

April 21, 2011



Ms. Michelle Tipple  
New York State Department of Environmental Conservation (NYSDEC)  
Region 3  
21 South Putt Corners Road  
New Paltz, NY 12561

Subject: Work Plan to Install Upgradient Well Clusters  
Hangar D1 Bay 1B Project at the Westchester County Airport  
White Plains, New York

Dear Ms. Tipple:

We would like to thank you and Ms. Brown for meeting with us on March 30, 2011. Confirming our meeting, ExxonMobil is planning to implement the following work scope to investigate possible sources of chlorinated solvents that are upgradient to Hangar D1 Bay 1B at the Westchester County Airport. A Site Location Map and a Site Area Map are included as Figures 1 and 2.

#### **1.0 BACKGROUND / REMEDIAL ACTIVITIES CONDUCTED**

In accordance with the Record of Decision for the Hangar D1 Bay 1B site, soil vapor extraction (SVE) was selected as the remedial alternative for chlorinated volatile organic compounds (CVOCs) found in soils and in-situ oxidation using potassium permanganate was selected as the remedial alternative for CVOCs in ground water.

In 2004, a SVE system was installed and started-up to remediate impacted soils above the water table where they were found in the vicinity of well MW-02. Initial removal rates were 2.5 pounds of CVOCs per year; presently, the system is removing less than 1 pound of CVOCs per year.

In August 2001 and September 2004, Potassium Permanganate was applied to the subsurface beneath Hangar D1 Bay 1B near monitoring wells MW-01 and MW-02 (see Figure 3). Results from samples collected three months after each injection indicated a rebound of contaminant concentrations in the MW-01 area. In November and December 2008, a third application of Potassium Permanganate was applied to the subsurface near monitoring well MW-01, and a subsurface investigation was conducted to discern the source of impact near well MW-01. Again, ground water samples collected after injection showed that contaminant concentrations in the MW-01 area rebounded, and long term concentrations remain stable.

For the 2008 investigation in the MW-01 area, total CVOCs in soil samples were minimal, ranging from an estimated value of 2.7 micrograms per kilogram (ug/kg) to below method detection limits. However, the highest concentration of Tetrachloroethene and the second highest concentration of 1,1,1-Trichloroethane in ground water were detected in the new upgradient well MW-13 along the northwest hangar wall (refer to Figure 3). Concentrations of Tetrachloroethene degradation products, including Trichloroethene, 1,1-Dichloroethene, cis- and trans-1,2-Dichloroethene, and Vinyl Chloride, were found at the highest concentrations downgradient from well MW-13 (refer to the Appendix A).

Research for potential upgradient sources, including extensive documentation obtained under Freedom of Information Law (FOIL) requests, revealed a Former Air National Guard (ANG) Septic Area that is reported to be impacted with Tetrachloroethene. Ongoing investigation at the ANG facility (Site V-00499-3)



documented Tetrachloroethene and its breakdown products in the deep overburden and shallow bedrock ground water between Hangars 6, 26, and V (refer to Figure 2 for hangar locations).

ExxonMobil contacted Westchester County Airport regarding these findings and to request installation of bedrock well clusters between Hangar D and Hangar V. After providing two separate submittals of information to the Airport, the Airport responded that they did not believe the ground water concentrations in the MW-01 area were explained by an upgradient source.

On March 30, 2011, ExxonMobil met with the NYSDEC to review its findings and the site status. At that meeting, ExxonMobil agreed to provide the work plan herein and conduct well installations to expedite the needed project documentation.

## **2.0 PROPOSED ACTIVITIES**

Upon notice from the NYSDEC that this work scope is approved, ExxonMobil and its contractors will coordinate the field schedule with Westchester County Airport. Two well clusters will be installed upgradient of Hangar D as noted on Figure 3. Construction of the wells will be similar to that of existing wells MW-13 and MW-8S (refer to Figure 3 and Attachment B). The shallow well of the cluster will be constructed of 2-inch diameter PVC with 10 feet of 10 slot well screen set at the top of bedrock. The deep well of the cluster will be constructed of 2-inch casing set at the top of rock with 10 feet of open boring into bedrock.

Following installation and redevelopment, each new well will be sampled for laboratory analysis using EPA Method SW846 8260B. Sampling is planned to be conducted coincidental with a quarterly ground water sampling event under the existing ground water monitoring plan for Hangar D1 Bay 1B.

## **3.0 SCHEDULE AND REPORTING**

Well installation activities will be conducted as soon as possible upon approval to proceed from the NYSDEC and Westchester County Airport. Well sampling will be coordinated with the quarterly ground water monitoring program for the Hangar D1 Bay 1B site. Installation activities and ground water monitoring results will be reported in quarterly progress reports submitted for the Hangar D1 Bay 1B site.

Please do not hesitate to contact me at (203) 271-0379 with if you need any additional information to facilitate your review and approval of this Work Plan. Thank you again for your time and assistance.

Sincerely,

WOODARD & CURRAN INC.

Anne E. Proctor, PE  
Sr. Project Manager



copy: M. Lamarre – ExxonMobil  
M. Tipple – NYSDEC (repository copy)  
S. Bates – NYSDOH (electronic copy only)  
M. Parletta - Westchester County Airport  
E. Faulkner, R. Martinez - Landmark Aviation  
M. DeGloria - GES

Attachments:

Figures

Attachment A: Summary of Ground Water Results

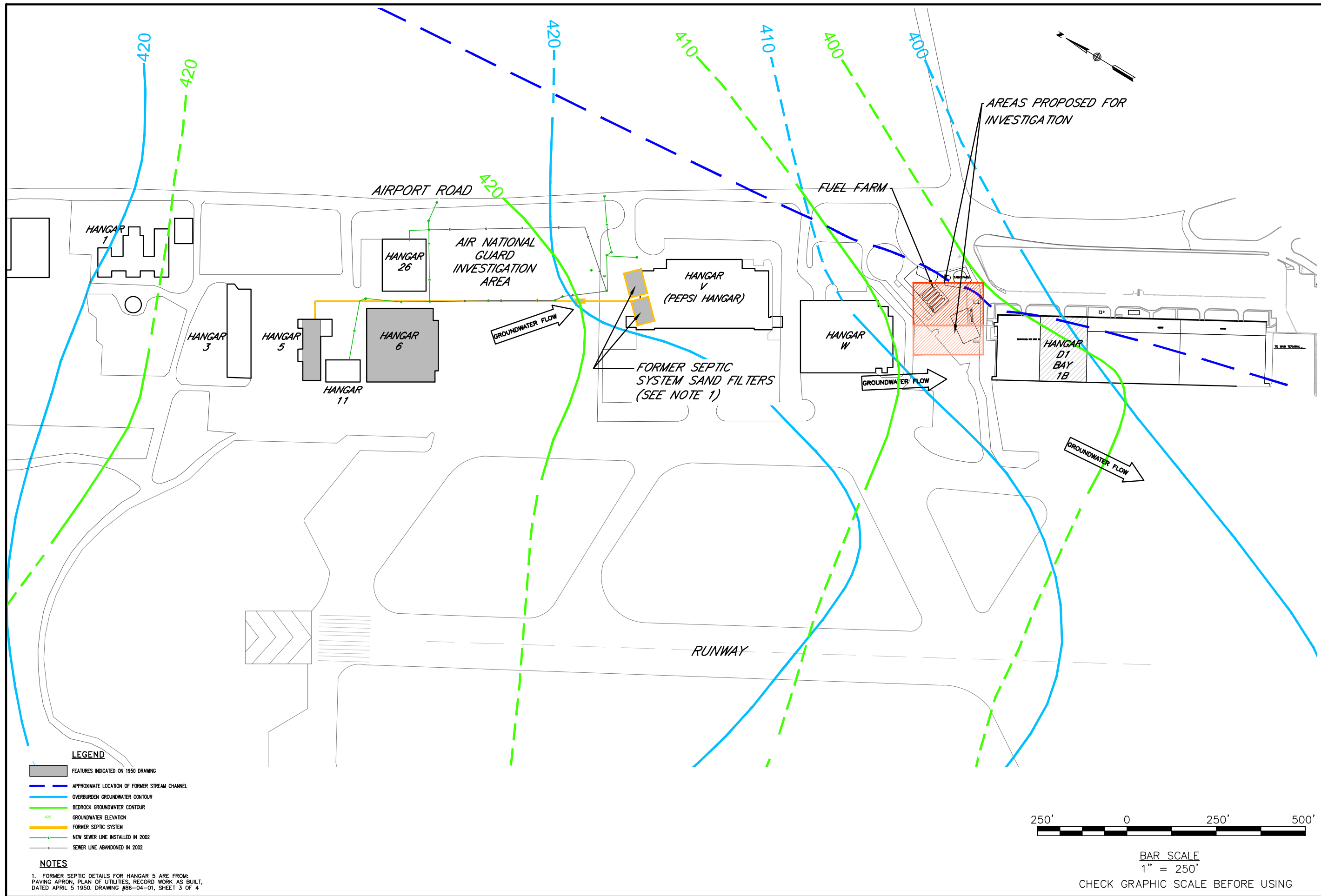
Attachment B: Sample Monitoring Well Logs



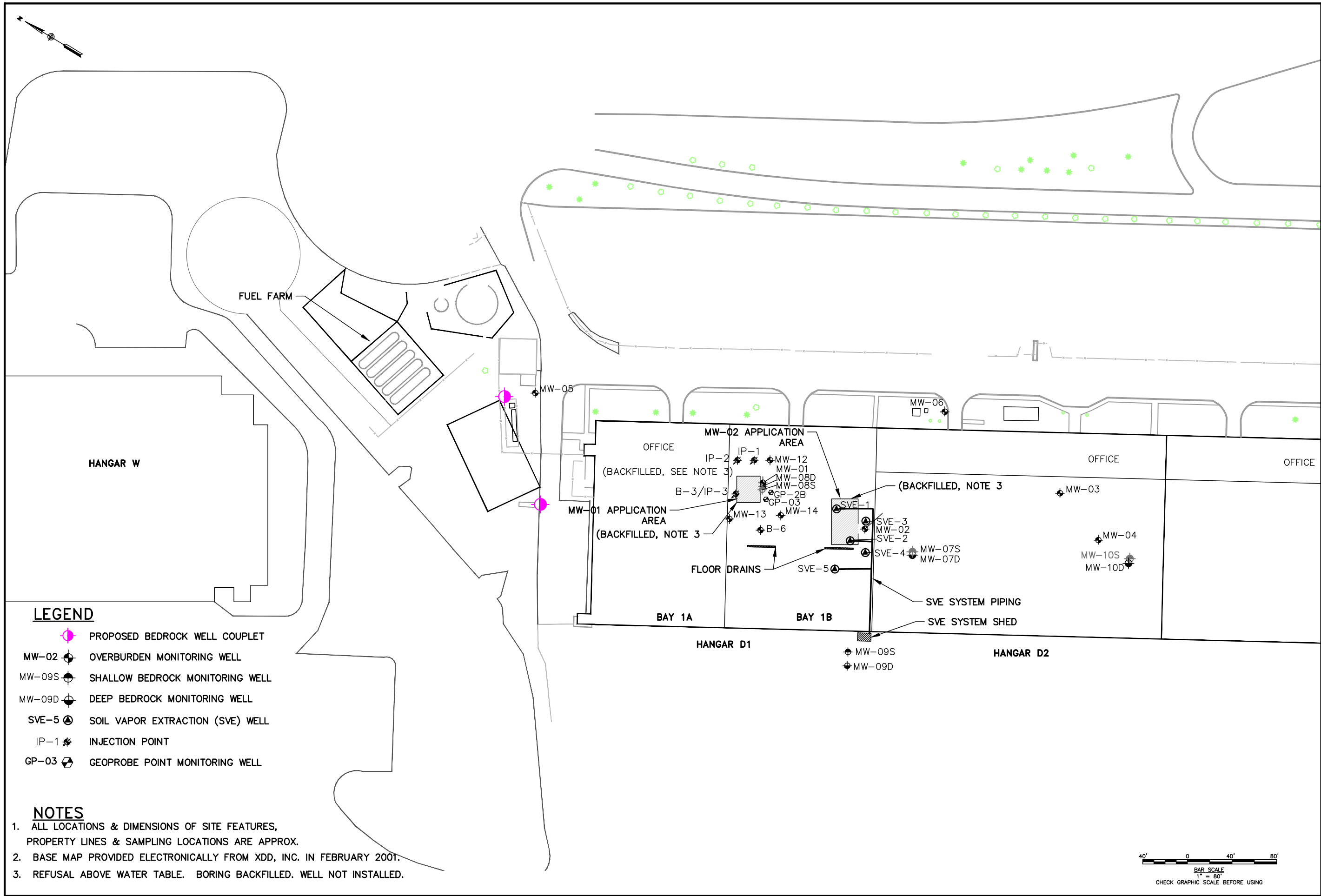



**FIGURE 1**  
**SITE LOCATION MAP**  
**Hangar D1, Bay 1B**  
**Westchester County Airport**  
**Site Number 360037**





<b>WOODARD &amp; CURRAN</b> 1520 HIGHLAND AVENUE CHESHIRE, CONNECTICUT 06410 888.265.8969   www.woodardcurran.com COMMITMENT & INTEGRITY DRIVE RESULTS	
<b>SITE AREA MAP</b>	
DESIGNED BY: PFF	CHECKED BY: AP
DRAWN BY: PFF	206924_U2 SITE 0411.dwg
EXXONMOBILE REFINING & SUPPLY INWOOD, NEW YORK	
WESTCHESTER COUNTY AIRPORT	
JOB NO: 206924.00 DATE: APRIL 2011 SCALE: AS NOTED	
FIGURE 2	



 1520 HIGHLAND AVENUE CHESHIRE CONNECTICUT 06410 888.265.8969   www.woodardcurran.com COMMITMENT & INTEGRITY DRIVE RESULTS	
<b>NORTH END, HANGAR D SITE PLAN</b>	
DESIGNED BY: BG	CHECKED BY: AP
DRAWN BY: PFF	206924_U3 HANGAR D 0411.dwg
EXXONMOBIL REFINING & SUPPLY INWOOD, NEW YORK	
WESTCHESTER COUNTY AIRPORT	
JOB NO: 206924 DATE: APRIL 2011 SCALE: 1" = 80'	
<b>FIGURE 3</b>	

## **ATTACHMENT A – SUMMARY OF GROUND WATER RESULTS**



Summary of Ground Water Results  
December 2008  
Hangar D1, Bay 1B, Westchester County Airport

Area	Monitoring Well	Sample Date	Tetrachloro-ethene	Trichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,1-Dichloro-ethene	Vinyl Chloride	1,1,1-Trichloro-ethane	1,1-Dichloro-ethane	Chloro-ethane
MW-01 Area	MW-13	12/19/08	256	12.4	84.9	0.40 U	1.4	0.52 U	11.7	16.8	0.55 U
	MW-14	12/19/08	146	20.3	105	2.0	1.8	0.61	5.8	16.1	0.22 U
	MW-01	12/19/08	0.29 U	1.5	74.6	20	0.53	9.4	0.24 U	14	0.22 U
	MW-8S	12/19/08	182	64.7	133	4.6	1.9	0.21 U	9	19.3	0.22 U
	GP-02B	12/19/08	0.47	2.6	226	10.7	1.5	9.4	0.24 U	32.8	0.22 U
	GP-03	12/19/08	95.5	79	151	6.3	1.9	3.9	3.8	30.1	0.22 U
MW-02 Area	MW-02	12/19/08	0.29 U	3.2	47.1	1.2	0.51	43.3	0.24 U	22.7	1.2
	MW-7S	12/19/08	3.4	13.1	53.1	0.16 U	15.6	13.9	24	41.2	0.22 U
	MW-7D	12/19/08	1.6	12.3	37.9	0.16 U	19.1	3.3	0.24 U	78.1	0.22 U
Down-gradient Area	MW-03	12/19/08	0.29 U	0.18 U	0.43	0.16 U	0.29 U	0.65	0.24 U	0.24 U	0.52
	MW-04	12/19/08	0.29 U	0.18 U	0.72	0.16 U	0.29 U	2.3	0.24 U	0.96	1.6
	MW-10S	12/19/08	0.7	2.3	23.6	0.16 U	4.7	3.8	0.24 U	31.4	0.22 U
	MW-10D	12/19/08	0.29 U	0.18 U	0.25 U	0.16 U	0.29 U	0.35	0.24 U	27.7	15.7
	MW-9S	12/19/08	0.49	0.18 U	0.32	0.16 U	0.29 U	0.21 U	0.24 U	0.24 U	0.22 U
	MW09D	12/19/08	7.9	0.74	2.8	0.16 U	0.29 U	0.21 U	0.24 U	1.3	0.22 U

**Notes:**

Concentrations are in ug/L (ppb).

U = Compound undetected.

Highest concentration in wells monitored.

Second highest concentration in wells monitored.



Summary of Ground Water Results  
November 2009  
Hangar D1, Bay 1B, Westchester County Airport

Area	Monitoring Well	Sample Date	Tetrachloro-ethene	Trichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,1-Dichloro-ethene	Vinyl Chloride	1,1,1-Trichloro-ethane	1,1-Dichloro-ethane	Chloro-ethane
MW-01 Area	MW-13	11/09/09	258	19	92.8	1.3	1.3	0.44 U	7.8	13.6	0.37 U
	MW-14	11/09/09	220	36.1	126	3.2	1.5	0.54 J	5.1	17.2	0.37 U
	MW-01	11/09/09	0.27 U	1.1	67.8	19.4	0.40 U	16.5	0.26 U	13.9	0.37 U
	MW-8S	11/09/09	175	79.2	141	7.3	1.6	0.70 J	5.1	19.1	0.37 U
	GP-02B	11/09/09	0.69 J	1.7	193	9.4	1.1	12.3	0.26 U	28.8	0.37 U
	GP-03	11/09/09	97.3	78.5	146	5	0.97 J	2.5	2	21.7	0.37 U
MW-02 Area	MW-02	11/09/09	0.91 J	26.9	45.2	1.2	0.48 J	31.5	0.46 J	19.6	0.37 U
	MW-7S	11/09/09	0.35 J	13.6	55.8	0.44 J	5.7	11.5	8.8	24.8	0.37 U
	MW-7D	11/09/09	3.0	11.7	37.5	0.25 U	17	2.8	0.26 U	69.1	0.37 U
Down-gradient Area	MW-03	11/09/09	0.27 U	0.24 U	0.22 U	0.25 U	0.40 U	0.44 U	0.26 U	0.29 U	0.37 U
	MW-04	11/09/09	0.27 U	0.24 U	0.22 U	0.25 U	0.40 U	0.82 J	0.26 U	0.62 J	1.8
	MW-10S	11/09/09	1.6	4	39.2	0.32 J	6.1	5.6	0.26 U	46	0.37 U
	MW-10D	11/09/09	0.27 U	0.24 U	0.22 U	0.25 U	0.40 U	0.82 J	0.26 U	8.8	0.37 U
	MW-9S	11/09/09	0.35 J	0.24 U	0.22 U	0.25 U	0.40 U	0.44 U	0.26 U	0.29 U	0.37 U
	MW09D	11/09/09	0.73 J	0.24 U	0.22 U	0.25 U	0.40 U	0.44 U	0.26 U	0.29 U	0.37 U

**Notes:**

Concentrations are in ug/L (ppb).

U = Compound undetected.

Highest concentration in wells monitored.

Second highest concentration in wells monitored.

Summary of Ground Water Results  
November 2010  
Hangar D1, Bay 1B, Westchester County Airport

Area	Monitoring Well	Sample Date	Tetrachloro-ethene	Trichloro-ethene	cis-1,2-Dichloro-ethene	trans-1,2-Dichloro-ethene	1,1-Dichloro-ethene	Vinyl Chloride	1,1,1-Trichloro-ethane	1,1-Dichloro-ethane	Chloro-ethane
MW-01 Area	MW-13	11/12/10	298	19.1	87.1	1.5 J	1.5 J	0.89 U	7.2	12.7	0.74 U
	MW-14	11/12/10	223	36.9	133	3.3	1.6	0.73 J	4.2	16.7	0.37 U
	MW-01	11/12/10	1.5	2.7	122	21.3	0.76 J	11	0.26 U	14.3	0.37 U
	MW-8S	11/12/10	184	85.4	168	6.6	2.4	0.99 J	5.2	20.3	0.37 U
	MW-8D	11/12/10	79.1	20.9	73.6	3.5	0.98 J	0.44 U	0.6 J	14	0.37 U
	GP-02B	11/12/10	1.6	1.4	181	10.2	1	22.9	0.26 U	29.7	0.37 U
	GP-03	11/12/10	117	107	164	6.8	1.7	6.5	2.4	25.8	0.37 U
MW-02 Area	MW-02	11/12/10	0.60 J	9.1	70	0.96 J	0.69 J	16.4	0.26 U	13.7	0.37 U
	MW-7S	11/12/10	3.7	20.6	86.8	0.93 J	22.8	17.5	18	50.7	0.37 U
	MW-7D	11/12/10	8	25.1	67.1	0.68 J	34.8	6.1	0.26 U	119	0.37 U
Down-gradient Area	MW-03	11/12/10	0.27 U	0.24 U	0.47 J	0.25 U	0.40 U	0.75 J	0.26 U	0.29 U	0.37 U
	MW-04	11/12/10	0.27 U	0.24 U	0.57 J	0.43 J	0.40 U	1.6	0.26 U	0.49 J	0.88 J
	MW-10S	11/12/10	3.3	3.9	33.1	0.49 J	6.3	5	0.26 U	33.7	0.37 U
	MW-10D	11/12/10	0.27 U	0.24 U	0.22 U	0.25 U	0.40 U	0.44 U	0.26 U	10.1	0.71 J
	MW-9S	11/12/10	1.5	0.24 U	0.22 U	0.25 U	0.40 U	0.44 U	0.26 U	0.29 U	0.37 U
	MW09D	11/12/10	11.6	1.6	7.6	0.25 U	0.40 U	0.44 U	0.26 U	1.6	0.37 U

**Notes:**

Concentrations are in ug/L (ppb).

U = Compound undetected.

Highest concentration in wells monitored.

Second highest concentration in wells monitored.

## ATTACHMENT B – SAMPLE MONITORING WELL LOGS



PROJECT: Former Mobil Oil

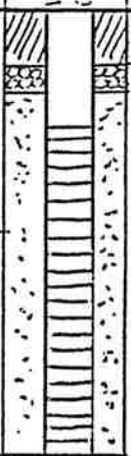
PROJECT NO: 1030060

DATE: 10/8/96

LOCATION: Westchester Cty. Airport

ELEVATION:

DATUM:

SAMPLE				DEPTH	STRATUM	SAMPLE DESCRIPTION	WELL CONST.	REMARKS
no.	depth	recov ery	blows per 6"					
S-1	0-2	10%	<del>11</del> 50% <del>15</del>	5	SP	(cement 0-6") cf lt. brn SAND, tr. gravel, boulder @ 1.5', rock flour (schist)		1 @ 10'
S-2	2-4	40%	15 35 50% <del>11</del>					
S-3	4-6	60%	11 14 9 7					
S-4	6-8	60%	5 3 3 6					
S-5	8-10	40%	7 5 4 3	10	SM	f grn/gry SAND, some silt, tr. clay, tr. f. gravel		
S-6	10-12	80%	6 4 3 2					
S-7	12-14	60%	5 6 5 4					
				15		Rock @ 14' EOB @ 14'		
				20				
				25				
				30				
				35				
				40				

NOTES: Sample S-7 selected for geotech. analysis



<b>ADVANCED DRILLING, INC.</b>		<b>PROJECT</b> Westchester County Airport		<b>CLIENT</b> Malcolm Pirnie, Inc.		<b>PROJECT NO.</b> ADV-327	<b>HOLE NUMBER</b> MW-1
<b>MUNICIPALITY</b> Westchester Airport		<b>COUNTY</b> Westchester	<b>STATE</b> New York	<b>COORDINATES</b>		<b>WELL PERMIT NO.</b>	
<b>START DATE</b> 10-8-96	<b>COMPLETION DATE</b> 10-8-96	<b>DRILLER</b> Scott Alberalla		<b>DRILLER LICENSE NO.</b> J 1320		<b>BORING DIA.</b> 8.25	<b>TOTAL DEPTH</b> 14 Ft.
<b>LOT</b>	<b>BLOCK</b>	<b>DRILLING METHOD</b> Hollow Stem Augers		<b>SAMPLE TYPE</b> Split Spoon		<b>DEPTH OF GROUNDWATER</b> 10 Feet	

**PROTECTIVE CASING**  
FLUSH

**NOTES**

Soil Boring Cross-Reference MW-1

Town and City \_\_\_\_\_

County and State Westchester, New York

Installation Date (s) 10-8-96

Drilling Method Hollow Stem Augers

Driller Scott Alberalla

Drilling Fluid None

Static water level after drilling ft.

Well developed for \_\_\_\_\_ hours at \_\_\_\_\_ gpm

Method of development \_\_\_\_\_

Well Purpose Monitoring

Remarks \_\_\_\_\_

Prepared By Scott

Date Prepared 10/14/96

Flush Protective Casing set  
in Concrete

Concrete

Locking Cherne Cap

Cement/Bentonite Grout

Bentonite Pellet Seal

2" Ø Sch.40 Blank PVC Riser  
Pipe

2" Ø Sch.40 (10slot) PVC  
Screen

#1 Sand Pack Filter

Bottom of Boring & Bottom  
of Well 14 Feet

ground surface

— .1

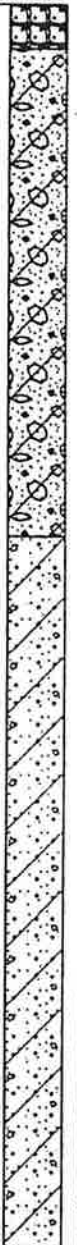
— .4

— 1.5


— 3.5

— 4

— 13.9





CLIENT: XDD		NEW ENGLAND BORING CONTRACTORS OF CT., INC.		BORING No. MW-8D	
PROJECT NAME: WESTCHESTER COUNTY AIRPORT LOCATION: WESTCHESTER, NY		 129 KRIEGER LANE GLASTONBURY, CT 06033 (860) 633-4649 -- (413) 733-1232 FAX (860) 657-8046		SHEET 1 OF 1	
DRILLER: M. St. John				ARCHITECT/ ENGINEER	
INSPECTOR: S.Maggie/L.Buttermor				FILE NO. XDDWESTC	
DATE START: 5-23-00		TYPE Casing Sampler Core Barrel SIZE I.D. NW SS NQ HAMMER WT. 300 140 2" HAMMER FALL 24" 30"		SURFACE ELEV.	
DATE FINISH: 5-23-00				LINE & STATION	
				OFFSET	
SAMPLE		CASING			
No.	DEPTH RANGE IN FEET	BLOWS PER 6" ON SAMPLER	REC.	FIELD CLASSIFICATION AND REMARKS	Well Cons. Installation Details
		0-6 6-12 12-18 18-24			
S1	5'-5'3"	100/	3"	6" Concrete	
R1	6'-10'	3" CORED	14"	12" Thin Wall	
				Gravel Silt	1.5
				Brown Fine - Coarse Sand, Some Fine - Coarse Gravel, Silt	6
				Run #1, Cored Boulders, Rec. 14"	10
S2	10'-12'	2 2 1 4	10"	Gray Silt and Fine - Medium Sand, Little Fine Gravel	13
S3	12'-13'	12 100	6"	Top of Weathered Rock @ 13'	15
R2	15'-20'	CORED	38"	Run #2, Cored Gray Mica Schist, Rec. 38"	20
					25
R3	20'-25'	CORED	46"	Run #3, Cored Gray Mica Schist, Rec. 46"	30
					35
R4	25'-30'	CORED	50"	Run #4, Cored Gray Mica Schist, Rec. 50"	40
					45
R5	30'-35'	CORED	49"	Run #5, Cored Gray Mica Schist, Rec. 49"	
R6	35'-40'	CORED	45"	Run #6, Cored Gray Mica Schist, Rec. 45"	
R7	40'-45'	CORED	43"	Run #7, Cored Gray Mica Schist, Rec. 43"	
				End of Boring @ 45'	
				Water @ 9'	
NOTES: 1) The stratification lines represent the approximate boundary between soil types. Transitions may be gradual. 2) Water level readings have been made in the drill holes at times and under conditions stated on the boring logs. Fluctuations in the level of ground-water may occur due to factors other than those present at the time measurements were made.					
REMARKS: Grouted 35' of NW Casing in place One 8" Road Way Box Installed					



# Monitoring Well Log

Groundwater & Environmental Services, Inc.

ID NO. MW-13

Project: **Hangar D, Westchester Co. Airport** Client: **EMES** Regulatory Case #:  
 Address: **184 Airport Rd, White Plains, NY** GES Job #: **1101379** Regulatory Case Mgr: **M. Tipple**  
 County: **Westchester** GES Project Mgr: **M. DeGloria** Permit #: **NA**

Logged By: **John Simms** Date Drilled: **November 22, 2008** Split Spoon/Acetate Sleeve Diameter: **NA**  
 Drilling Company: **Zebra** Completion Date: **November 22, 2008** Split Spoon/Acetate Sleeve Length: **NA**  
 Drill Operator: **Charlie** Drilling Method: **HSA** Soil Classification System: **USCS/Burmister**  
 Drill Rig Type: **GeoProbe 6620DT** Sampling Method: **Macro Core** Field Screening: **PID 10.6 eV Lamp (ppm)**

Latitude: **NA** Longitude: **NA** Top of Bentonite Seal: **3 fbg**  
 Surface Elevation: **NA** Borehole Diameter: **7 in.** Type of Seal: **Cetco Granular**  
 Total Depth: **20 fbg** Well Diameter: **2 in.** Top of Sand: **4 fbg**  
 Refusal Depth: **NA** Riser Length: **4.5 ft** Sand Type: **#2**  
 Initial Depth to Water: **NA** Screen Slot Size: **10** Well Material Type: **Schedule 40 PVC**  
 Static Depth to Water: **NA** Screen Length: **15 ft** Top of Grout: **NA**

Depth (feet)	Sample Interval (feet)	Recovery (inches)	Field Screen (ppm)	Blow Counts	SAMPLE LITHOLOGY	Comments	Well Completion Detail
0	0-5 fbg	NA	NA		No recovery.	Hand-cleared boring to 4 fbg.	
5	5-7 fbg	24 in.	0.0 ppm		SM: Olive-grey, fine to medium SAND with some silt and trace gravel.		
	7-9 fbg	24 in.	0.5 ppm		SM: Moist, fine SAND and silt with trace gravel and clay.		
10					No recovery.		
15							
20					End of Boring.		

#### Proportions Used:

Trace = < 10%  
 Little = < 30%  
 Some = < 50%  
 and = @ 50%


#### Notes:

NA = not available; fbg. = feet below grade  
 in. = inches; ft. = feet; ppm. = parts per million  
 Soil Lithologies based on field observations only.

#### Blow Count Penetration Resistance:

0 - 4 = Very Loose  
 5 - 9 = Loose  
 10 - 29 = Medium Dense  
 30 - 49 = Dense  
 50 + = Very Dense

#### Symbols:

Apparent Water Level   
 Lab Sample Location 