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CNC CHARLESTON
5090.3a

INITIAL GROUNDWATER ASSESSMENT REPORT FOR BUILDING 236 (GROUP 2) CNC CHARLESTON SC

1/1/2005

ADVENT ENVIRONMENTAL INC

BUILDING 236, (GROUP 2) INITIAL GROUNDWATER ASSESSMENT
CHARLESTON NAVAL COMPLEX, SOUTH CAROLINA

Prepared for:

Naval Facilities Engineering Command
North Charleston, South Carolina

Contract Number
N62467-04-M-0124

Prepared By:

ADVENT Environmental, Inc.
498 Wando Park Blvd.
Suite 500
Mt. Pleasant SC 29464

Brian R. Crawford, R.E.M.
Project Manager

Jeffrey C. Smoak, P.E.
Principal

January 2005
ADVENT 04-511

INITIAL GROUND-WATER ASSESSMENT REPORT

Facility Name: Charleston Naval Complex- Building 236 (Group 2)

UST Permit Number: Unregulated

UST Owner or Operator's Name: Navy

Address: 2155 Eagle Drive N Charleston, SC 29419

Phone Number: 843-820-7307

Property Owner's Name (if different than UST owner/operator):

Address: Same

Phone Number: Same

Contractor: ADVENT Environmental, Inc. Cert. #149

Address: 498 Wando Park Blvd., Suite 500, Mount Pleasant, South Carolina, 29464

Phone Number: 843-388-1851

Well Driller: Diversified Drilling Cert. #1142

Address: 620 Palmetto St. Mt. Pleasant, SC 29464

Phone Number: 843-607-2017

Receptor and Site Data
Please place a check in the appropriate answer block for each question:

Receptor Survey Questions	No	Yes *
Is there a drinking water supply well (public or private) or surface water supply intake within 1000 feet of the UST?	X	
Are irrigation or other non-drinking water wells located within 1000 feet of the UST?	X	
Are there other potential receptors (i.e.,utilities, surface waters, wetlands) less than 500 feet from the UST?		X

* If "yes" provide additional information:
The Cooper River is within 500 feet of the site.

Were any water wells within 250 ft radius sampled? _____ Yes ___X___ No

Is a public water supply line in the area? _____ Yes ___X___ No

Is the current use of the facility and surrounding properties commercial, residential, agricultural or industrial?

Site: Commercial Adjacent Properties: Commercial

See Appendix B for Chain of Custody Form and Laboratory Data.

Soil and Boring/Monitoring Well Data

Primary Soil Type: Soft brownish Coarse Sand

Well Installation Method and Date: Drill Rig, 11-1-04
Development Method: Purge using Perastaltic Pump

Soil Sample obtained at 2 to 4 feet.

SOIL ANALYTICAL DATA

Benzene (ug/kg)	Toluene (ug/kg)	Ethylbenzene (ug/kg)	Xylenes (ug/kg)	Naphthalene (ug/kg)
ND < .91	ND < .90	ND < .91	ND < .91	ND < 37

Benzo(a)-anthracene (ug/kg)	Benzo(b)-fluoranthene (ug/kg)	Benzo(k)-fluoranthene (ug/kg)	Chrysene (ug/kg)	Dibenz(a,h) anthracene (ug/kg)
ND < 37	ND < 37	ND < 37	ND < 37	ND < 37

Total PAH (ug/kg)	Lead (ug/kg)
ND < 37	3.0

*For waste oil UST releases only:

Total Chromium* (ug/kg)	Mercury* (ug/kg)	Selenium* (ug/kg)	Silver* (ug/kg)
5.0	.019	ND < 22	ND < 2

Arsenic* (ug/ kg)	Barium* (ug/kg)	Cadmium* (ug/kg)
1.5	34.0	ND < 1.0

Ground-Water Data

Depth to Ground Water: 8.9 feet below ground surface

Well Purging/Sampling Method: Purge using perastaltic pump

Date Sampled: November 11, 2004

Free Product Thickness: None

Equilibrated values:

Temperature: 23.8C pH: 6.76

Dissolved Oxygen: 7.87mg/L Specific Conductance: .518um/sm

Soil/Water Disposal Method: IDW was containerized in 55 gallons drums, labeled and disposed of.

GROUND-WATER ANALYTICAL DATA

Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Xylenes (ug/l)	MTBE (ug/l)	Naphthalene (ug/l)
ND < 1.0	ND < 1.0	ND < 1.0	ND < 3.0	ND < 1.0	ND < 2.1

Benzo(a)-anthracene (ug/l)	Benzo(b)-fluoranthene (ug/l)	Benzo(k)-fluoranthene (ug/l)	Chrysene (ug/l)	Dibenz(a,h) anthracene (ug/l)
ND < .10	ND < .10	ND < .10	ND < .10	ND < .10

EDB (ug/L)	Total PAH (ug/L)	Lead (ug/L)
ND < .02	ND < .10	.00001

*For waste oil UST releases.

Total Chromium* (ug/kg)	Mercury* (ug/kg)	Selenium* (ug/ug)	Silver* (ug/ug)
ND < 10	ND < 2	ND < 10	ND < 10

Arsenic* (ug/L)	Barium* (ug/L)	Cadmium* (ug/L)
ND < 10	ND < 100	ND < 79,000

Appendices

The appendices required for this report are as follows:

Appendix A. Well Construction Log
Appendix B. Laboratory Data
Appendix C. Topographic map with site location marked.
Appendix D. Site Base Map
Appendix E. Disposal Manifest(s). (Must be included for payment from SUPERB)
Appendix F. Additional Data (Sampling Results of Existing Ground-Water Wells)

Report Completed By: _____ Contractor Cert.# 149
(signature)

Date: December 04, 2005

APPENDIX A
Well Construction Log

D H E C
PROMOTE PROTECT PROSPER

Water Well Record
Bureau of Water
2600 Bull Street, Columbia, SC 29201-1708; (803) 898-4300

1. WELL OWNER INFORMATION:
Name: N.A.V.F.A.C. southern div. (last) (first)
Address: 2155 Eagle dr.
City: North Charleston State: S.C. Zip: 29419-9010
Telephone: Work: (843) 820-7307 Home:

2. LOCATION OF WELL: COUNTY: Chas.
Name: Charleston Navel Complex Bldg.236
Street Address:
City: North Charleston Zip: 29419-9010
Latitude: 32 56 594" Longitude: 79 59 842"

3. PUBLIC SYSTEM NAME: bldg 236 **PUBLIC SYSTEM NUMBER:** cnc236gw002

4. ABANDONMENT: ☐ Yes ☑ No
Grouted Depth: from _____ ft. to _____ ft.

Formation Description	*Thickness of Stratum	Depth to Bottom of Stratum
see attached		
*Indicate Water Bearing Zones (Use a 2nd sheet if needed)		

5. REMARKS:
CNC236GW002

6. TYPE: ☐ Mud Rotary ☐ Jetted ☑ Bored ☐ Dug ☐ Air Rotary ☐ Driven ☐ Cable tool ☐ Other

7. PERMIT NUMBER:

8. USE:
☐ Residential ☐ Public Supply ☐ Process
☐ Irrigation ☐ Air Conditioning ☐ Emergency
☐ Test Well ☑ Monitor Well ☐ Replacement

9. WELL DEPTH (completed) Date Started: 11/03/04
15.0 ft. Date Completed: 11/03/04

10. CASING: ☑ Threaded ☐ Welded
Diam.: 2"
Type: ☑ PVC ☐ Galvanized ☐ Steel ☐ Other
0.00 in. to 5.0 ft. depth
_____ in. to _____ ft. depth
Height: Above ☐ Below ☐
Surface N/A ft.
Weight N/A lb./ft.
Drive Shoe? ☐ Yes ☑ No

11. SCREEN:
Type: PVC Diam.: 2"
Slot/Gauge: 010 Length: 10.0
Set Between: 5.0 ft. and 15.0 ft.
_____ ft. and _____ ft.
NOTE: MULTIPLE SCREENS USE SECOND SHEET
Sieve Analysis ☐ Yes (please enclose) ☑ No

12. STATIC WATER LEVEL n/a ft. below land surface after 24 hours

13. PUMPING LEVEL Below Land Surface.
n/a ft. after _____ hrs. Pumping _____ G.P.M.
Pumping Test: ☐ Yes (please enclose) ☐ No
Yield: _____

14. WATER QUALITY
Chemical Analysis ☑ Yes ☐ No Bacterial Analysis ☐ Yes ☑ No
Please enclose lab results.

15. ARTIFICIAL FILTER (filter pack) ☑ Yes ☐ No
Installed from 15.0 ft. to 2.0 ft.
Effective size med. Uniformity Coefficient n/a

16. WELL GROUTED? ☑ Yes ☐ No
☐ Neat Cement ☐ Bentonite ☑ Bentonite/Cement ☐ Other _____
Depth: From 2.0 ft. to 0.00 ft.

17. NEAREST SOURCE OF POSSIBLE CONTAMINATION: ____ ft. ____ direction
Type n/a
Well Disinfected ☐ Yes ☑ No Type: _____ Amount: _____

18. PUMP: Date installed: _____ Not installed ☑
Mfr. Name: _____ Model No.: _____
H.P. _____ Volts _____ Length of drop pipe ___ ft. Capacity ___ gpm
TYPE: ☐ Submersible ☐ Jet (shallow) ☐ Turbine ☐ Jet (deep) ☐ Reciprocating ☐ Centrifugal

19. WELL DRILLER: Diversified Drilling Servic **CERT. NO.:** 1142
Address: (Print) Level: A ☑ B ☐ C ☐ D ☐ (circle one)
620 Palmetto st. MT.Pleasant S.C. 29464
Telephone No.: 843-607-2017 Fax No.: 843-884-4604

20. WATER WELL DRILLER'S CERTIFICATION: This well was drilled under my direction and this report is true to the best of my knowledge and belief.

Signed: _____ Date: 11/8/04
Well Driller

If D Level Driller, provide supervising driller's name:

ADVENT

SOIL TEST BORING FIELD REPORT

BORING NO. 236SB002

JOB NO. 04-511

DRILLING CONTRACTOR DIVERSIFIED DRILLING

PAGE 2 OF 3

JOB NAME CNC BLDG. 236 IGWA

INSPECTOR Cls

GROUND SURFACE ELEV.

DATE 04 Nov, 2004

TIME - RATE (CLEANING, ETC.) _____ HRS.

WELL CASING ELEV.

SAMPLING NO.	DEPTH	"N" 1ST 6"	2ND 6"	3RD 6"	SCALE	LABORATORY SAMPLE	OVA/HNU READINGS	SOIL CLASSIFICATION
1	0-2				0		5	brown sand, little clay; no odor
2	2-4						6	brown clayey sand; no odor
3	4-6						3	brown clayey sand; no odor
4	6-8						3	Lt. brown sandy clay; no odor
					5			
					0			
					5			
					0			
					5			
					0			
					5			
					0			

DISPOSITION OF CUTTINGS _____

BORING TERMINATED: Y ~ 15.1 ft

BORING REFUSAL: N

WATER TOB DEPTH: ~ 8 ft.

WATER 24 HR. DEPTH:

WATER LOSSES:

DISPOSITION OF FLUIDS _____

METHOD OF ADVANCING BORING	DEPTH
HOLLOW STEM AUGER	TO
ROTARY DRILL: W/MUD: W/WATER: W/AIR:	TO
DIAMOND CORE (SIZE)	TO
HAND AUGER	TO

COMPLETION: GROUT BACKFILL _____ SOIL BACKFILL Y WELL Y

APPENDIX B
Laboratory Data

QSARF #_____
P19015

ENVIRONMENTAL CONSERVATION LABORATORIES

4810 Executive Park Court, Suite 211
Jacksonville, Florida 32216-6069
Ph. (904) 296-3007 • Fax (904) 296-6210

10775 Central Port Drive
Orlando, Florida 32824
Ph. (407) 826-5314 • Fax (407) 850-6945

1015 Passport Way
Cary, North Carolina 27513
Ph. (919) 677-1669 • Fax (919) 677-9846

ENCO CompQAP No.: 960038G/0

CHAIN OF CUSTODY RECORD

CNC BUILDING

PROJECT REFERENCE	PROJECT NO.	P.O. NUMBER
U4-511	236	U4-511

PROJECT LOC. (State)	SAMPLER(s) NAME	PHONE
FL	Chrissa Stroh	(843)-388-1851
		FAX (843)-388-1891

CLIENT NAME: Advent Environmental, Inc.
CLIENT PROJECT MANAGER: Mr. Brian Crawford
CLIENT ADDRESS (CITY, STATE, ZIP): 498 Wando Park Blvd Suite 500 Mt. Pleasant, SC 29464

☐ STANDARD REPORT DELIVERY
☐ EXPEDITED REPORT DELIVERY (surcharge)
Date Due:_____

STATION	DATE	TIME	GRAB	COMP	SAMPLE IDENTIFICATION	SURFACE WATER	GROUND WATER	WASTEWATER	DRINKING WATER	SOIL/SOLID/SEDIMENT	NONAQUEOUS LIQUID (oil, solvent, etc.)	AIR	SLUDGE	OTHER	8260	8270 PAH TPH	TOC	metals-Hg, Ba, Cd, Se, Silver, Chrom							REMARKS
						MATRIX TYPE									REQUIRED ANALYSIS										
															PRESERVATIVE										
															NUMBER OF CONTAINERS SUBMITTED										
1 CNC	11/4/04	0830		X	236SB001		X			X					3	1	1								
2 CNC	11/4/04	1230		X	236SB002		X			X					3	1	1	1							
3 CNC	11/4/04	1415		X	236SB003		X			X					3	1	1								
4										X															
5										X															
6										X															
7																									
8																									
9																									
10																									
11																									
12																									
13																									
14																									

SAMPLE KIT PREPARED BY: ☐JACKSONVILLE ☐ORLANDO	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
	6/29/04	1500						
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME
RECEIVED BY (SIGNATURE)	DATE	TIME	RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE	TIME	CUSTODY INTACT	ENCO LOG NO.	REMARKS
☐Jacksonville ☐Orlando	11/5/04	9:40	☑YES ☐NO	JAX ~~442~~ 44392	

ENCO LABORATORIES
REPORT # : JAX44392
DATE REPORTED: November 15, 2004
REFERENCE : CNC BUILDING 236
PROJECT NAME : 04-511

RESULTS OF ANALYSIS

EPA METHOD 8260 - VOLATILE ORGANICS	236SB002	Units
Benzene	0.91 U D2	ug/Kg
Ethylbenzene	0.90 U D2	ug/Kg
m-Xylene & p-Xylene	1.8 U D2	ug/Kg
o-Xylene	0.91 U D2	ug/Kg
Naphthalene	0.90 U D2	ug/Kg

Surrogate:	% RECOV	LIMITS
Dibromofluoromethane	95	61-128
D8-Toluene	88	77-119
Bromofluorobenzene	92	60-130
Date Prepared	11/11/04 18:00	
Date Analyzed	11/11/04 23:32	

U = Compound was analyzed for but not detected to the level shown.
D2 = Analyte value determined from a 1:.81 dilution.

ENCO LABORATORIES
REPORT # : JAX44392
DATE REPORTED: November 15, 2004
REFERENCE : CNC BUILDING 236
PROJECT NAME : 04-511

RESULTS OF ANALYSIS

EPA METHOD 8270 - PAH Compounds by SIM	236SB002	Units
Naphthalene	37 U	ug/Kg
2-Methylnaphthalene	37 U	ug/Kg
1-Methylnaphthalene	37 U	ug/Kg
Acenaphthylene	37 U	ug/Kg
Acenaphthene	37 U	ug/Kg
Fluorene	37 U	ug/Kg
Phenanthrene	37 U	ug/Kg
Anthracene	37 U	ug/Kg
Fluoranthene	37 U	ug/Kg
Pyrene	37 U	ug/Kg
Chrysene	37 U	ug/Kg
Benzo(a)anthracene	37 U	ug/Kg
Benzo(b)fluoranthene	37 U	ug/Kg
Benzo(k)fluoranthene	37 U	ug/Kg
Benzo(a)pyrene	37 U	ug/Kg
Indeno(1,2,3-cd)pyrene	37 U	ug/Kg
Dibenzo(a,h)anthracene	37 U	ug/Kg
Benzo(g,h,i)perylene	37 U	ug/Kg
Surrogate:	**% RECOV**	**LIMITS**
p-Terphenyl	103	19-162
Date Prepared	11/08/04	
Date Analyzed	11/10/04 20:21	

U = Compound was analyzed for but not detected to the level shown.

ENCO LABORATORIES
REPORT # : JAX44392
DATE REPORTED: November 15, 2004
REFERENCE : CNC BUILDING 236
PROJECT NAME : 04-511

RESULTS OF ANALYSIS

EPA METHOD 8015 MODIFIED - DIESEL RANGE ORGANICS	236SB002	Units
DRO (C10-C24)	3.7 U	mg/Kg
Surrogate:	**% RECOV**	**LIMITS**
m-Terphenyl	97	D-183
Date Prepared	11/10/04	
Date Analyzed	11/12/04 15:27	

Miscellaneous	METHOD	236SB002	Units
Percent Solids	WETS/72	89	%
Date Prepared		11/10/04	
Date Analyzed		11/11/04 10:30	
Total Org. Carbon	CE-81-1/9060	34 U	mg/Kg
Date Analyzed		11/12/04 17:00	

U = Compound was analyzed for but not detected to the level shown.

ENCO LABORATORIES
REPORT # : JAX44392
DATE REPORTED: November 15, 2004
REFERENCE : CNC BUILDING 236
PROJECT NAME : 04-511

RESULTS OF ANALYSIS

TOTAL METALS	METHOD	236SB002	Units
Arsenic	6010	1.5	mg/Kg
Date Analyzed		11/08/04 22:40	
Barium	6010	34	mg/Kg
Date Analyzed		11/08/04 22:39	
Cadmium	6010	1.0 U	mg/Kg
Date Analyzed		11/08/04 22:40	
Chromium	6010	5.0	mg/Kg
Date Analyzed		11/08/04 22:39	
Lead	6010	3.0	mg/Kg
Date Analyzed		11/08/04 22:40	
Selenium	6010	22 U	mg/Kg
Date Analyzed		11/13/04 15:24	
Silver	6010	2.0 U	mg/Kg
Date Analyzed		11/08/04 22:39	
Mercury	7471	0.019	mg/Kg
Date Analyzed		11/08/04 14:40	

U = Compound was analyzed for but not detected to the level shown.

ENCO LABORATORIES
REPORT # : JAX44392
DATE REPORTED: November 15, 2004
REFERENCE : CNC BUILDING 236
PROJECT NAME : 04-511

RESULTS OF ANALYSIS

EPA METHOD 8270 - PAH Compounds by SIM	LAB BLANK	Units
Naphthalene	33 U	ug/Kg
2-Methylnaphthalene	33 U	ug/Kg
1-Methylnaphthalene	33 U	ug/Kg
Acenaphthylene	33 U	ug/Kg
Acenaphthene	33 U	ug/Kg
Fluorene	33 U	ug/Kg
Phenanthrene	33 U	ug/Kg
Anthracene	33 U	ug/Kg
Fluoranthene	33 U	ug/Kg
Pyrene	33 U	ug/Kg
Chrysene	33 U	ug/Kg
Benzo(a)anthracene	33 U	ug/Kg
Benzo(b)fluoranthene	33 U	ug/Kg
Benzo(k)fluoranthene	33 U	ug/Kg
Benzo(a)pyrene	33 U	ug/Kg
Indeno(1,2,3-cd)pyrene	33 U	ug/Kg
Dibenzo(a,h)anthracene	33 U	ug/Kg
Benzo(g,h,i)perylene	33 U	ug/Kg

Surrogate:	% RECOV	LIMITS
p-Terphenyl	112	19-162
Date Prepared	11/08/04	
Date Analyzed	11/10/04 11:18	

U = Compound was analyzed for but not detected to the level shown.

ENCO LABORATORIES
REPORT # : JAX44392
DATE REPORTED: November 15, 2004
REFERENCE : CNC BUILDING 236
PROJECT NAME : 04-511

RESULTS OF ANALYSIS

EPA METHOD 8015 MODIFIED - DIESEL RANGE ORGANICS	LAB BLANK	Units
DRO (C10-C24)	3.3 U	mg/Kg
Surrogate:	**% RECOV**	**LIMITS**
m-Terphenyl	93	D-183
Date Prepared	11/10/04	
Date Analyzed	11/12/04 14:27	

MISCELLANEOUS	METHOD	LAB BLANK	Units
Total Org. Carbon	CE-81-1/9060	10 U	mg/Kg
Date Analyzed		11/12/04 17:00	

U = Compound was analyzed for but not detected to the level shown.

ENCO LABORATORIES
REPORT # : JAX44392
DATE REPORTED: November 15, 2004
REFERENCE : CNC BUILDING 236
PROJECT NAME : 04-511

RESULTS OF ANALYSIS

TOTAL METALS	METHOD	LAB BLANK	Units
Arsenic	6010	0.50 U	mg/Kg
Date Analyzed		11/08/04 19:49	
Barium	6010	20 U	mg/Kg
Date Analyzed		11/08/04 19:49	
Cadmium	6010	1.0 U	mg/Kg
Date Analyzed		11/08/04 19:49	
Chromium	6010	1.0 U	mg/Kg
Date Analyzed		11/08/04 19:49	
Lead	6010	1.0 U	mg/Kg
Date Analyzed		11/08/04 19:49	
Selenium	6010	2.0 U	mg/Kg
Date Analyzed		11/08/04 19:49	
Silver	6010	2.0 U	mg/Kg
Date Analyzed		11/08/04 19:49	
Mercury	7471	0.010 U	mg/Kg
Date Analyzed		11/08/04 13:57	

U = Compound was analyzed for but not detected to the level shown.

LABORATORY CERTIFICATIONS

Laboratory Certification: NELAC:E82277

All analyses reported with this project were analyzed by the facility indicated unless identified below.

ENCO LABORATORIES
REPORT # : JAX44392
DATE REPORTED: November 15, 2004
REFERENCE : CNC BUILDING 236
PROJECT NAME : 04-511

QUALITY CONTROL DATA

Parameter	% RECOVERY LCS/MS/MSD	LCS LIMITS	MS/MSD LIMITS	RPD MS/MSD	RPD LIMITS
EPA Method 8260					
1,1-Dichloroethene	69/ 61/ 59	59-144	19-161	3	19
Benzene	98/ 97/ 92	67-150	60-129	5	23
Trichloroethene	102/ 99/ 92	69-137	56-132	7	17
Toluene	96/ 94/ 87	72-124	53-129	8	22
Chlorobenzene	106/104/ 96	75-125	61-136	8	24
EPA Method 8270					
Naphthalene	95/ 90/ 90	48-88	20-131	<1	29
Acenaphthene	100/ 92/ 92	57-96	24-132	<1	23
Benzo(a)pyrene	72/ 78/ 80	37-134	34-140	2	28
Benzo(g,h,i)perylene	65/ 64/ 64	11-145	31-152	<1	21
EPA Method 8015 MODIFIED					
DRO (C10-C24)	91/ 90/ 84	25-129	14-162	7	31
MISCELLANEOUS					
Total Org. Carbon, CE-81-1/	91/100/ 97	70-132	49-130	3	18
TOTAL METALS					
Arsenic, 6010	101/ 96/ 97	77-125	53-153	1	22
Barium, 6010	99/ 98/100	71-129	70-120	2	16
Cadmium, 6010	100/ 97/100	76-124	59-130	3	24
Chromium, 6010	99/ 98/101	81-130	57-135	3	24
Lead, 6010	100/100/101	75-127	63-128	<1	26
Selenium, 6010	98/ 88/ 90	72-127	60-121	2	14
Silver, 6010	95/ 81/ 84	49-146	69-118	4	10
Mercury, 7471	102/102/102	78-130	69-121	<1	18

< = Less Than
MS = Matrix Spike
MSD = Matrix Spike Duplicate
LCS = Laboratory Control Standard
RPD = Relative Percent Difference

RESULTS OF ANALYSIS

EPA METHOD 8260 - VOLATILE ORGANICS	**236MW002**	**236MW003**	**Units**
Methyl tert-butyl ether	1.0 U	1.0 U	ug/L
Benzene	1.0 U	1.0 U	ug/L
Toluene	1.0 U	1.0 U	ug/L
Chlorobenzene	1.0 U	1.0 U	ug/L
Ethylbenzene	1.0 U	1.0 U	ug/L
m-Xylene & p-Xylene	2.0 U	2.0 U	ug/L
o-Xylene	1.0 U	1.0 U	ug/L
1,3-Dichlorobenzene	1.0 U	1.0 U	ug/L
1,4-Dichlorobenzene	1.0 U	1.0 U	ug/L
1,2-Dichlorobenzene	1.0 U	1.0 U	ug/L
Naphthalene	**2.1**	2.0 U	ug/L

Surrogate:	**% RECOV**	**% RECOV**	**LIMITS**
Dibromofluoromethane	110	105	52-149
D8-Toluene	92	98	70-132
Bromofluorobenzene	95	90	60-135
Date Analyzed	11/20/04 10:21	11/20/04 10:56	

U = Compound was analyzed for but not detected to the level shown.

RESULTS OF ANALYSIS

EPA METHOD 8270 - PAH Compounds by SIM	**236MW002**	**236MW003**	**Units**
Naphthalene	0.50 U	0.50 U	ug/L
2-Methylnaphthalene	0.50 U	0.50 U	ug/L
1-Methylnaphthalene	0.50 U	0.50 U	ug/L
Acenaphthylene	0.10 U	0.10 U	ug/L
Acenaphthene	0.10 U	0.10 U	ug/L
Fluorene	0.10 U	0.10 U	ug/L
Phenanthrene	0.10 U	0.10 U	ug/L
Anthracene	0.10 U	0.10 U	ug/L
Fluoranthene	0.10 U	0.10 U	ug/L
Pyrene	0.10 U	0.10 U	ug/L
Chrysene	0.10 U	0.10 U	ug/L
Benzo(a)anthracene	0.10 U	0.10 U	ug/L
Benzo(b)fluoranthene	0.10 U	0.10 U	ug/L
Benzo(k)fluoranthene	0.10 U	0.10 U	ug/L
Benzo(a)pyrene	0.10 U	0.10 U	ug/L
Indeno(1,2,3-cd)pyrene	0.10 U	0.10 U	ug/L
Dibenzo(a,h)anthracene	0.10 U	0.10 U	ug/L
Benzo(g,h,i)perylene	0.10 U	0.10 U	ug/L
Surrogate:	**% RECOV**	**% RECOV**	**LIMITS**
p-Terphenyl	73	78	20-148
Date Prepared	11/15/04	11/15/04	
Date Analyzed	11/16/04 11:46	11/16/04 12:15	

EPA METHOD RSK 175 - Dissolved Gases	**236MW002**	**236MW003**	**Units**
Methane	**0.0012**	**0.0025**	mg/L
Ethene	0.0010 U	0.0010 U	mg/L
Ethane	0.0010 U	0.0010 U	mg/L
Date Analyzed	11/15/04 14:08	11/15/04 14:12	

U = Compound was analyzed for but not detected to the level shown.

ENCO LABORATORIES
REPORT # : JAX44569
DATE REPORTED: November 23, 2004
REFERENCE : 04-511
PROJECT NAME : cnc building 1279

RESULTS OF ANALYSIS

MISCELLANEOUS	METHOD	236MW002	236MW003	Units
Alkalinity (as CaCO3)	310.1	**170**	**440**	mg/L
Date Analyzed		11/15/04 15:35	11/15/04 15:35	
Dissolved Oxygen	360.1	**11** Q	**9.9** Q	mg/L
Date Analyzed		11/15/04 10:40	11/15/04 10:40	
Nitrate-N	353.1	**0.61**	**0.19**	mg/L
Date Analyzed		11/18/04 15:16	11/18/04 15:16	
Nitrite-N	354.1	0.10 U	0.10 U	mg/L
Date Analyzed		11/15/04 12:55	11/15/04 12:55	
Nitrate-Nitrite-N	353.1	**0.61**	**0.19**	mg/L
Date Analyzed		11/18/04 10:22	11/18/04 10:23	
Sulfate, Total	375.4	**80**	**190**	mg/L
Date Analyzed		11/15/04 16:00	11/15/04 16:00	

U = Compound was analyzed for but not detected to the level shown.
Q = Analysis performed outside of method-specified holding time.

ENCO LABORATORIES
REPORT # : JAX44569
DATE REPORTED: November 23, 2004
REFERENCE : 04-511
PROJECT NAME : cnc building 1279

RESULTS OF ANALYSIS

TOTAL METALS	METHOD	236MW002	236MW003	Units
Arsenic	200.7	0.010 U	NA	mg/L
Date Analyzed		11/18/04 18:06		
Barium	200.7	0.10 U	NA	mg/L
Date Analyzed		11/18/04 18:06		
Calcium	200.7	**79**	NA	mg/L
Date Analyzed		11/18/04 18:06		
Chromium	200.7	0.010 U	NA	mg/L
Date Analyzed		11/18/04 18:06		
Lead	200.7	0.010 U	0.010 U	mg/L
Date Analyzed		11/18/04 18:06	11/18/04 18:54	
Selenium	200.7	0.010 U	NA	mg/L
Date Analyzed		11/18/04 18:06		
Silver	200.7	0.010 U	NA	mg/L
Date Analyzed		11/18/04 18:06		
Mercury	245.1	0.00020 U	NA	mg/L
Date Analyzed		11/24/04 16:30		

NA = Analysis not applicable for this sample.
U = Compound was analyzed for but not detected to the level shown.

RESULTS OF ANALYSIS

EPA METHOD 8011 - EDB & DBCP by GC/ECD	**LAB BLANK**	**Units**
Ethylene Dibromide	0.020 U	ug/L
Dibromochloropropane	0.020 U	ug/L
Date Prepared	11/16/04	
Date Analyzed	11/17/04 14:10	

U = Compound was analyzed for but not detected to the level shown.

RESULTS OF ANALYSIS

EPA METHOD 8260 - VOLATILE ORGANICS	**LAB BLANK**	**Units**
Methyl tert-butyl ether	1.0 U	ug/L
Benzene	1.0 U	ug/L
Toluene	1.0 U	ug/L
Chlorobenzene	1.0 U	ug/L
Ethylbenzene	1.0 U	ug/L
m-Xylene & p-Xylene	2.0 U	ug/L
o-Xylene	1.0 U	ug/L
1,3-Dichlorobenzene	1.0 U	ug/L
1,4-Dichlorobenzene	1.0 U	ug/L
1,2-Dichlorobenzene	1.0 U	ug/L

Surrogate:	**% RECOV**	**LIMITS**
Dibromofluoromethane	107	52-149
D8-Toluene	90	70-132
Bromofluorobenzene	91	60-135
Date Analyzed	11/20/04 07:23	

U = Compound was analyzed for but not detected to the level shown.

RESULTS OF ANALYSIS

EPA METHOD 8270 - PAH Compounds by SIM	**LAB BLANK**	**Units**
Naphthalene	0.50 U	ug/L
2-Methylnaphthalene	0.50 U	ug/L
1-Methylnaphthalene	0.50 U	ug/L
Acenaphthylene	0.10 U	ug/L
Acenaphthene	0.10 U	ug/L
Fluorene	0.10 U	ug/L
Phenanthrene	0.10 U	ug/L
Anthracene	0.10 U	ug/L
Fluoranthene	0.10 U	ug/L
Pyrene	0.10 U	ug/L
Chrysene	0.10 U	ug/L
Benzo(a)anthracene	0.10 U	ug/L
Benzo(b)fluoranthene	0.10 U	ug/L
Benzo(k)fluoranthene	0.10 U	ug/L
Benzo(a)pyrene	0.10 U	ug/L
Indeno(1,2,3-cd)pyrene	0.10 U	ug/L
Dibenzo(a,h)anthracene	0.10 U	ug/L
Benzo(g,h,i)perylene	0.10 U	ug/L
Surrogate:	**% RECOV**	**LIMITS**
p-Terphenyl	74	20-148
Date Prepared	11/15/04	
Date Analyzed	11/16/04 04:35	

EPA METHOD RSK 175 - Dissolved Gases	**LAB BLANK**	**Units**
Methane	0.0010 U	mg/L
Ethene	0.0010 U	mg/L
Ethane	0.0010 U	mg/L
Date Analyzed	11/15/04 12:02	

U = Compound was analyzed for but not detected to the level shown.

RESULTS OF ANALYSIS

MISCELLANEOUS	METHOD	LAB BLANK	Units
Alkalinity (as CaCO3)	310.1	2.0 U	mg/L
Date Analyzed		11/15/04 15:35	
Nitrite-N	354.1	0.10 U	mg/L
Date Analyzed		11/15/04 12:55	
Nitrate-Nitrite-N	353.1	0.10 U	mg/L
Date Analyzed		11/18/04 10:04	
Sulfate, Total	375.4	1.0 U	mg/L
Date Analyzed		11/15/04 16:00	

U = Compound was analyzed for but not detected to the level shown.

ENCO LABORATORIES
REPORT # : JAX44569
DATE REPORTED: November 23, 2004
REFERENCE : 04-511
PROJECT NAME : cnc building 1279

RESULTS OF ANALYSIS

TOTAL METALS	METHOD	LAB BLANK	Units
Arsenic	200.7	0.010 U	mg/L
Date Analyzed		11/18/04 17:53	
Barium	200.7	0.10 U	mg/L
Date Analyzed		11/18/04 17:53	
Calcium	200.7	0.50 U	mg/L
Date Analyzed		11/18/04 17:53	
Chromium	200.7	0.010 U	mg/L
Date Analyzed		11/18/04 17:53	
Lead	200.7	0.010 U	mg/L
Date Analyzed		11/18/04 17:53	
Selenium	200.7	0.010 U	mg/L
Date Analyzed		11/18/04 17:53	
Silver	200.7	0.010 U	mg/L
Date Analyzed		11/18/04 17:53	
Mercury	245.1	0.00020 U	mg/L
Date Analyzed		11/24/04 16:20	

U = Compound was analyzed for but not detected to the level shown.

LABORATORY CERTIFICATIONS

Laboratory Certification: SCDHEC:96009001

All analyses reported with this project were analyzed by the facility indicated unless identified below.

PARAMETER	LAB CERT #'s
EDB & DBCP, SW-846 Method 8011	SCDHEC:96002001
Nitrogen, Nitrate, EPA Method 353.1	SCDHEC:96002001
Nitrogen, NO3-NO2, EPA Method 353.1	SCDHEC:96002001

QUALITY CONTROL DATA

Parameter	% RECOVERY LCS/MS/MSD	LCS LIMITS	MS/MSD LIMITS	RPD MS/MSD	RPD LIMITS
EPA Method 8011					
Ethylene Dibromide	88/ 92/ 96	53-154	57-130	4	18
Dibromochloropropane	84/ 84/ 88	38-163	60-130	5	20
EPA Method 8260					
1,1-Dichloroethene	93/ 82/ 83	58-149	40-155	1	30
Benzene	117/103/106	62-135	70-131	3	23
Trichloroethene	110/ 93/ 98	66-136	68-128	5	10
Toluene	110/ 91/ 94	72-126	84-116	3	12
Chlorobenzene	113/ 96/100	77-124	88-123	4	11
EPA Method 8270					
Naphthalene	63/ 67/ 64	32-86	30-112	4	28
Acenaphthene	72/ 74/ 72	47-90	28-113	3	32
Benzo(a)pyrene	73/ 70/ 74	39-129	39-148	6	38
Benzo(g,h,i)perylene	41/ 40/ 38	8-142	20-130	5	43
EPA Method RSK 175					
Methane	106/ NA/ NA	57-135	57-154	NA	24
Ethene	100/ NA/ NA	52-126	48-138	NA	21
Ethane	104/ NA/ NA	59-141	61-149	NA	22
MISCELLANEOUS					
Alkalinity (as CaCO3), 310.	98/104/104	89-123	73-126	<1	11
Nitrite-N, 354.1	116/ 95/ 95	50-150	69-124	<1	13
Nitrate-Nitrite-N, 353.1	101/104/ 97	90-112	61-144	7	21
Sulfate, Total, 375.4	103/104/107	44-149	61-138	3	22

< = Less Than
MS = Matrix Spike
MSD = Matrix Spike Duplicate
LCS = Laboratory Control Standard
RPD = Relative Percent Difference

QUALITY CONTROL DATA

Parameter	% RECOVERY LCS/MS/MSD	LCS LIMITS	MS/MSD LIMITS	RPD MS/MSD	RPD LIMITS
TOTAL METALS					
Arsenic, 200.7	101/101/103	85-120	64-126	2	12
Barium, 200.7	98/ 96/ 97	80-120	74-119	1	11
Calcium, 200.7	99/ 83/ 93	88-116	63-131	11	22
Chromium, 200.7	98/ 98/ 99	89-120	73-120	1	10
Lead, 200.7	99/ 97/ 98	82-117	68-126	1	19
Selenium, 200.7	100/ 99/100	83-118	65-129	1	10
Silver, 200.7	94/ 94/ 95	51-144	69-121	1	12
Mercury, 245.1	104/103/104	81-126	70-136	<1	12

< = Less Than
MS = Matrix Spike
MSD = Matrix Spike Duplicate
LCS = Laboratory Control Standard
RPD = Relative Percent Difference

APPENDIX C
Topographic Map

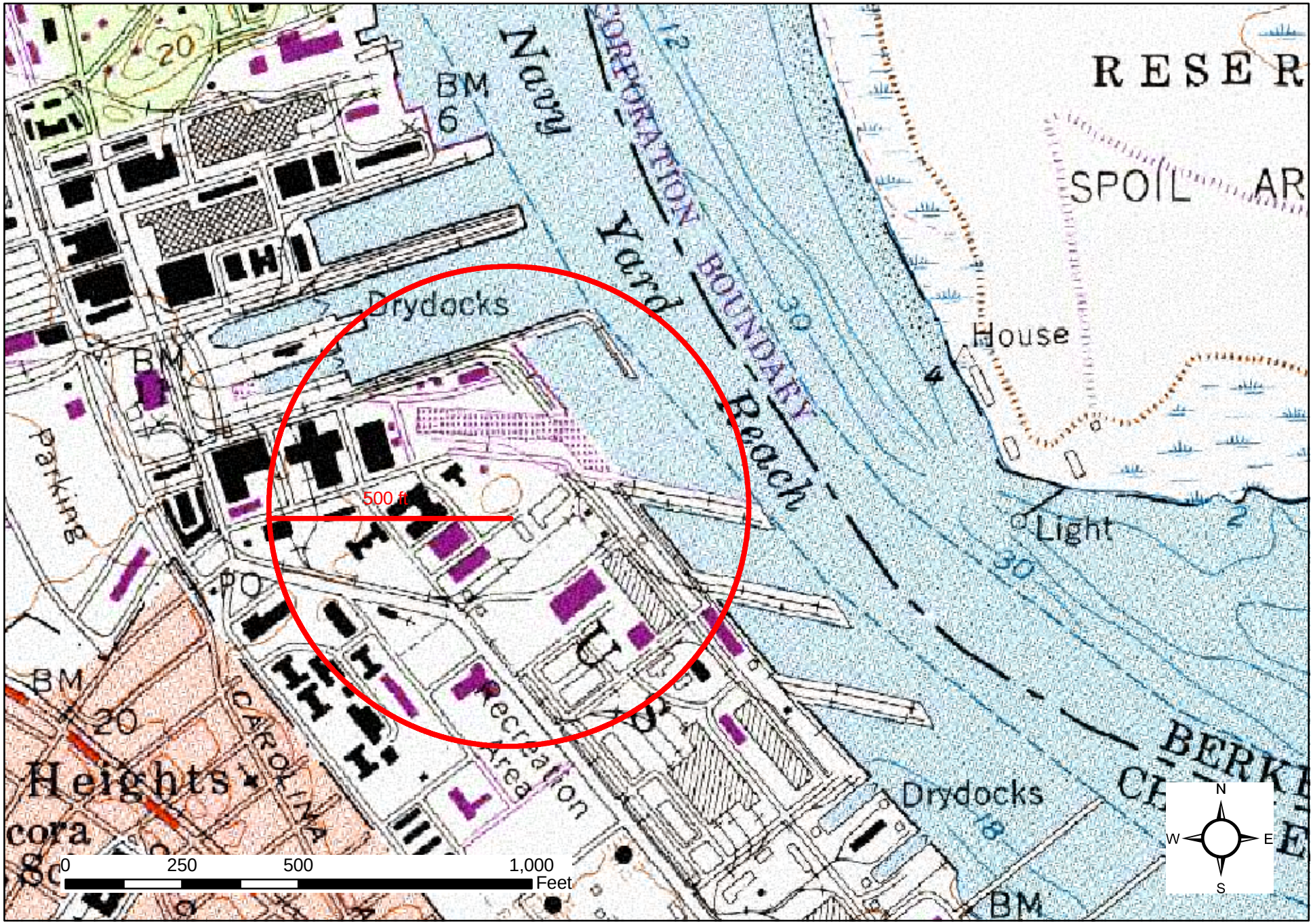


Figure 1: Topographic Map Showing 500ft Radius of Site.	Prepared by: ADVENT Environmental, Inc. Project 04-511 January 07, 2005	Building 236 Charleston Naval Complex Charleston, SC

APPENDIX D
Scaled Site Map

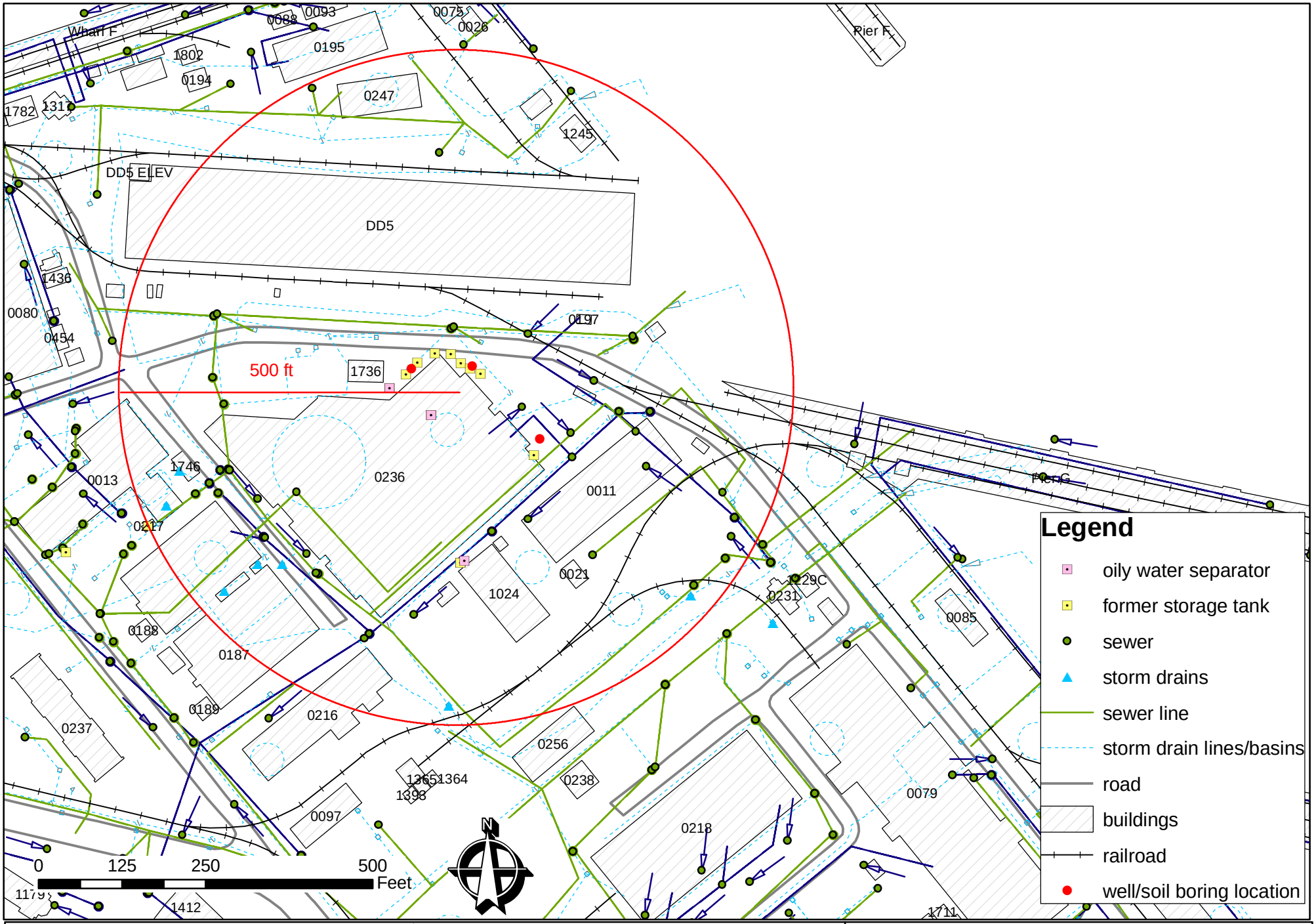


Figure 2: Scaled Site Location Map of Building 236	Prepared by: ADVENT Environmental, Inc. Project 04-511 January 07, 2005	Building 236 Charleston Naval Complex Charleston, SC

APPENDIX E
Surveyed Site Map

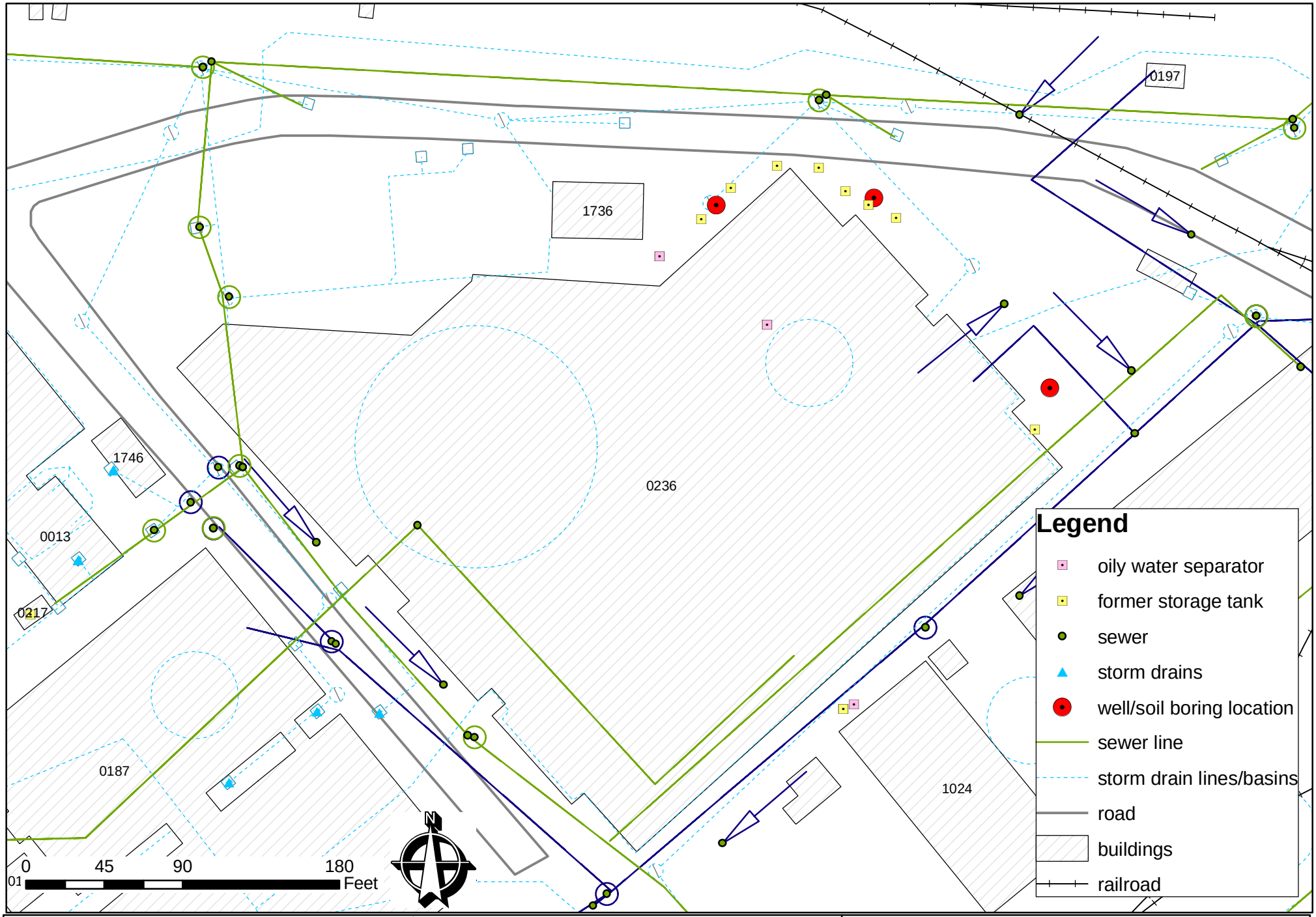
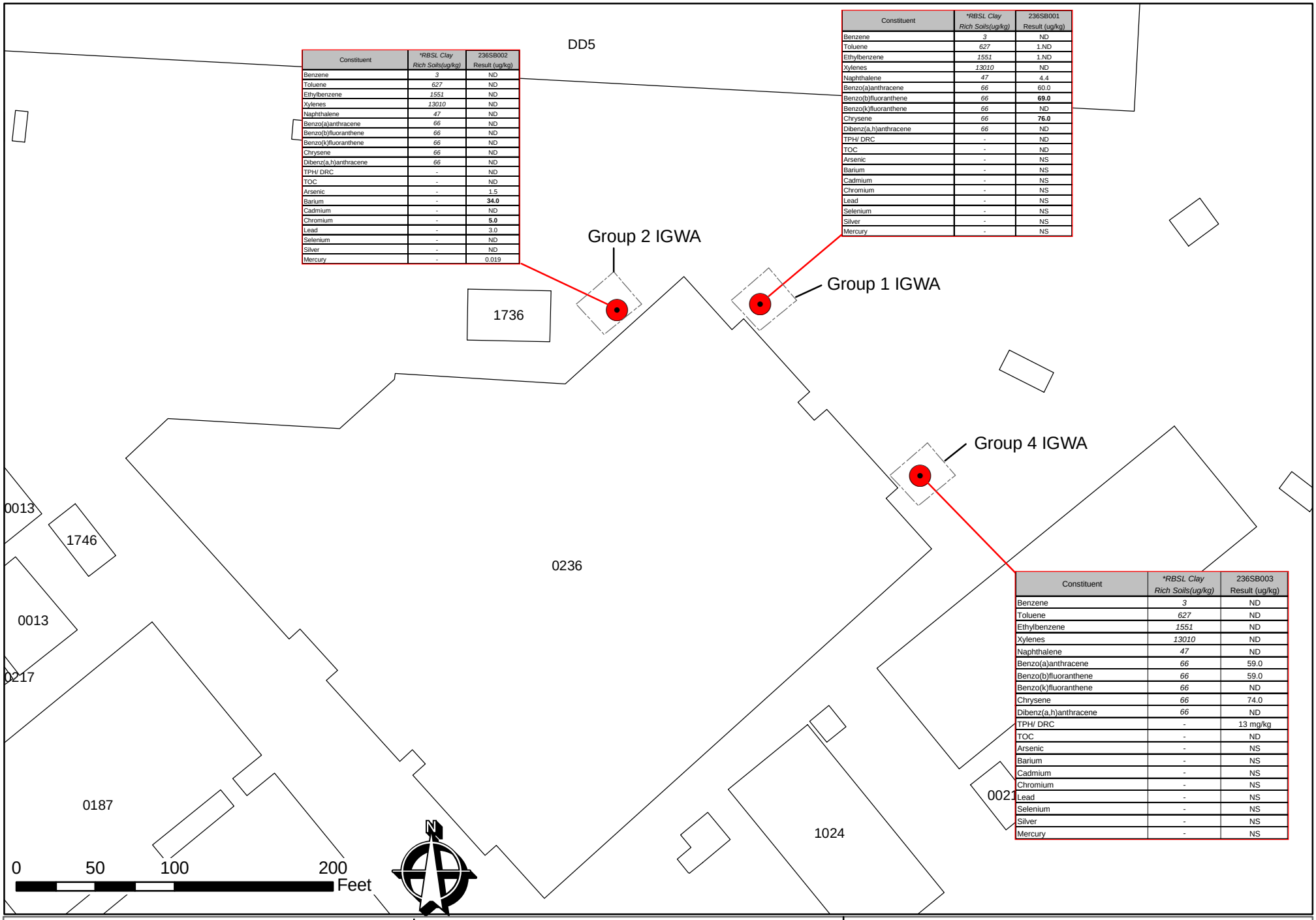


Figure 3: Surveyed Site Map Including Utilities	Prepared by: ADVENT Environmental, Inc. Project 04-511 January 07, 2005	Building 236 Charleston Naval Complex Charleston, SC

APPENDIX F
Chemicals of Concern in Soil



Constituent	*RBSL Clay Rich Soils(ug/kg)	236SB002 Result (ug/kg)
Benzene	3	ND
Toluene	627	ND
Ethylbenzene	1551	ND
Xylenes	13010	ND
Naphthalene	47	ND
Benzo(a)anthracene	66	ND
Benzo(b)fluoranthene	66	ND
Benzo(k)fluoranthene	66	ND
Chrysene	66	ND
Dibenz(a,h)anthracene	66	ND
TPH/ DRC	-	ND
TOC	-	ND
Arsenic	-	1.5
Barium	-	**34.0**
Cadmium	-	ND
Chromium	-	**5.0**
Lead	-	3.0
Selenium	-	ND
Silver	-	ND
Mercury	-	0.019

Constituent	*RBSL Clay Rich Soils(ug/kg)	236SB001 Result (ug/kg)
Benzene	3	ND
Toluene	627	1.ND
Ethylbenzene	1551	1.ND
Xylenes	13010	ND
Naphthalene	47	4.4
Benzo(a)anthracene	66	60.0
Benzo(b)fluoranthene	66	**69.0**
Benzo(k)fluoranthene	66	ND
Chrysene	66	**76.0**
Dibenz(a,h)anthracene	66	ND
TPH/ DRC	-	ND
TOC	-	ND
Arsenic	-	NS
Barium	-	NS
Cadmium	-	NS
Chromium	-	NS
Lead	-	NS
Selenium	-	NS
Silver	-	NS
Mercury	-	NS

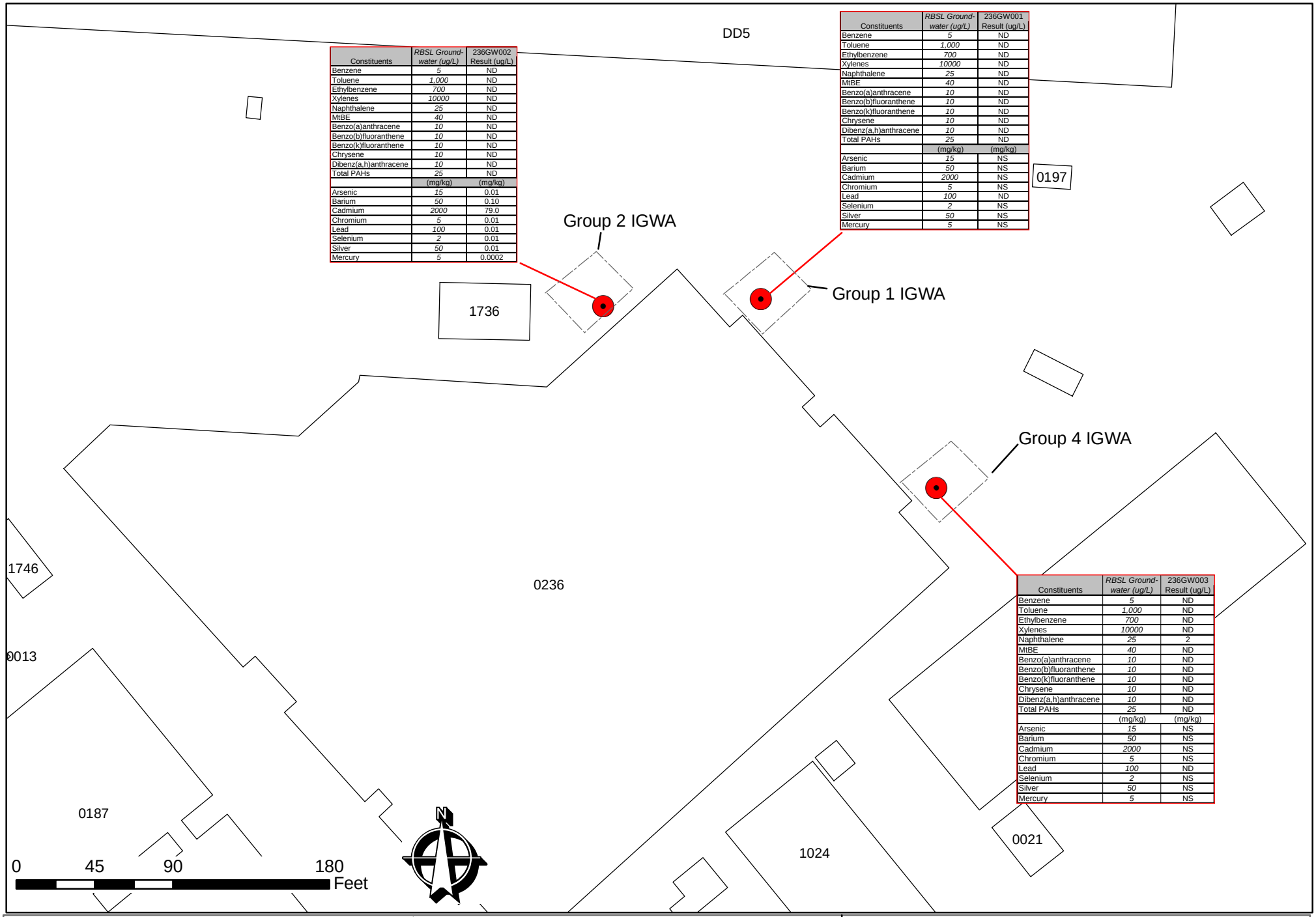
Constituent	*RBSL Clay Rich Soils(ug/kg)	236SB003 Result (ug/kg)
Benzene	3	ND
Toluene	627	ND
Ethylbenzene	1551	ND
Xylenes	13010	ND
Naphthalene	47	ND
Benzo(a)anthracene	66	59.0
Benzo(b)fluoranthene	66	59.0
Benzo(k)fluoranthene	66	ND
Chrysene	66	74.0
Dibenz(a,h)anthracene	66	ND
TPH/ DRC	-	13 mg/kg
TOC	-	ND
Arsenic	-	NS
Barium	-	NS
Cadmium	-	NS
Chromium	-	NS
Lead	-	NS
Selenium	-	NS
Silver	-	NS
Mercury	-	NS

Figure 4: Concentrations of Constituents of Concern Dectected at Soil Borings.

Prepared by:
ADVENT Environmental, Inc.
Project 04-511
January 07, 2005

Building 236
Charleston Naval Complex
Charleston, SC

APPENDIX G
Chemicals of Concern in Groundwater



Constituents	RBSL Ground-water (ug/L)	236GW002 Result (ug/L)
Benzene	5	ND
Toluene	1,000	ND
Ethylbenzene	700	ND
Xylenes	10000	ND
Naphthalene	25	ND
MtBE	40	ND
Benzo(a)anthracene	10	ND
Benzo(b)fluoranthene	10	ND
Benzo(k)fluoranthene	10	ND
Chrysene	10	ND
Dibenz(a,h)anthracene	10	ND
Total PAHs	25	ND
	(mg/kg)	(mg/kg)
Arsenic	15	0.01
Barium	50	0.10
Cadmium	2000	79.0
Chromium	5	0.01
Lead	100	0.01
Selenium	2	0.01
Silver	50	0.01
Mercury	5	0.0002

Constituents	RBSL Ground-water (ug/L)	236GW001 Result (ug/L)
Benzene	5	ND
Toluene	1,000	ND
Ethylbenzene	700	ND
Xylenes	10000	ND
Naphthalene	25	ND
MtBE	40	ND
Benzo(a)anthracene	10	ND
Benzo(b)fluoranthene	10	ND
Benzo(k)fluoranthene	10	ND
Chrysene	10	ND
Dibenz(a,h)anthracene	10	ND
Total PAHs	25	ND
	(mg/kg)	(mg/kg)
Arsenic	15	NS
Barium	50	NS
Cadmium	2000	NS
Chromium	5	NS
Lead	100	ND
Selenium	2	NS
Silver	50	NS
Mercury	5	NS

Constituents	RBSL Ground-water (ug/L)	236GW003 Result (ug/L)
Benzene	5	ND
Toluene	1,000	ND
Ethylbenzene	700	ND
Xylenes	10000	ND
Naphthalene	25	2
MtBE	40	ND
Benzo(a)anthracene	10	ND
Benzo(b)fluoranthene	10	ND
Benzo(k)fluoranthene	10	ND
Chrysene	10	ND
Dibenz(a,h)anthracene	10	ND
Total PAHs	25	ND
	(mg/kg)	(mg/kg)
Arsenic	15	NS
Barium	50	NS
Cadmium	2000	NS
Chromium	5	NS
Lead	100	ND
Selenium	2	NS
Silver	50	NS
Mercury	5	NS

Figure 5: Concentrations of constituents of concern dectected in ground-water.

Prepared by:
ADVENT Environmental, Inc.
Project 04-511
January 07, 2005

Building 236
Charleston Naval Complex
Charleston, SC