locations may be adjusted based on data collected and evaluated.

3. **Data Evaluation:** ARCADIS will review, summarize, and evaluate the data developed from the above proposed VPBs.

ARCADIS' general approach for the proposed work scope, which will be implemented upon receipt of NYSDEC written approval, is described in the following sections. The objectives of the Phase 2 RI are as follows: (1) determine the nature and extent of Site-related groundwater volatile organic compound (VOC) impacts in the areas south/southeast of the Site and, (2) determine the need for and scope of additional phases of the off-site investigation.

Pre-Field Preparation

NYSDEC approval of this work plan will be obtained, and all applicable TOB notifications and pre-mobilization requirements, consistent with the TOB Site Access Agreement, will be completed prior to mobilization for Phase 2.

Utility Markouts

As required by the TOB Site Access Agreement, an independent, location and mark-out of underground utilities and other potential buried obstructions will be made prior to commencing intrusive work. New York State One-Call will be contacted to perform utility markouts before subsurface work begins. Additionally, if necessary, a geophysical survey subcontractor may be used to identify and delineate locations of

subsurface utilities and any other metallic anomalies within the areas proposed for VPB installation.

Vertical Profile Borings

ARCADIS utilized particle tracking modeling to assist with identifying preliminary locations and depths of the VPBs proposed for the Phase 2 RI. The modeling conducted, which incorporated data developed from Phases 1, 1A, and 1B, indicated the potential for VOCs present in groundwater beneath the Sit to migrate off-site to the south and southeast. Based on this modeling, ARCADIS has proposed 14 VPBs arranged in four east-west oriented transects, as follows: Transect 1: Thomas Avenue/Sherwood Drive (VP-100 to VP-104); Transect 2: Sherman Avenue/Corronet Crescent (VP-105 to VP-109); Transect 3: Burkhardt Avenue/Powell Avenue (VP-110 to VP-112); and Transect 4: Steuben Avenue (VP-113) (see Figure 1). Because the modeling conducted shows that the potential off-site VOC-impacted groundwater (plume) will move vertically downwards as it moves horizontally to the south/southeast, the proposed VPB depths will vary for each transect and will range from about 400 ft bls to about 650 ft bls (see Table 1 for details). Based on the modeling conducted, it is anticipated that the proposed VPB transects will intersect the potential off-site plume and will provide information on the nature and extent of the plume.

ARCADIS will utilize Delta Well & Pump Co., Inc. to drill and sample the proposed VPBs. The driller will mobilize a hollow-stem auger drilling rig and utilize a temporary well point and submersible pump to drill and sample VPBs up to 450 ft deep. A mud rotary (MR) drilling rig and hydropunch sampler will be used to drill and sample VPBs at depth intervals in excess of 450 ft deep. Additionally, the driller will mobilize ancillary vehicles/equipment, as necessary. The previously-designated staging area on the NGC commissary property (west of the Site) will be used to store and decontaminate equipment, as well as temporarily store investigation derived wastes until characterization and proper disposal are completed. The scope of the proposed Phase 2 RI investigation will include the drilling and collection of groundwater samples from 14 VPBs. Groundwater samples will be collected from each VPB for laboratory analysis of VOCs. Except as stated below, the proposed Phase 2 investigation will utilize drilling, geophysical logging, groundwater sampling, and laboratory analysis methodologies consistent with previous work done during Phases 1, 1A, and 1B. Furthermore, ARCADIS may adjust laboratory turnaround times and/or VPB locations to accelerate/optimize the drilling program, based on the timing of groundwater quality results obtained. Additionally, ARCADIS will provide a full-time qualified on-site field hydrogeologist to oversee/document activities and collect groundwater samples.

Exceptions to the previously-approved investigation methodologies include the following:

- A MR rig (equipped with portable mud pits) and hydropunch sampler will be used to drill and sample VPBs at intervals in excess of 450 ft bls.
- To minimize nuisance to residents (i.e., noise, schedule, and alteration of traffic patterns) while, at the same time, focusing the collection of samples on the essential data needed to characterize the nature and extent of the potential plume, the following measures will be carried out :
    - The collection of split-spoon soil samples will not be conducted during VPB drilling as this activity tightens the sediments making it difficult to achieve maximum drilling depths with an auger rig, and creates a noise nuisance.
    - VPB locations were selected on street corners to utilize the longer road shoulder so that residential driveways will not be blocked and road closures will not be necessary.
    - Every effort will be made to purge water lost during drilling plus three standing well casing volumes of groundwater from the temporary well points prior to sample collection. However, due to the formation being sampled and the depth of the well points in this Phase 2 investigation (up to 450 ft bls) excessive time may be required to purge a zone prior to sample collection, or it may be necessary to re-drill/reinstall the temporary well point to obtain purge volumes needed. These above measures would add considerable time to the work and therefore be a nuisance to the nearby residents. Therefore, for zones with poor yields, ARCADIS proposes to purge a minimum of three standing well casing volumes prior to sample collection.

In general, preparation work and VPB drilling, sampling, and abandonment will consist of the following (site-specific conditions may warrant slight modifications to this approach):

1. Assuming NYSDEC approves this work plan with no or only minor changes, then prior to start of drilling, ARCADIS and NGC will prepare a brief fact sheet similar to that used for the work on-site describing the proposed Phase 2 work scope, schedule, hours of operation, and other pertinent facts. Representatives from NYSDEC, NGC, and ARCADIS will then go door-to-door (limited to houses to be affected by drilling activities and adjacent houses within appropriate radius of the work) to deliver the fact sheet and discuss the need for, scope and

schedule of the proposed Phase 2 investigation. Comments received from the door-to-door visits will be considered for incorporation into the program.

2. Concrete coring will be performed, as needed, to access the subsurface and to minimize disturbance to the surrounding area.

3. VPB borehole drilling will be initiated. For VPBs drilled by the hollow stem auger method, the VPB will be drilled until the total depth of the VPB is reached (estimated at a maximum depth of 450 ft bls), followed by Steps 4 through 8, below. For VPBs drilled by the MR method, the VPB will initially be drilled by the auger method as discussed immediately above and in Steps 4 through 8 below, then the borehole will be abandoned and the auger rig will be moved from the drill site. The MR rig will then be set-up a few feet from the augered hole and drilled without sampling (groundwater or soil) to the depth of the just completed augered hole. Groundwater sampling will then be resumed at 20 ft intervals using a hydropunch sampler (samples will be collected through the drill bit from the undisturbed portion of the borehole). The hydropunch sampling will proceed downward to the full depth of the borehole as the drilling occurs (as opposed to the auger and well point method where sampling will proceed from the bottom of the borehole up). As stated above, the number and/or locations of VPBs may be modified to accelerate/optimize the drilling program, based on the groundwater quality results obtained.

4. A temporary well point (black steel casing/stainless steel screen) will be installed (estimated at bottom of VPB) once the VPB has been drilled to its specified depth, and the hollow-stem augers will be removed.

5. Borehole geophysical logging (natural gamma) will be performed and groundwater sampling intervals will be selected.

6. Following stabilization of field parameters (pH, specific conductance, and temperature) the groundwater sample will be collected from the temporary well using a 2-inch diameter submersible pump. The VPB will then be retracted vertically upward to the next selected groundwater sampling interval (20-foot intervals are proposed).

7. Groundwater samples will be submitted to a NYS-certified laboratory for analysis of Target Compound List (TCL) VOCs using NYSDEC Analytical Services Protocol (ASP) Method 2000. Sample handling, collection, and analysis protocols will be consistent with the Quality Assurance Project Plan (QAPP) developed for the NGC site (ARCADIS G&M, Inc. 2002).

8. Following completion of the VPB, the rig and tools will be decontaminated using high-pressure steam cleaning (performed at the staging area), residual containerized investigation-derived waste will be removed to the staging area, the VPB borehole will be abandoned according to NYSDEC protocols, and the

rig/ancillary equipment will be mobilized to the next VPB location. Site restoration will also be conducted at the completed VPB, as needed.

9. VPB locations will be surveyed to the NYS Plane Coordinate System and National Geodetic Vertical Datum.

The NGC Health and Safety Plan (ARCADIS G&M, Inc. 2004) and New York State Department of Health (NYSDOH) Community Air Monitoring Plan (CAMP – Attachment 1) will be followed for all site work.

Data Evaluation

As stated previously, the Phase 2 RI field program was designed based on modeling, information obtained from the Phase 1 RI, and our understanding of the factors affecting plume migration in this area. However, during the course of drilling VPBs VP-100 to 113, ARCADIS will re-evaluate the need for, location, and depth of the VPBs. If the proposed work scope/VPB locations change, or if there is the need for additional VPBs, ARCADIS will prepare an amended table summarizing the revised work scope and an updated site plan showing the revised locations of VPBs and submit this to the NYSDEC and TOB prior to drilling.

Data evaluation of the VPB groundwater data will include validation of the data (consistent with NYSDEC DER-10 Draft Site Characterization Guidance Document [2002]), additions/updates/modifications to the existing data tables, additions/ updates/modifications to the draft hydro-chemical cross sections and updates to draft plan-view VOC plume maps that were provided to NYSDEC in our December 1, 2004 report.

Data validation and useability requirements/protocols will be consistent with the QAPP developed for the NGC site (ARCADIS G&M, Inc. 2002).

Site Operations Plan and Estimated Schedule

In accordance with Section 4 of the TOB Site Access Agreement, a Remedial Investigation Site Operations Plan (RISOP), which covers the proposed Phase 2 scope described herein, has been prepared and is provided with this work plan as Attachment 2. As a NYSDEC-approved work plan must be submitted to TOB prior to our mobilization to the site, we would appreciate NYSDEC's prompt review and approval of this work plan.

ARCADIS estimates that mobilization for the Phase 2 VPB drilling program proposed herein will be initiated on or about July 5, 2005 (door-to-door site visits will be conducted on or about June 29, 2005) and, using two drilling rigs with two

drilling/sampling crews, will take about 14 weeks to complete (augered portion of the program only). If additional drilling via MR is required to deepen selected VPBs, ARCADIS will provide an amended schedule to TOB and the NYSDEC prior to commencing work.

If you have any questions or comments, please feel free to call.

Sincerely,

ARCADIS G&M, Inc.

David E. Stern
Senior Hydrogeologist

Carlo San Giovanni
Project Manager

Michael Wolfert
Project Director

Enclosures

Copies:
John Cofman, Northrop Grumman
Larry Leskovjan, Northrop Grumman

Table 1. Summary of Phase 2 Off-Site Remedial Investigation and Rationale, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Description of Activity Location Identification	Proposed Total Depth (ft bls)	Proposed Groundwater Sampling Intervals (ft)	Proposed Groundwater Analysis	Proposed Geophysical Logging	General Rationale
Vertical Profile Borings					
VP-100	420 (1)	20 (1) (4)	VOC (2)	Yes (3)	VPBs will be drilled to help delineate the vertical and horizontal extent of the off-site portion of groundwater VOC standard exceedences that were identified on-site. VPBs will be drilled at locations shown on Figure 1. Geophysical logging will be performed to provide a continuous profile of borehole lithology. Based on lithology in VPBs and/or groundwater quality results obtained, the locations of the VPBs and/or the groundwater sampling interval may be adjusted.
VP-101 through VP-102	450 (1)	20 (1) (4)	VOC (2)	Yes (3)	
VP-103 through VP-104	370 (1)	20 (1) (4)	VOC (2)	Yes (3)	
VP-105 through VP-106	570 (1)	20 (1) (4)	VOC (2)	Yes (3)	
VP-107 through VP-109	500 (1)	20 (1) (4)	VOC (2)	Yes (3)	
VP-110 through VP-113	650 (1)	20 (1) (4)	VOC (2)	Yes (3)	

Footnotes:

(1) For VPBs less than 450 ft deep, the VPB will be drilled and sampled using the Hollow-Stem Auger and Temporary Well Point methods, respectively. Groundwater sampling using the temporary well point method will commence with collection of the sample at the bottom of the borehole and proceed upward at 20 ft intervals until the water table is reached. For that portion of the VPB that is deeper than 450 ft bls, the mud rotary and hydropunch methods will be used to drill and sample the VPB, respectively.

(2) Laboratory analysis of groundwater samples shall be performed using the following method:
- VOCs: TCL List of VOCs using NYSDEC ASP Method 2000.

(3) Geophysical logging will be performed using the natural gamma method.

(4) Additional, more frequent groundwater sampling may be performed based on field conditions.

Definitions:

VPB	Vertical Profile Boring
ft bls	feet below land surface
TCL VOC	Target Compound List of Volatile Organic Compounds
NYSDEC	New York State Department of Environmental Conservation

EXPLANATION

- PROPERTY BOUNDARY OF THE FORMER GRUMMAN AEROSPACE SITE
- PROPERTY BOUNDARY OF U.S. NAVY SITE
- LONG ISLAND RAILROAD
- DENOTES NORTHROP GRUMMAN OWNED PROPERTY
- DENOTES U.S. NAVY OWNED PROPERTY
- RECHARGE BASIN
- VP-1 COMPLETED VERTICAL PROFILE BORING LOCATION AND DESIGNATION
- VP-100 PROPOSED VERTICAL PROFILE BORING LOCATION AND DESIGNATION
- 6781 INDUSTRIAL WELL
- 9591 PUBLIC SUPPLY WELL
- 10592 OBSERVATION, MONITORING WELL
- 4175 IRRIGATION WELL
- ONCT-2 NORTHROP GRUMMAN OR NAVY PRODUCTION WELL OR OU2 REMEDIAL WELL
- GP-11 ABANDONED PRODUCTION WELL
- PRIMARY ROADWAYS TO BE USED AS TRAFFIC ROUTES FOR VEHICLES ASSOCIATED WITH RI ACTIVITIES.

DEFINITIONS:

BWD	BETHPAGE WATER DISTRICT
VP	VERTICAL PROFILE BORING
RI/FS	REMEDIAL INVESTIGATION/FEASIBILITY STUDY

GENERAL NOTES:

1. THIS FIGURE INCLUDES LOCATIONS OF PUBLIC SUPPLY WELLS BASED ON INFORMATION RECIEVED BY ARCADIS IN RESPONSE TO A SEPTEMBER 2001 LETTER TO WATER DISTRICTS.
2. BASIN LOCATIONS OBTAINED FROM USGS TOPOGRAPHIC MAPS (HUNTINGTON, HICKSVILLE, FREEPORT AND AMITYVILLE QUADRANGLES) AND INFORMATION PROVIDED BY NORTHROP GRUMMAN.
3. NORTHROP GRUMMAN PROPERTY HOLDINGS BASED ON DATA PROVIDED IN JUNE 2003.
4. LOCATIONS OF MONITORING WELLS INSTALLED BY DVIRKA & BARTILUCCI (D&B) AT PLANT 1 (i.e., MW-1 TO MW-6) ARE APPROXIMATE BASED ON D&B SITE PLAN, PROVIDED ON DECEMBER 19, 2002.
5. LOCATIONS OF MONITORING WELLS INSTALLED BY DVIRKA & BARTILUCCI (D&B) AT BETHPAGE COMMUNITY PARK ARE APPROXIMATE BASED ON DATA PROVIDED BY D&B SITE PLAN, DATED DECEMBER 2003.

SITE OPERATION PLAN NOTES:

1. WELL & VPB LOCATIONS ARE APPROXIMATE.
2. PROPOSED VPB LOCATIONS WILL BE FIELD VERIFIED AND ARE SUBJECT TO CHANGE BASED ON FIELD CONDITIONS AND UTILITY MARKOUTS.
3. RIG, SUPPORT TRUCK AND WORKER PARKING WILL BE WITHIN DESIGNATED WORK ZONE AROUND EACH PROPOSED VPB. (SEE DETAILS ON DRAWINGS 2 & 3, DIMENSIONS WILL VARY BASED ON ACCESS AND SITE CONDITIONS.
4. MAJOR EQUIPMENT (i.e., DRILLING RIG AND TOOLS) DECONTAMINATION TO BE PERFORMED AT THE NGC STAGING AREA. MINOR WASH AND RINSE OF SAMPLING EQUIPMENT WILL BE PERFORMED AT VPB LOCATIONS.
5. WORK AREAS WILL BE SECURED WITH CAUTION TAPE AT ALL TIMES.
6. STOCKPILING OF SOIL WILL NOT OCCUR AT VPB LOCATIONS. DRILL CUTTINGS MUD AND WATER WILL BE CONTAINERIZED AND MOVED OFF TO THE NGC STAGING AREA EACH DAY FOR EVENTUAL CHARACTERIZATION AND DISPOSAL.
7. EXCAVATION (OTHER THAN DRILLING) AND DIVERSION OF UTILITIES ARE NOT REQUIRED AND WILL NOT BE PERFORMED.
8. IF NEEDED, WORK AREA EVACUATION WILL INVOLVE SHUTDOWN OF RIG OR SAMPLING OR SUPPORT TRUCK, SECURING THE BOREHOLE AND EXITING THE WORK AREA IN AN ORDERLY MANNER.
9. WORK AREAS WILL BE SECURED WITH CONSTRUCTION FENCING DURING NON-WORKING HOURS. HOLES/PITS/TUBS WILL BE COVERED AND SECURED DURING NON-WORKING HOURS. LIGHTED (BLINKING) CONSTRUCTION BARRIERS WILL BE ERECTED AND OPERATED AROUND THE WORK AREA(S) DURING NON-WORKING HOURS.
10. NEARBY FIRE HYDRANTS WILL BE USED FOR POTABLE WATER DURING DRILLING. DRILLER WILL SECURE HYDRANT PERMITS BEFORE USE.
11. IN CASE OF QUESTIONS OR CONCERNS 24 HOURS/DAY, PLEASE CONTACT:

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REV. ISSUED DATE DESCRIPTION

KEYPLAN

0' 300' 600'
SCALE: 1" = 300'

PROJECT TITLE

OPERABLE UNIT 3

FORMER GRUMMAN SETTLING PONDS BETHPAGE, NEW YORK

SHEET TITLE

SOUTH PROJECT AREA SHOWING REMEDIAL INVESTIGATION SITE OPERATIONS PLAN

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SEAL | SEAL

PROJECT MANAGER: C. SAN GIOVANNI	DEPARTMENT MANAGER: M. WOLFERT
LEAD DESIGN PROF.	CHECKED BY: D. STERN
TASK/PHASE NUMBER: 00001	DRAWN BY: E. HUGHES
PROJECT NUMBER: NY001348.1005	DRAWING NUMBER: 1

Acad Version : R16.2s (LMS Tech) Date\Time : Fri, 24 Jun 2005 - 2:54pm
User Name : ehughes Path\Name : G:\APROJECT\Northrop Grumman\Cadd\OFF-SITE RI SITE PLAN.dwg - Layout Tab : 36X24 H (2)

Attachment 1
Community Air Monitoring Plan
Northrop Grumman Corporation, Bethpage, New York.

Date Prepared: May 18, 2005

Introduction

In accordance with New York State Department of Health (NYSDOH) requirements, this Community Air Monitoring Plan (CAMP) has been prepared for use during certain investigative and remedial field activities associated with the Northrop Grumman Corporation (NGC), Bethpage Facility (Site). This CAMP serves to present the methods and procedures to conduct real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at each designated work area when certain activities are in progress. This CAMP is not intended for use in establishing action levels for worker respiratory protection; action levels are described in the Northrop Grumman Corporation Health and Safety Plan (HASP) (ARCADIS G&M, Inc. 2004). The intent of this CAMP is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers that are not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities that are related to the Site. The response levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, this CAMP helps to confirm that work activities do not spread contamination off-site through the air.

Depending upon the nature of the site-related contaminants of concern, chemical-specific monitoring, with appropriately-sensitive methods, may be required during field work (please refer to the HASP for details).

Reliance on this CAMP does not preclude simple, common-sense measures to keep potential VOCs, dust, and odor emissions at a minimum around work areas.

The following sections of this CAMP present the monitoring instrumentation required to comply with NYSDOH policy, the frequency of monitoring, response levels, and response actions.

Monitoring Instrumentation

Based on the currently available analytical data and the contaminants of concern for the NGC Site, real-time air monitoring for VOCs and particulates at the perimeter areas of the work area (i.e., the exclusion zone – see HASP for definition) will be necessary for field activities associated with investigation and remediation of the NGC Site.

VOC monitoring will be performed using real-time monitoring instrumentation that is appropriate to measure the types of VOCs known or suspected to be present at the work location (please refer to the HASP for details). The equipment will be calibrated on the frequency and using the methods described in the HASP. It is preferable to use instrumentation that is capable of calculating 15-minute running average concentrations or provide a written record of readings taken during monitoring events. If neither capability is available, then the reading obtained every 15 minutes will be used for decision making.

The particulate monitoring will be performed using real-time monitoring instrumentation that is capable of measuring particulates less than 10 micrometers in size (PM-10). It is preferable to use instrumentation that is capable of calculating 15-minute running average concentrations or provide a written record of readings taken during monitoring events. If neither capability is available, then the reading obtained every 15 minutes will be used for decision making. The particulate monitoring equipment will be equipped with an audible alarm to indicate exceedence of the response level.

Monitoring Frequency

This section defines the typical activities that will occur in relation to the NGC Site and relates these activities to the frequency of monitoring required.

Continuous monitoring for VOCs and particulates will be carried out for intrusive activities. Additionally, upwind VOC and particulate concentrations will be measured at the **start** of each work day and **periodically** (see below) thereafter to establish the background concentration. Ground intrusive activities typically include the following:

1. Soil excavation and handling.
2. Test pitting or trenching.
3. Drilling and installation of vertical profile borings, soil borings, and/or wells.
4. During the demolition of contaminated or potentially contaminated structures.
5. Construction activities involving earthwork or disturbance of earthen surfaces.
6. Other activities specified in this CAMP.

Periodic monitoring for VOCs will be carried out during non-intrusive activities. For non-intrusive activities, the upwind concentrations will be measured at the **start and finish** of the work effort to establish the background concentration. Non-intrusive activities typically include the following:

1. Site Mobilization/Demobilization of equipment and machinery.
2. Drum or container sampling.
3. Soil sampling (to the extent not coinciding with intrusive work).

If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm **above background** but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the work area or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15- minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

All readings will be recorded on the appropriate air monitoring log (please refer to the HASP for details) or the electronic log will be printed out. Air monitoring results will be appended to the appropriate report.

Particulate Monitoring Station Locations, Response Levels, and Actions

For intrusive activities, the particulate (i.e., dust) monitoring station will be positioned at the downwind perimeter of the work zone (i.e., exclusion zone – see HASP for definition). In addition, fugitive dust migration will be visually assessed during all work activities. The direction of wind (if any) will be periodically recorded during each work day and re-positioning of the downwind monitoring station will be performed accordingly. The response levels and actions for fugitive dust are as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater **than background** (upwind perimeter) for the 15-minute period or if airborne dust is visually observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is observed leaving the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the **background** concentration, then work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust from leaving the work area.

All readings will be recorded on the appropriate air monitoring log (please refer to the HASP for details) or the electronic log will be printed out. Air monitoring results will be appended to the appropriate report.

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Infrastructure, environment, buildings

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VIA EXPRESS MAIL

Messrs. Gregory J. Giammalvo, Esq., Town Attorney and
Steven L. Labriola, Town Clerk
Town of Oyster Bay
Town Hall West
74 Audrey Avenue
Oyster Bay, New York 11771

ENVIRONMENT

Subject:
Phase 2 Remedial Investigation Site Operations Plan,
Operable Unit 3 – Former Grumman Settling Ponds (Bethpage Community Park),
Bethpage, New York.

Date:
June 27, 2005

Contact:
David E. Stern

Phone:
631-391-5284

Email:
dstern@arcadis-us.com

Our ref:
NY001348.0805.0001

Dear Messrs. Giammalvo and Labriola:

In accordance with Section 4 of the May 24, 2005 Site Access Agreement ("Agreement") between Town of Oyster Bay ("Town") and Northrop Grumman Systems Corporation (NGSC), ARCADIS has prepared this Remedial Investigation Site Operations Plan (RISOP) for Phase 2 of the Remedial Investigation (RI) for the Former Grumman Settling Ponds (Bethpage Community Park), Bethpage, New York Site ("RI activities"). Drawings 1, 2, and 3 (enclosed) provide details on the RISOP that are consistent with the requests made in Section 4 of the Agreement.

Also included in this letter are the following:

1. Project Schedule, in accordance with Section 4 of the Agreement (see "Project Schedule", below).
2. Description of Field Supervision to be provided during the RI activities, in accordance with Section 5 of the Agreement (see "Field Supervision", below).

This document serves as Attachment 2 to the Phase 2 RI Work Plan prepared by ARCADIS and is provided for your review and will be provided collectively to the Town with the Final Phase 2 RI Work Plan and New York State Department of Environmental Conservation (NYSDEC) approval letter, in accordance with Section 4 of the Agreement.

Background

NGC appreciates the Town's willingness to permit access to its property for the purposes of conducting the required RI activities. As a general approach to performing RI activities on Town property, it is NGC's intention to conduct such RI activities in a cooperative manner with the Town and to perform all RI activities with the goal of minimizing the effect of RI activities on Town property and the surrounding community.

The RISOP provides information to the Town for RI activities to be performed on the Town Rights-of-Way (i.e., off Site) in areas south and southeast of the Bethpage Community Park (termed the "South Project Area").

The RI activities that are subject to this RISOP have been described in a work plan that has been submitted to the NYSDEC and New York State Department of Health (NYSDOH). The "Phase 2 RI Work Plan" contains (or indicates by reference) a description of methods for the field work to be performed as part of the RI activities subject to this RISOP. In general, the work consists of drilling and sampling vertical profile borings (VPBs) (referred to as "Temporary Test Wells" for the purpose of this RISOP). The sequence of activities associated with drilling, installing, and sampling Temporary Test Wells, as is applicable to this RISOP, is provided in the following section.

Remedial Investigation Site Operations Plan

In accordance with Section 4 of the Agreement before the Phase 2 RI field work begins, the locations and types of underground utilities will be checked (by contacting NYS One-Call and, in some instances, using an independent geophysical specialist, if needed), labeled, and verified by ARCADIS or its subcontractor (on behalf of NGSC) so that the Temporary Test Well (TTW) does not encounter or pass unnecessarily close to underground utilities. The drilling will be performed by mobile drilling rigs using hollow-stem auger methodology. Additional drilling may be performed at selected VPBs using the mud rotary drilling method. All VPBs will be drilled by a licensed New York State Well Driller.

In the case of augered TTWs, split-spoon sampling (if required) will be performed in the borehole before the TTW is installed. The TTWs will be installed by the drill rig and geophysical logging will then be performed. The drill rig will then relocate and a sampling team with a pull rig and support truck will be used to collect groundwater samples from the TTW. Groundwater samples will be collected from discrete

intervals starting from depth (ranging from 300 to 450 feet below land surface [ft bls]) and continuing up to the water table (approximately 50 ft bls) as the TTW is retracted upward and eventually removed. The TTW borehole will be abandoned by following NYSDEC approved methods. Work site restoration will be performed in accordance with Section 11 of the Agreement.

If necessary, additional deeper drilling and groundwater sampling will be performed at some VPB locations that are shown on Drawing 1 using the mud rotary method. In these cases, hydropunch groundwater samples will be collected as the borehole is advanced. Geophysical logging will be performed in the completed borehole. Groundwater samples will be collected from discrete intervals from approximately 450 to 650 ft bls. The borehole will be abandoned by following NYSDEC approved methods. Work site restoration will be performed in accordance with Section 11 of the Agreement.

Drawings 1, 2, and 3 describe the complete details of the RISOP for Phase 2 of the RI. Additional information is provided as necessary in this section. As described in Section 4 of the Agreement, the RISOP (this letter collectively with Drawings 1, 2, and 3) includes or addresses the following:

1. Project Schedule (See "Project Schedule" below).
2. Site Plan showing the following:
   a. Stockpile Areas (Drawing 1).
   b. Staging Area (Drawing 1).
   c. Material and Equipment Storage Area (Drawings 1 and 2).
   d. Truck routes (for ingress and egress along the Rights-of-Way (Drawing 1).
   e. Excavation techniques (Drawing 1).
   f. Equipment decontamination areas (Drawings 1 and 2). The major decontamination will be performed before work commences at a particular location, between locations, and before demobilizing. Decontamination method will consist of steam cleaning. As stated on Drawing 1, major decontamination of rigs, trucks, and downhole tools will be performed in the areas indicated within or near the NGC staging area. Minor washing and rinsing of sampling equipment (hydropunch [if used], split spoons and other small equipment) will occur within the work zone. Such activity will be very limited in nature. Waste will be properly containerized and removed daily

from the work area and staged in the NGC staging area, in accordance with Section 9 of the Agreement.

g. Temporary sanitary facility location (Drawing 1).

h. Methods of diverting active utilities (Drawing 1).

i. Lay-down Areas (Drawing 1).

j. Fencing (Drawings 1, 2, and 3).

k. Worker Parking (Drawing 2). Drawings 2 and 3 show the typical work area for each type of rig that may be used at various locations to be investigated as part of Phase 2 of the RI, and addresses location/orientation of the drilling rig or sampling truck as well as worker/support truck parking at the drilling location.

l. Security Measures (Drawings 1 and 2).

m. Name and telephone numbers of three (3) emergency contacts who can be reached on a 24-hour basis (Drawing 1).

Notification

The Phase 1B work activity within the Park property is substantially completed and as the Phase 2 work activity is part of the overall OU3 RI it will be performed during the same Driller mobilization. Pursuant to the requirements of the Site Access Agreement, prior notice to the Town of the commencement of RI activities was provided on May 25, 2005.

Project Schedule

The first phase of drilling (hollow stem auger drilling) is scheduled to commence July 5, 2005 and is anticipated to require 14 weeks to complete. The schedule proposed has been developed to comply with the provisions of Section 2 of the Agreement, which in sum indicates access shall be limited to the hours of 8:00 AM to 5:00 PM weekdays and that access to perform work is not permitted on weekends and official Town holidays.

ARCADIS' drilling subcontractor will initially mobilize up to three rigs to perform the work described in the Phase 2 RI Work Plan while also complying with the time limitation imposed by the Town. Depending on work progress, additional rigs may be used.

Field Supervision

In accordance with Section 5, ARCADIS shall provide Mr. John Corral, who is an ARCADIS employee. Mr. Corral will serve as the on-site representative and is qualified to supervise the RI activities proposed. If this individual should change, the identification of the replacement Site Supervisor will be submitted to the Town prior to July 5, 2005.

Please contact us if you have any questions or comments.

Sincerely,

ARCADIS G&M, Inc.

David E. Stern
Senior Hydrogeologist

Carlo San Giovanni
Project Manager

Michael Wolfert
Project Director

Enclosures

Copies:
Richard W. Lenz, Commissioner, Town of Oyster Bay Public Works
Theodore W. Firetog, Esq., Rivkin Radler, LLP
Jill Palmer, Northrop Grumman
John Cofman, Northrop Grumman
Larry Leskovjan, Northrop Grumman
Frank Amoroso, Esq., Nixon Peabody, LLP

EXPLANATION

- PROPERTY BOUNDARY OF THE FORMER GRUMMAN AEROSPACE SITE
- PROPERTY BOUNDARY OF U.S. NAVY SITE
- LONG ISLAND RAILROAD
- DENOTES NORTHROP GRUMMAN OWNED PROPERTY
- DENOTES U.S. NAVY OWNED PROPERTY
- RECHARGE BASIN
- VP-1 COMPLETED VERTICAL PROFILE BORING LOCATION AND DESIGNATION
- VP-100 PROPOSED VERTICAL PROFILE BORING LOCATION AND DESIGNATION
- 6781 INDUSTRIAL WELL
- 9591 PUBLIC SUPPLY WELL
- 10592 OBSERVATION, MONITORING WELL
- 4175 IRRIGATION WELL
- ONCT-2 NORTHROP GRUMMAN OR NAVY PRODUCTION WELL OR OU2 REMEDIAL WELL
- GP-11 ABANDONED PRODUCTION WELL
- PRIMARY ROADWAYS TO BE USED AS TRAFFIC ROUTES FOR VEHICLES ASSOCIATED WITH RI ACTIVITIES.

DEFINITIONS:

BWD	BETHPAGE WATER DISTRICT
VP	VERTICAL PROFILE BORING
RI/FS	REMEDIAL INVESTIGATION/FEASIBILITY STUDY

GENERAL NOTES:

1. THIS FIGURE INCLUDES LOCATIONS OF PUBLIC SUPPLY WELLS BASED ON INFORMATION RECIEVED BY ARCADIS IN RESPONSE TO A SEPTEMBER 2001 LETTER TO WATER DISTRICTS.
2. BASIN LOCATIONS OBTAINED FROM USGS TOPOGRAPHIC MAPS (HUNTINGTON, HICKSVILLE, FREEPORT AND AMITYVILLE QUADRANGLES) AND INFORMATION PROVIDED BY NORTHROP GRUMMAN.
3. NORTHROP GRUMMAN PROPERTY HOLDINGS BASED ON DATA PROVIDED IN JUNE 2003.
4. LOCATIONS OF MONITORING WELLS INSTALLED BY DVIRKA & BARTILUCCI (D&B) AT PLANT 1 (i.e., MW-1 TO MW-6) ARE APPROXIMATE BASED ON D&B SITE PLAN, PROVIDED ON DECEMBER 19, 2002.
5. LOCATIONS OF MONITORING WELLS INSTALLED BY DVIRKA & BARTILUCCI (D&B) AT BETHPAGE COMMUNITY PARK ARE APPROXIMATE BASED ON DATA PROVIDED BY D&B SITE PLAN, DATED DECEMBER 2003.

SITE OPERATION PLAN NOTES:

1. WELL & VPB LOCATIONS ARE APPROXIMATE.
2. PROPOSED VPB LOCATIONS WILL BE FIELD VERIFIED AND ARE SUBJECT TO CHANGE BASED ON FIELD CONDITIONS AND UTILITY MARKOUTS.
3. RIG, SUPPORT TRUCK AND WORKER PARKING WILL BE WITHIN DESIGNATED WORK ZONE AROUND EACH PROPOSED VPB. (SEE DETAILS ON DRAWINGS 2 & 3, DIMENSIONS WILL VARY BASED ON ACCESS AND SITE CONDITIONS.
4. MAJOR EQUIPMENT (i.e., DRILLING RIG AND TOOLS) DECONTAMINATION TO BE PERFORMED AT THE NGC STAGING AREA. MINOR WASH AND RINSE OF SAMPLING EQUIPMENT WILL BE PERFORMED AT VPB LOCATIONS.
5. WORK AREAS WILL BE SECURED WITH CAUTION TAPE AT ALL TIMES.
6. STOCKPILING OF SOIL WILL NOT OCCUR AT VPB LOCATIONS. DRILL CUTTINGS MUD AND WATER WILL BE CONTAINERIZED AND MOVED OFF TO THE NGC STAGING AREA EACH DAY FOR EVENTUAL CHARACTERIZATION AND DISPOSAL.
7. EXCAVATION (OTHER THAN DRILLING) AND DIVERSION OF UTILITIES ARE NOT REQUIRED AND WILL NOT BE PERFORMED.
8. IF NEEDED, WORK AREA EVACUATION WILL INVOLVE SHUTDOWN OF RIG OR SAMPLING OR SUPPORT TRUCK, SECURING THE BOREHOLE AND EXITING THE WORK AREA IN AN ORDERLY MANNER.
9. WORK AREAS WILL BE SECURED WITH CONSTRUCTION FENCING DURING NON-WORKING HOURS. HOLES/PITS/TUBS WILL BE COVERED AND SECURED DURING NON-WORKING HOURS. LIGHTED (BLINKING) CONSTRUCTION BARRIERS WILL BE ERECTED AND OPERATED AROUND THE WORK AREA(S) DURING NON-WORKING HOURS.
10. NEARBY FIRE HYDRANTS WILL BE USED FOR POTABLE WATER DURING DRILLING. DRILLER WILL SECURE HYDRANT PERMITS BEFORE USE.
11. IN CASE OF QUESTIONS OR CONCERNS 24 HOURS/DAY, PLEASE CONTACT:

JOHN A. VOSILLA
NORTHROP GRUMMAN CORPORATION
600 GRUMMAN ROAD WEST
BETHPAGE, NY 11714-3582
OFFICE: (516) 575-5119
CELL: (516) 816-5354
PAGER: (516) 275-7159
E-MAIL: JOHN.VOSILLA@NGC.COM

LARRY LESKOVJAN
NORTHROP GRUMMAN CORPORATION
600 GRUMMAN ROAD WEST
BETHPAGE, NY 11714-3582
OFFICE: (516) 575-2333
PAGER: (516) 275-6775
E-MAIL: LARRY.LESKOVJAN@NGC.COM

MICHAEL WOLFERT
ARCADIS
88 DURYEA ROAD
MELVILLE, NY 11747
OFFICE: (631) 391-5238
CELL: (516) 250-8059

REV. ISSUED DATE DESCRIPTION

KEYPLAN

0' 300' 600'
SCALE: 1" = 300'

PROJECT TITLE

OPERABLE UNIT 3

FORMER GRUMMAN SETTLING PONDS
BETHPAGE, NEW YORK

SHEET TITLE

SOUTH PROJECT AREA SHOWING REMEDIAL INVESTIGATION SITE OPERATIONS PLAN

ARCADIS

88 Duryea Road
Melville, NY 11747
Tel: 631-249-7600 Fax: 631-249-7610
www.arcadis-us.com

SEAL	SEAL
PROJECT MANAGER: C. SAN GIOVANNI	DEPARTMENT MANAGER: M. WOLFERT
LEAD DESIGN PROF.	CHECKED BY: D. STERN
TASK/PHASE NUMBER: 00001	DRAWN BY: E. HUGHES
PROJECT NUMBER: NY001348.1005	DRAWING NUMBER: 1

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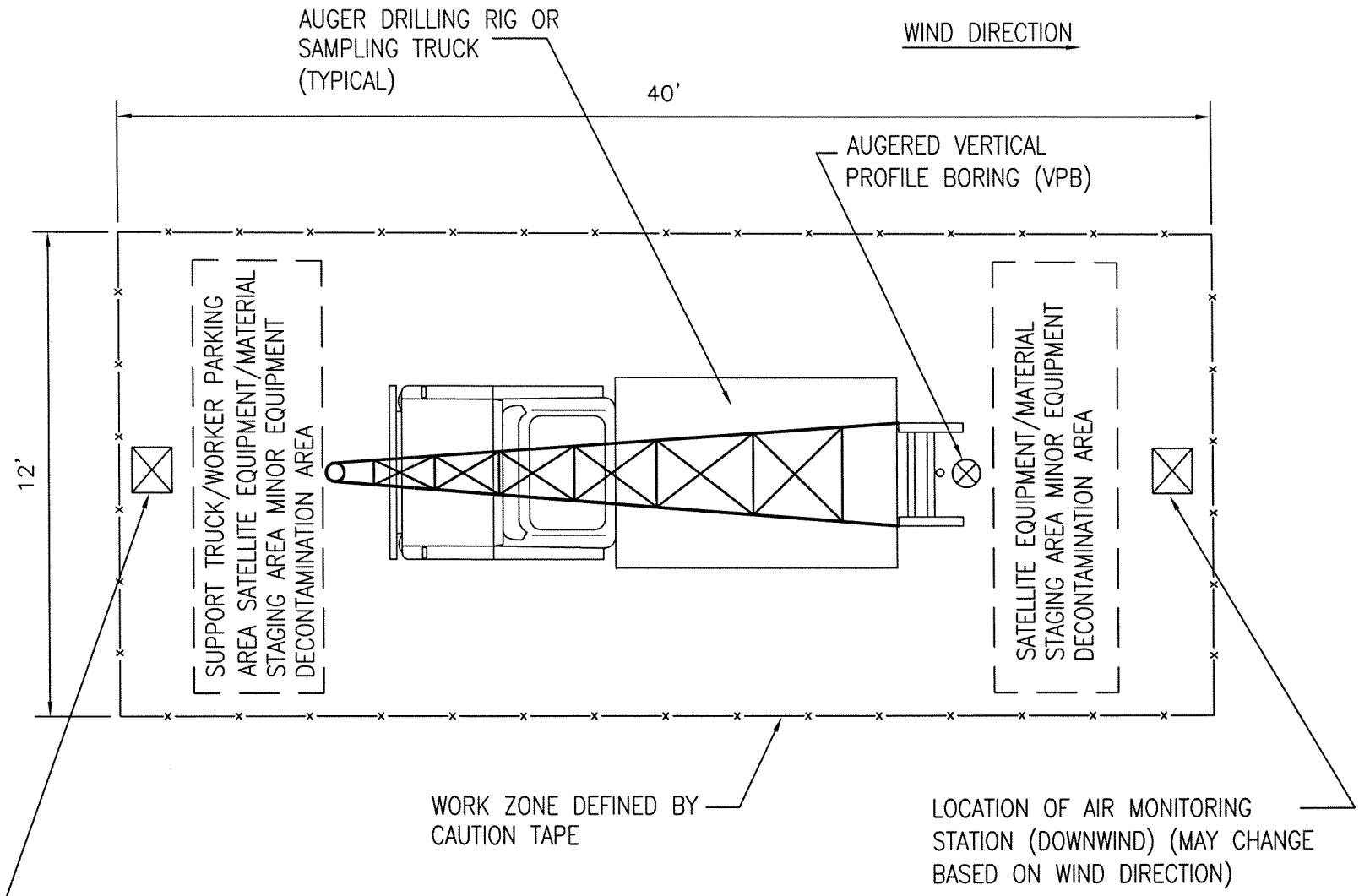

NOTE:

DIMENSIONS AND ORIENTATION OF WORK ZONE AND ITEMS IN WORK ZONE MAY CHANGE BASED ON ACCESS AND FIELD CONDITIONS.

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PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
C. SAN GIOVANNI	M. WOLFERT		D. STERN
SHEET TITLE		TASK/PHASE NUMBER	DRAWN BY
TYPICAL OFF-SITE AUGERED VPB DRILLING/SAMPLING FOOTPRINT		00001	E. HUGHES
		PROJECT NUMBER	DRAWING NUMBER
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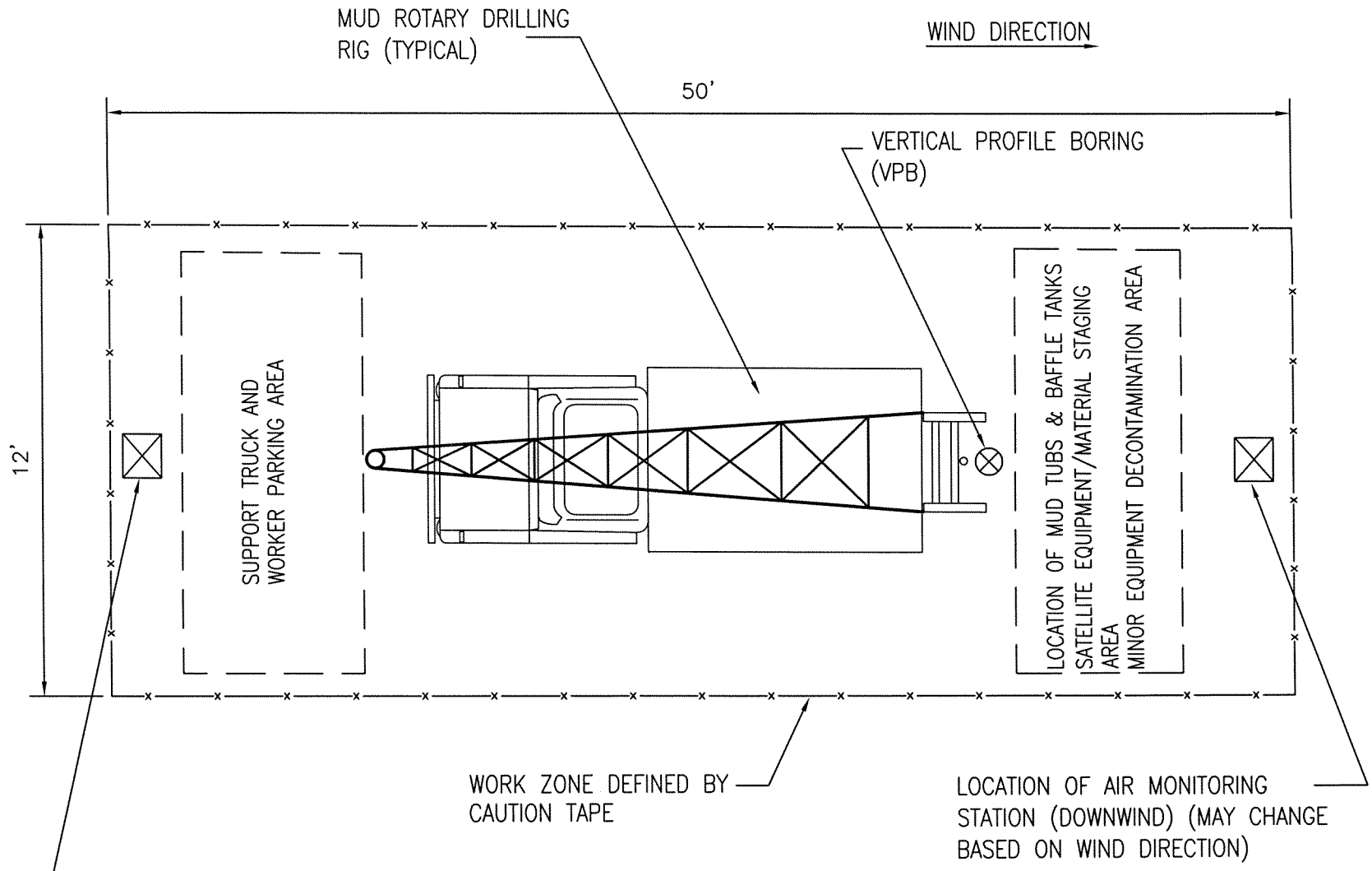

NOTE:

DIMENSIONS AND ORIENTATION OF WORK ZONE AND ITEMS IN WORK ZONE MAY CHANGE BASED ON ACCESS AND FIELD CONDITIONS.

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C. SAN GIOVANNI	M. WOLFERT		D. STERN
SHEET TITLE		TASK/PHASE NUMBER	DRAWN BY
TYPICAL MUD ROTARY VPB DRILLING AND HYDROPUNCH SAMPLING FOOTPRINT		00001	E. HUGHES
		PROJECT NUMBER	DRAWING NUMBER
		NY001348.0805	3