SEAD-01-008

U.S. ARMY ENGINEER DIVISION
HUNTSVILLE, ALABAMA

00060

PRE-DRAFT

SEAD-64A
PROJECT SCOPING PLAN FOR PERFORMING A CERCLA REMEDIAL INVESTIGATION/ FEASIBILITY STUDY (RI/FS) AT A GARBAGE DISPOSAL AREA (SEAD-64A)

JULY 1995

PARSONS ENGINEERING SCIENCE, INC.

Prudential Center • Boston, Massachusetts 02199-7697 • (617) 859-2000 • Fax: (617) 859-2043

July 31, 1995

Ms. Dorothy Richards
CEHND-PM-ED
U.S. Army Corps of Engineers
Huntsville Division
106 Wynn Drive
Huntsville, Alabama 35805-1957

SUBJECT: Submittal of a Pre-Draft Project Scoping Plan for Performing a CERCLA Remedial Investigation/Feasibility Study (RI/FS) at SEAD-64A, a Garbage Disposal Area

Dear Ms. Richards:

Parsons Engineering Science, Inc. (Parsons ES) is pleased to submit the Pre-Draft Project Scoping Plan for performing a Comprehensive Environmental Responsibility, Compensation and Liability Act (CERCLA) Remedial Investigation/Feasibility Study (RI/FS) at a Garbage Disposal Area (SEAD-64A) at the Seneca Army Depot Activity (SEDA) located in Romulus, New York. This work was performed in accordance with the Scope of Work (SOW) for Delivery Order 0041 to the Parsons ES Contract DACA87-92-D-0022.

The Project Scoping Plan contains specific information about this site for conducting an RI/FS. Additional information that is not specific to any particular site at SEDA is contained in the Generic Installation RI/FS Workplan that serves as a foundation for this RI/FS Project Scoping Plan. The Generic Installation RI/FS Workplan was previously submitted to you. The Generic Installation RI/FS Workplan and its associated Scoping Plans provide a mechanism for investigating Areas of Concerns at SEDA as part of the United States Army Corps of Engineers (USACE) remedial response activities under CERCLA.

Parsons ES appreciates the opportunity to work with the USACE on this important project and looks forward to a continued relationship on this and other projects. Please feel free to call me at 617-859-2492.

Sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Michael Duchesneau

Michael Duchesneau, P.E.
Project Manager

MD/cmf/Sead64A

cc: Mr. Randall Battaglia, SEDA
Mr. Keith Hoddinott, HSHB-ME-SR
Dr. Buchi, CETHA-IR-D
Mr. Naughton, CENAN-PP-E
Mr. Pickett, CENAD-CO-EP
Mr. B. King, AMCEN-A
Ms. Johnson, AMSDS-EN-FD
Ms. Percifield, CEMRD-ED-GL

PROJECT SCOPING PLAN
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
AT SEAD-64A
SENECA ARMY DEPOT ACTIVITY
ROMULUS, NEW YORK

Prepared For:

Seneca Army Depot Activity
Romulus, New York

Prepared By:

Parsons Engineering Science, Inc.
Prudential Center
Boston, Massachusetts

727651

July 1995

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LIST OF ACRONYMS

1,2-DCA	1,2-Dichloroethane
1,2-DCE	1,2-Dichloroethylene (total)
AA	Atomic absorption
AMC	U.S. Army Material Command
AN	Army-Navy
AOC	Areas of Concern
APCS	Air Pollution Control System
AQCR	Genesee-Finger Air Quality Control Region
ARAR	Applicable or Relevant and Appropriate Requirements
ASTM	American Society for Testing and Materials
BOD	Biological Oxygen Demand
CEC	Cation exchange capacity
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLP	Contract Laboratory Program
cm	Centimeters
cm/sec	Centimeters per second
COD	Chemical Oxygen Demand
Cr	Chromium
$CaCO_3$	Calcium Carbonate
CRT	Cathode ray tube
DARCOM	Development and Readiness Command
DERA	Defense Environmental Restoration Account
DO	Dissolved oxygen
DOT	Department of Transportation
DQO	Data Quality Objective
DRMO	Defense, Revitalization and Marketing Office
EM	Electromagnetic
EPA	Environmental Protection Agency
ESI	Expanded Site Inspections
FS	Feasibility Study
ft	Feet
ft/ft	Feet per foot
ft/sec	Feet per second
ft/yr	Feet per year

LIST OF ACRONYMS
(CONT.)

GA	Classification: The best usage of Class GA waters is as a source of potable water supply. Class GA waters are fresh groundwaters
GC	Gas chromatograph
gpm	Gallons per minute
GPR	Ground penetrating radar
GRI	Gas Research Institute
GSSI	Geophysical Survey Systems, Inc.
HSWA	Hazardous and Solid Waste Amendments
IAG	Interagency Agreement
Koc	Organic carbon coefficient
lb	pound
L/min	Liters per minute
MCL	Maximum Contaminant Level
mg/l	Milligram per liter
mg/kg	Milligrams per kilogram
MHz	Megahertz
Miniram	Minature Real-Time Aerosol Meter
mL	Milliliter
mmhos/m	Millimhos per meter
MSL	Mean sea level
MW	Monitoring Well
NA	Not analyzed or not available
NBS	National Bureau of Standards
NGVD	National Geologic Vertical Datum
NO_2/N	Nitrite-Nitrogen
NO_3/N	Nitrate-Nitrogen
NPL	National Priority List
NTU	Nephelometric turbidity units
NYSDEC	New York State Department of Environmental Conservation
OB	Open Burning
OD	Open Detonation
OVM	Organic Vapor Meter
Pb	Lead
PAH	Polynuclear Aromatic Hydrocarbon
Parsons ES	Parsons Engineering Science, Inc.
PCB	Polychlorinated biphenyls

LIST OF ACRONYMS
(CONT.)

PID	Photoionization detector
ppm	parts per million
ppmv	parts per million per volume
PSCR	Preliminary Site Characterization Report
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
RAGS	EPA Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RF	Response factor
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RQD	Rock Quality Designation
SB	Soil boring
SCS	Soil Conservation Service
SD	Sediment sample
SEAD	Seneca Army Depot (old name)
SEDA	Seneca Army Depot Activity
sec	Seconds
SOW	Statement of Work
SS	Soil sample
SVO	Semivolatile Organic Compounds
SW	Surface water sample
SWMU	Solid Waste Management Unit
TAGM	Technical and Administrative Guidance Memorandum
TAL	Target analyte list
TCL	Target compound list
TDS	Total dissolved solids
TKN	Total Kjeldah Nitrogen
TOC	Total Organic Carbon
TOX	Total Organic Halogens
TRPH	Total Recovered Petroleum Hydrocarbons
TP	Test Pit
UCL	Upper Confidence Level
ug/g	Micrograms per gram

LIST OF ACRONYMS
(CONT.)

ug/kg	Micrograms per kilogram
ug/mg	Micrograms per milligram
ug/L	Micrograms per liter
USACE	United States Army Corps of Engineers
USAEHA	United States Army Environmental Hygiene Agency
USATHAMA	United States Army Toxic and Hazardous Materials Agency
USCS	Unified Soil Classification System
USDA	United States Department of Agriculture
USGS	United States Geological Survey
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound
Vs	Volt Second

1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

This Project Scoping Plan was prepared by Parsons Engineering Science, Inc. (Parsons ES) to outline the work proposed for a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Remedial Investigation/Feasibility Study (RI/FS) at SEAD-64A at the Seneca Army Depot Activity (SEDA) in Romulus, New York. This Plan is based on the results and recommendations presented in the draft report, issued in April 1995, on the Expanded Site Investigation (ESI) conducted at this Area of Concern titled, "Expanded Site Inspection, Seven Low Priority AOCs, SEADs 60, 62, 63, 64 (A,B,C, and D), 67, 70, and 71". The purpose of this project is to determine the nature and extent of environmental impacts, and evaluate and select appropriate remedial actions. These actions will comply with Applicable or Relevant and Appropriate Requirements (ARARs) and take into account the risks to human health and the environment.

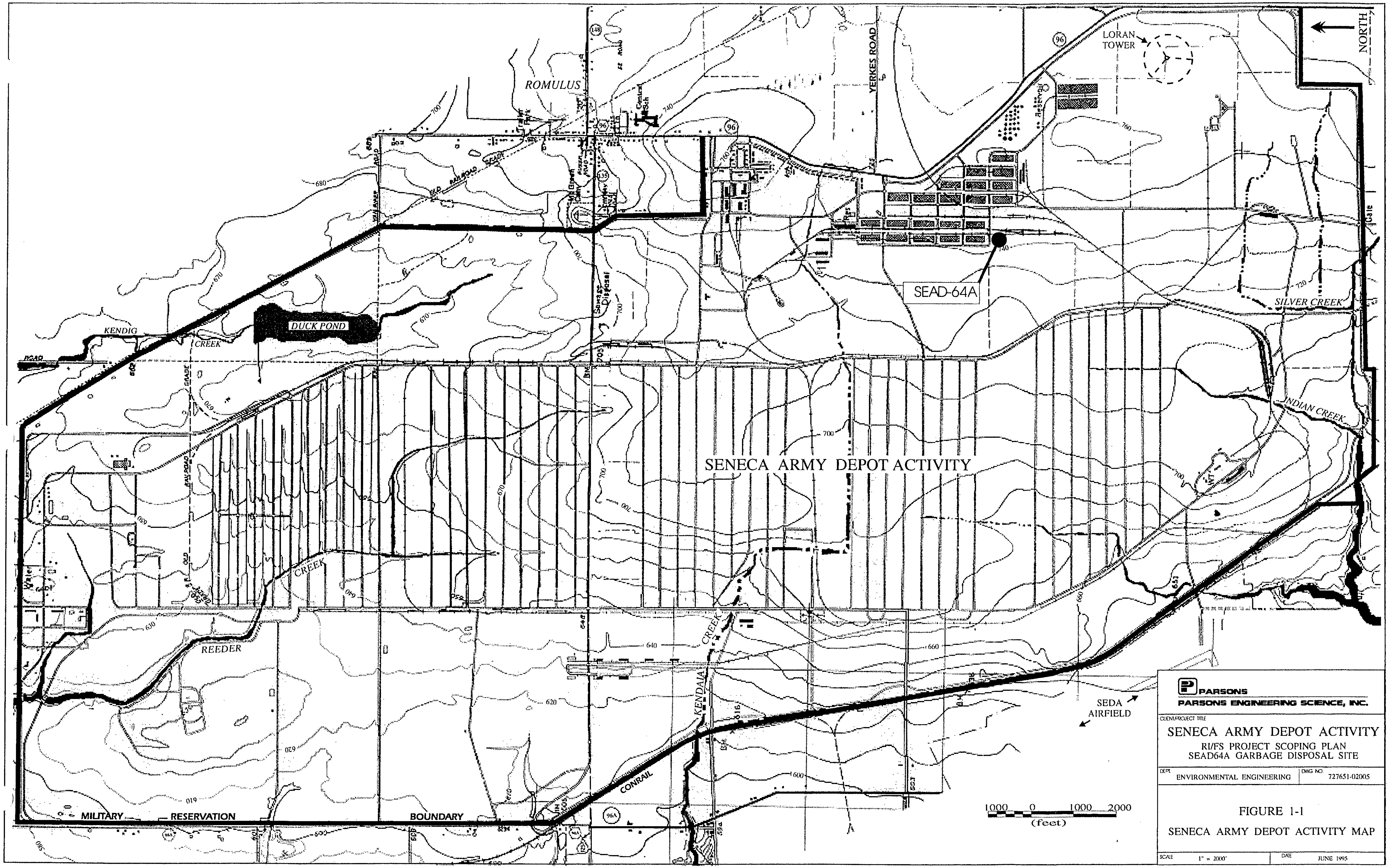
This work will be performed as part of the United States Army Corps of Engineers (USACE) remedial response activities under CERCLA. It will follow the requirements of the New York State Department of Environmental Conservation (NYSDEC), the U.S. Environmental Protection Agency Region II (EPA), and the Interagency Agreement (IAG).

1.2 REPORT ORGANIZATION

The remaining sections of this report are organized to describe the overall site conditions, provide a scoping of the RI/FS, and to provide task plans for the RI and FS. Section 2.0 presents a description of regional geologic and hydrogeologic site conditions and discusses the results of previous investigations. Section 3.0 discusses scoping of the RI/FS including the conceptual site model, identification of potential receptors and exposure scenarios, scoping of potential remedial action technologies, preliminary identification of ARARs, data quality objectives, and data gaps and needs. The task plans for the RI and FS are discussed in Sections 4.0 and 5.0, respectively. Section 6.0 discusses scheduling and staffing.

1.3 BACKGROUND

SEAD-64A is a former garbage disposal area at SEDA in Romulus, NY located on the south-east side of the SEDA facility (Figure 1-1). The site is a grassy area approximately 200 ft. by 350 ft. in area as shown in Figure 1-2.



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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD64A GARBAGE DISPOSAL SITE

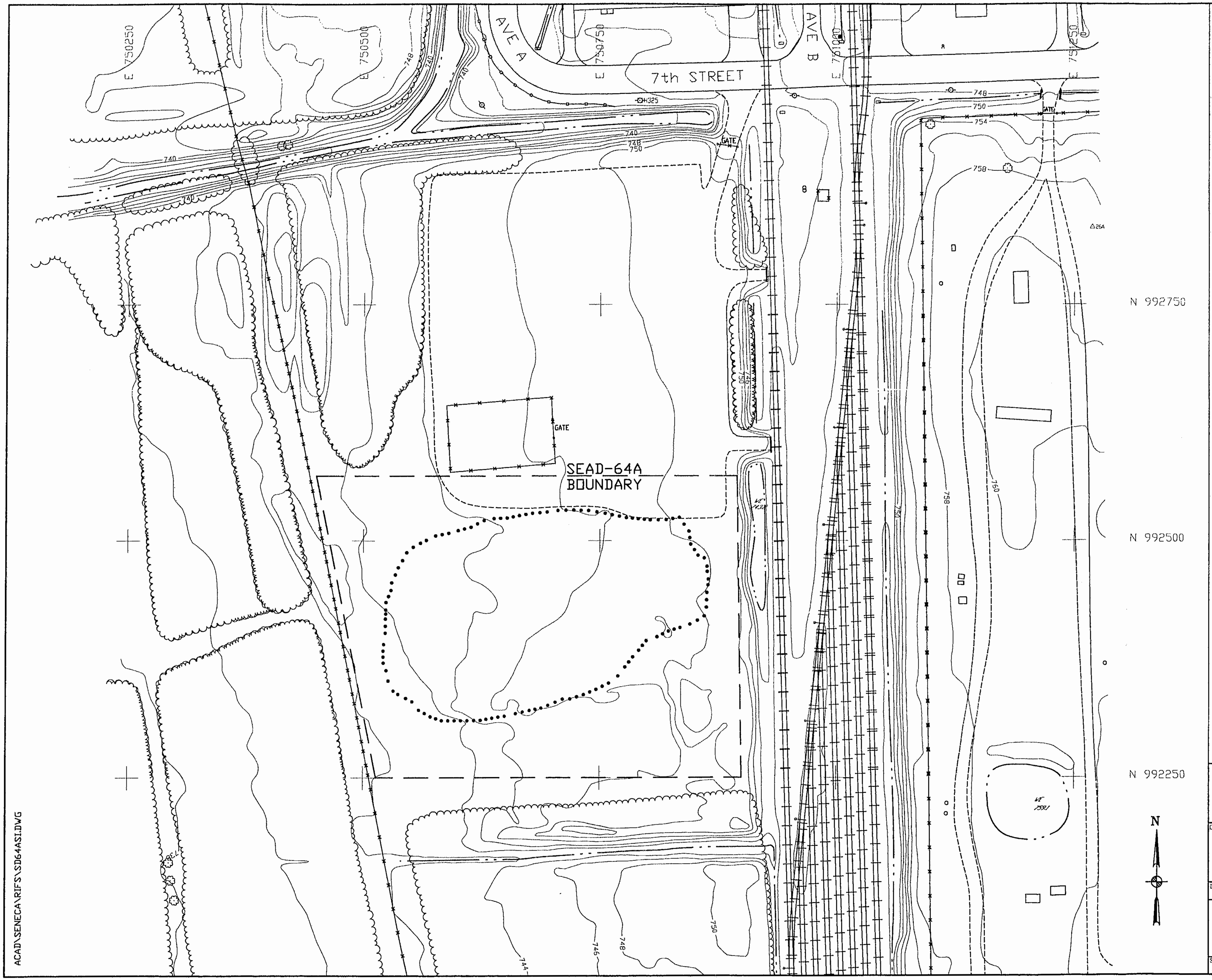
DEPT. ENVIRONMENTAL ENGINEERING
DWG NO. 727651-02005

FIGURE 1-1

SENECA ARMY DEPOT ACTIVITY MAP

SCALE 1" = 2000'
DATE JUNE 1995

R:\GRAPHICS\SENECA\BASEMAP\FINBASE.CDR(CVM)



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DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	727651-02005

FIGURE 1-2
SITE PLAN

SCALE	DATE	REV
1" = 100'	JUNE 1995	A

In accordance with the decision process outlined in the IAG, an Expanded Site Inspection (ESI) was performed at SEAD-64A in 1994. Surface soil, subsurface soil, and groundwater samples were collected to determine if contaminants were present. The draft ESI report indicated a release of semivolatile organic compounds and metals has impacted subsurface soils and groundwater. Based on these results, the draft ESI report recommended that an RI/FS be performed at SEAD-64A.

2.0 SITE CONDITIONS

2.1 PHYSICAL SETTING

The physical setting of SEDA is described in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

2.2 REGIONAL GEOLOGICAL SETTING

The regional geologic setting of SEDA is described in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

2.3 REGIONAL HYDROGEOLOGICAL SETTING

The regional hydrogeology of SEDA is described in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

3.0 SCOPING OF THE RI/FS

This section describes the conceptual model of SEAD-64A based on the results of the ESI. This information is used to identify the known contaminant sources and receptor pathways. The data quality objectives and potential remedial actions for SEAD-64A are also described. The information in this section is used to develop a list of the data gaps and needs that will be the basis for designing the Remedial Investigation in Section 4.0 and performing the feasibility study and baseline risk assessment.

3.1 CONCEPTUAL SITE MODEL

This section will describe the site history, the results of the ESI, and the environmental fate of the primary contaminants on site to develop a conceptual model of SEAD-64A.

3.1.1 Site History

SEAD-64A was used as a landfill during the time period from 1974 to 1979 when the on-site solid waste incinerator was not in operation. The types of wastes disposed of at the site are suspected to be primarily household items, although according to the SWMU Classification Report (Parsons ES, September 1994), metal drums and other industrial items were reported to have been disposed of at this site. SEDA personnel also reported the operation of small burning pits within this area when it was being landfilled.

3.1.2 Physical Site Characterization

3.1.2.1 Physical Site Setting

The disposal area at SEAD-64A is located south of the storage pad at the intersection of 7th Street and Avenue A in the east-central portion of SEDA (Figure 1-1). The site is bounded to the north by a square storage pad, to the east by the SEDA railroad tracks beyond which is the elevated fire training pad (SEAD-26), and to the south and west by undeveloped grassland (Figure 1-2).

The land on site is relatively flat, is covered with low grassland vegetation, and gently slopes downward to the west from the east end of the landfill. East of the landfill, the land slopes downward to the east to an intermittent surface water body located beside the railroad tracks.

A drainage channel is located 30 feet south of monitoring well MW64A-1A as shown in Figure 3-1. Access is restricted only by clearance through the main gates for SEDA. The disposal area is approximately 350 feet by 200 feet. Some debris was visible on the ground surface during the SWMU classification site visit.

3.1.2.2 Site Geology

Surface and subsurface soil samples were obtained from three borings (SB64A-1,2, and 3) and four borings in which monitoring wells were installed (MW64A-1, 1A, 2, and 3) as located on Figure 3-1. Three test pits were also excavated into the landfill to observe the subsurface conditions. The soil descriptions from the borings and test pits, presented in Appendix A, were used to define the site geology.

The following strata were observed with increasing depth: topsoil, fill material, till, weathered shale, and shale.

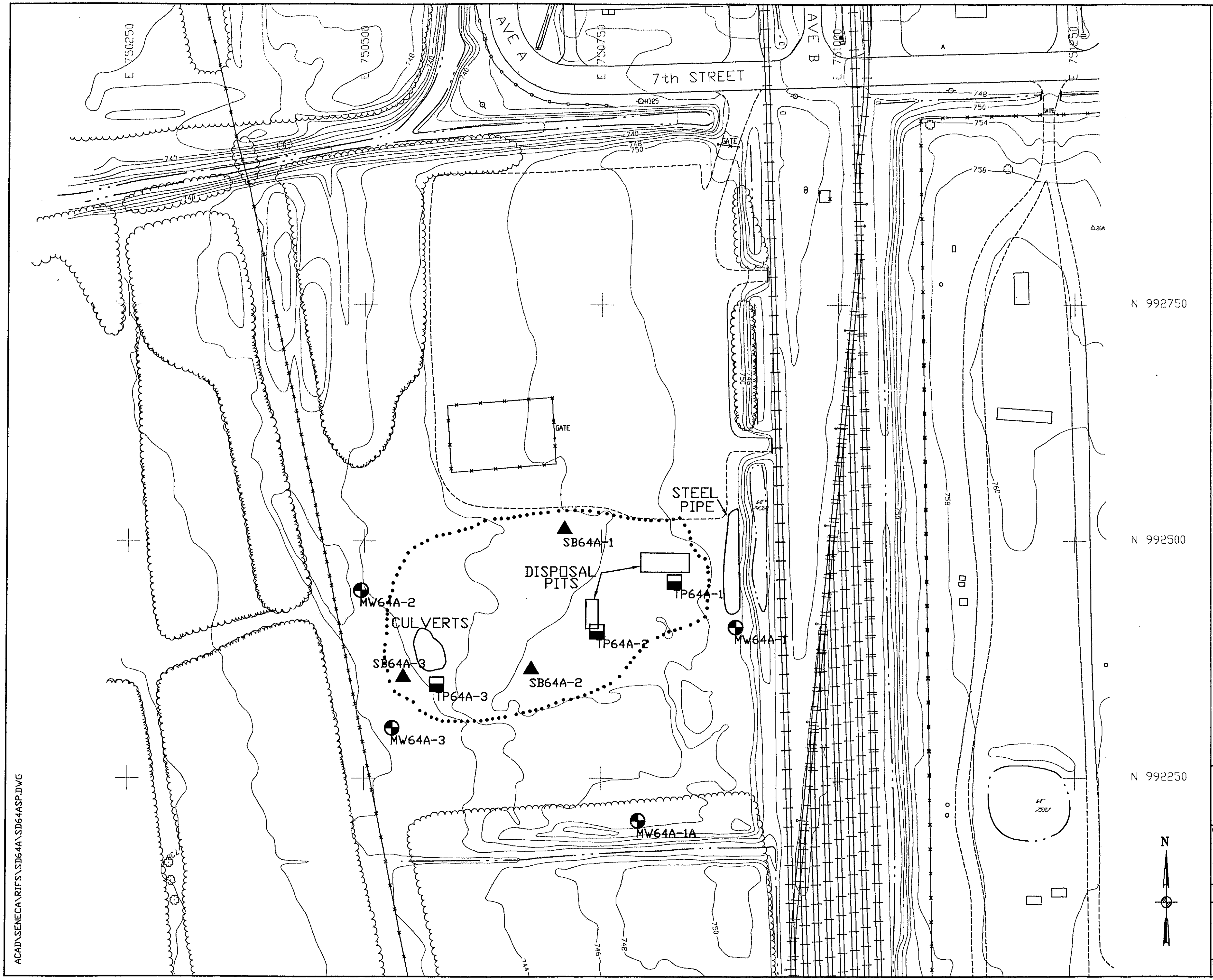
Topsoil was encountered in all of the exploration locations ranging from 0.3 to 1.1 feet thick.

The fill material was encountered in borings SB64A-1 and 2 and in the three test pits at thicknesses from 1.7 to 3.0 feet. The fill consisted of layers of till, shale fragments, and sand. A variety of waste material was observed in the test pits, such as asphalt, metal, car parts, wood and concrete.

The till was observed to be 2.1 to 6.1 feet thick in all the borings across the site. It generally consisted of brown silt and very fine sand with small (less than 1 inch) fragments of shale. Clay or clayey till layers were observed occasionally. Larger shale fragments, thought to be rip-up clasts, were encountered in some of the borings.

Weathered shale, 0.6 to 6.0 feet thick, was observed in all the borings.

Bedrock was composed of grey shale. The bedrock surface, as defined by auger refusal, was encountered at depths from 5.5 to 10.7 feet in four of the borings.



LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENT
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR

ROAD SIGN
DECIDUOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
COORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
☒ SURVEY MONUMENT

● MONITORING WELL
▲ SOIL BORING
■ TEST PIT

50 0 50 100
(feet)

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RI/FS PROJECT SCOPING PLAN
SEAD64A GARBAGE DISPOSAL SITE

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 727651-02005

FIGURE 3-1
LOCATION OF ESI SAMPLING POINTS

SCALE 1" = 100'
DATE JUNE 1995
REV A

3.1.2.3 Geophysics

Seismic Survey

Four seismic refraction profiles, each 120 feet long, were performed as part of the geophysical investigations for the ESI at the locations shown in Figure 3-2. The results of the seismic refraction survey conducted at SEAD-64A are shown in Table 3-1. Saturated overburden was not detected by the seismic survey. The seismic refraction profiles detected 6 to 9 feet of unconsolidated overburden (1,200 to 7,875 ft./sec.) overlying bedrock (9,000 to 13400 ft./sec.). In particular, the unconsolidated material included unsaturated overburden (1,200 to 1,450 ft./sec.) and dense glacial till (7,875 ft./sec.).

Electromagnetic Survey

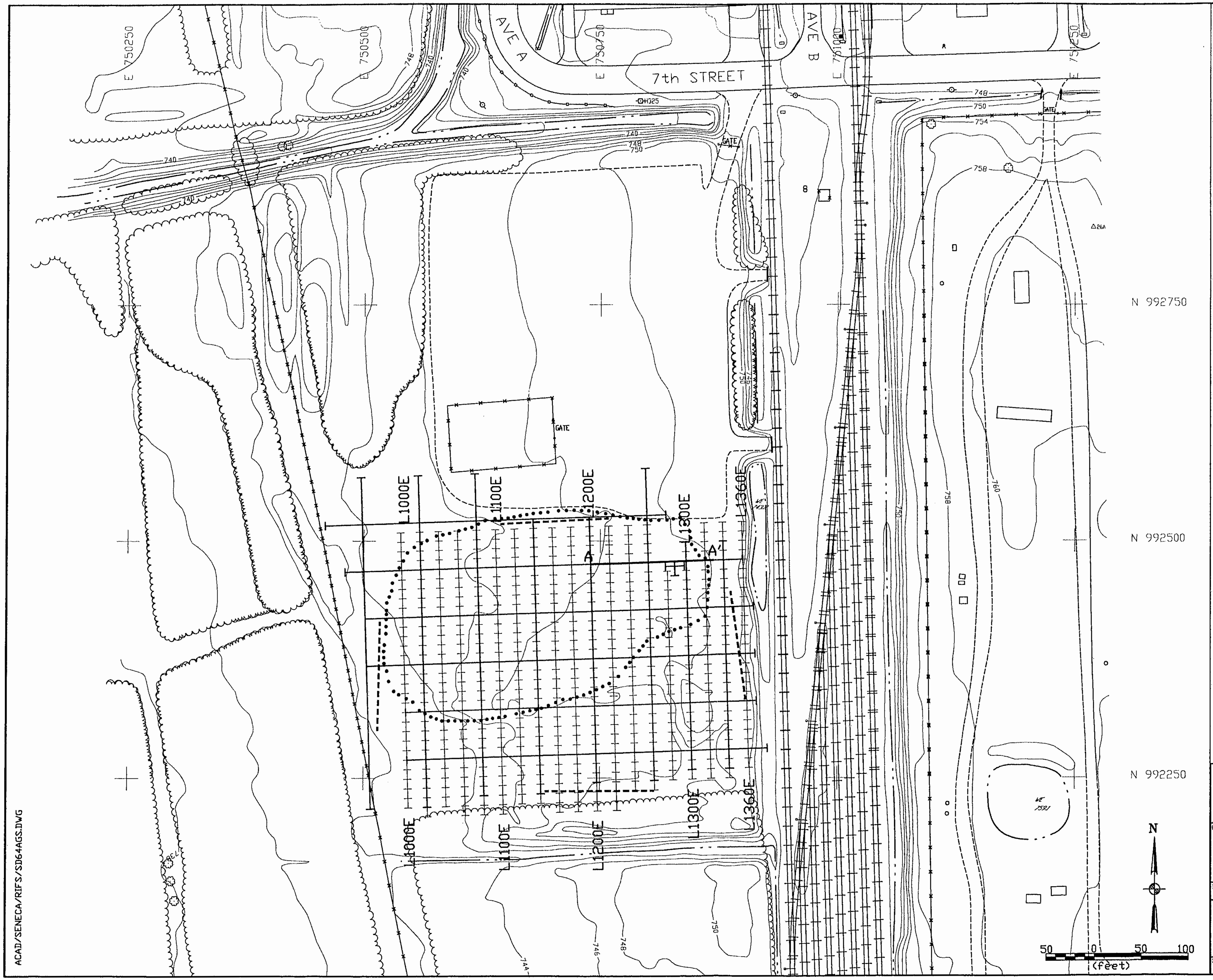
An electromagnetic (EM-31) survey was performed at SEAD-64A along the transects shown in Figure 3-2. Figure 3-3 shows the results of the quadrature response which is proportional to the apparent ground conductivity. A series of conductivity anomalies, forming an arc approximately 75 feet in width, were detected that extends from the west central section to the northeastern section of the survey area. The southern boundary of this arc coincided with a 1 to 2 foot drop in the ground topography which was interpreted as the southern boundary of the landfill area. In addition, the large negative anomalies in the western portion of the arc were associated with culverts that were present on the ground surface. The linear anomaly along the eastern portion of the grid was caused by six inch diameter steel pipe being stored at this site. The data over the remainder of the survey grid, including a large portion of the suspected area of the landfill, displayed a relatively uniform distribution of apparent ground conductivities.

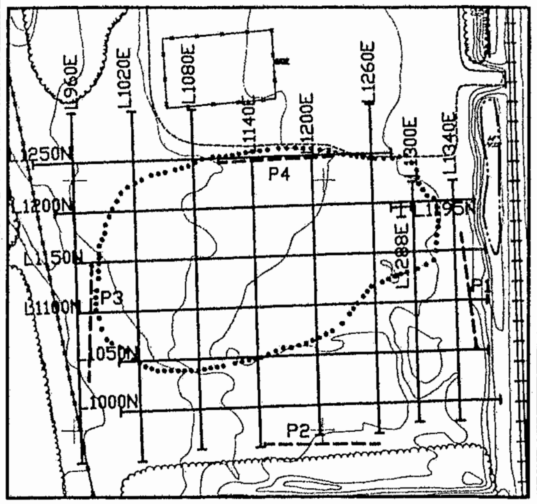
The in-phase response of the EM survey, which reflects the presence of buried ferrous objects, is shown in Figure 3-4. These results show the same anomaly features as described above.

The electromagnetic survey results suggest that the landfill may extend west and north of the surveyed area.

Ground Penetrating Radar (GPR) Survey

A GPR survey was conducted at SEAD-64A along the transects shown in Figure 3-2 to determine the extent of the landfill, to provide additional information on the depth of the fill,





SEISMIC AND GPR LABELS
NO SCALE

LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENT
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDUOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
COORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
⊠ SURVEY MONUMENT
L1200E GPR TRANSECT
P2 SEISMIC PROFILE
L1200N EM TRANSECT
A A' GPR RECORD SHOWN IN REPORT

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RI/FS PROJECT SCOPING PLAN
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DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 727651-02005

FIGURE 3-2
LOCATION OF GEOPHYSICAL SURVEYS

SCALE 1" = 100'
DATE JUNE 1995
REV A

TABLE 3-1

SENECA ARMY DEPOT ACTIVITY
SEAD-64A PROJECT SCOPING PLAN
RESULTS OF ESI SEISMIC REFRACTION SURVEY

Profile	Distance[1]	Ground Elevation[2]	Bedrock	
			Depth	Elev[2].
P1	.5 (South end) 57.5 112.5 (North end)	750.5 749 750	7.5 6.8 7.5	743 742 742.5
P2	.5 (West end) 57.5 112.5 (East end)	746 747 748.5	10.5 8.6 9.2	735.5 738.5 739.5
P3	.5 (South end) 57.5 112.5 (North end)	741.5 742 743	7.1 5.9 6.3	734.5 736 736.5
P4	.5 (West end) 57.5 112.5 (East end)	745.5 746.5 747	7.7 6.9 7.8	738 739.5 739

1. All distances are in feet along each seismic profile.

2. All elevations are accurate to ± 1 foot and are rounded to the nearest half foot.

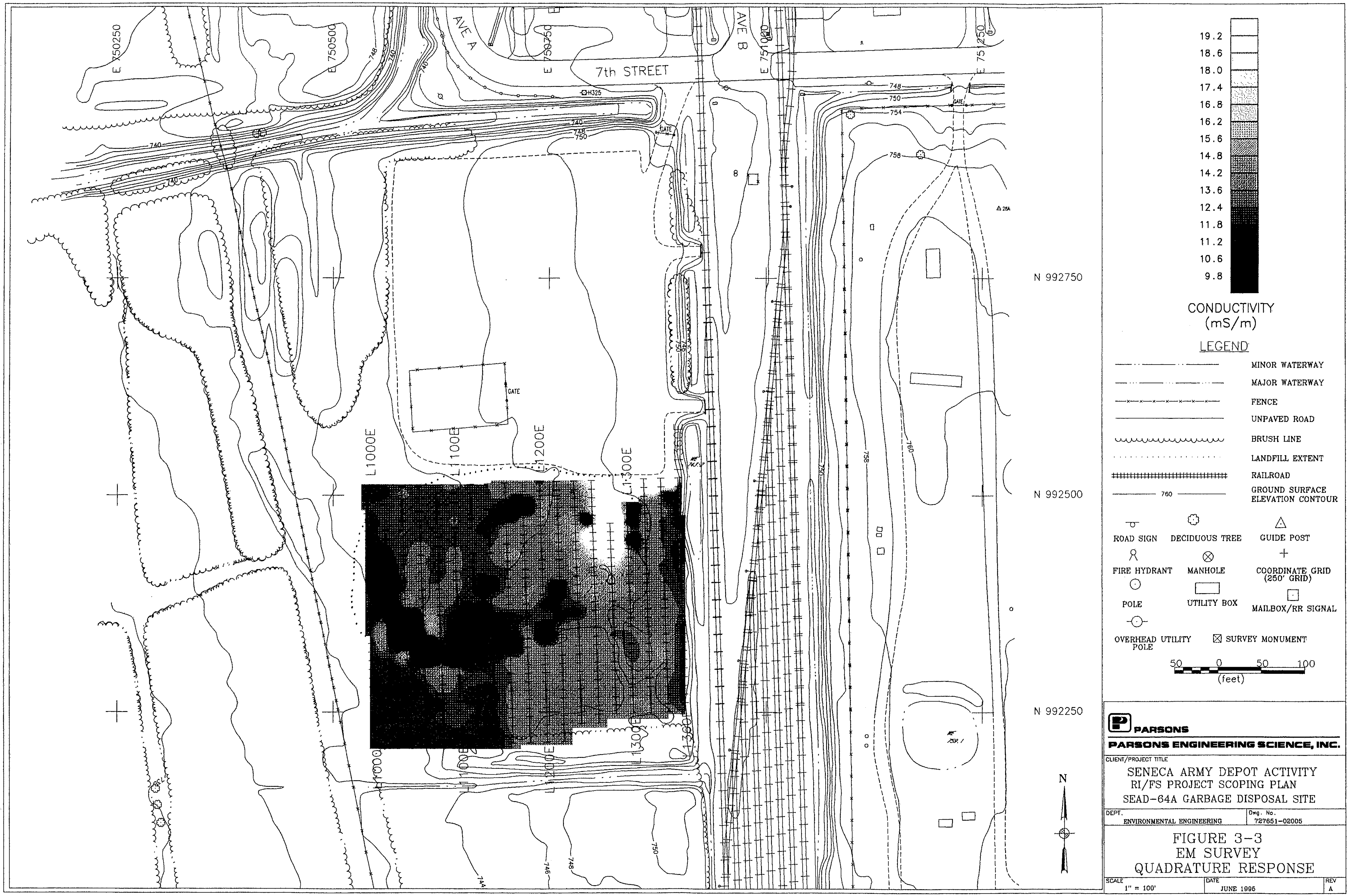

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FIGURE 3-3
EM SURVEY
QUADRATURE RESPONSE

SCALE	DATE	REV
1" = 100'	JUNE 1995	A

and to provide a better definition of the buried metallic objects detected by the EM survey. Two disposal pits containing metallic debris were identified during the GPR survey. One pit was approximately 35 feet long by 15 feet wide and was situated near the center of the suspected landfill area. The second pit, which measured 60 feet by 20 feet, was located near the northeastern boundary of the suspected landfill area, at the same location as one of the more pronounced EM anomalies. The location of these test pits are shown in Figure 3-1. Figure 3-5 shows the GPR data collected over this second burial pit.

The interpretation of the GPR data identified a subsurface contact in the suspected landfill area which appears to be associated with the base of the fill. Figure 3-6 shows an isopach contour map of the fill layer. Due to the conductive nature of the soils at this site, areas where the fill thickness was less than one foot could not be accurately resolved; therefore, the isopachs of the fill layer have a minimum contour level of 1 foot. Based on the GPR data, the approximate areal extent of the landfill is estimated to be 250 by 350 feet.

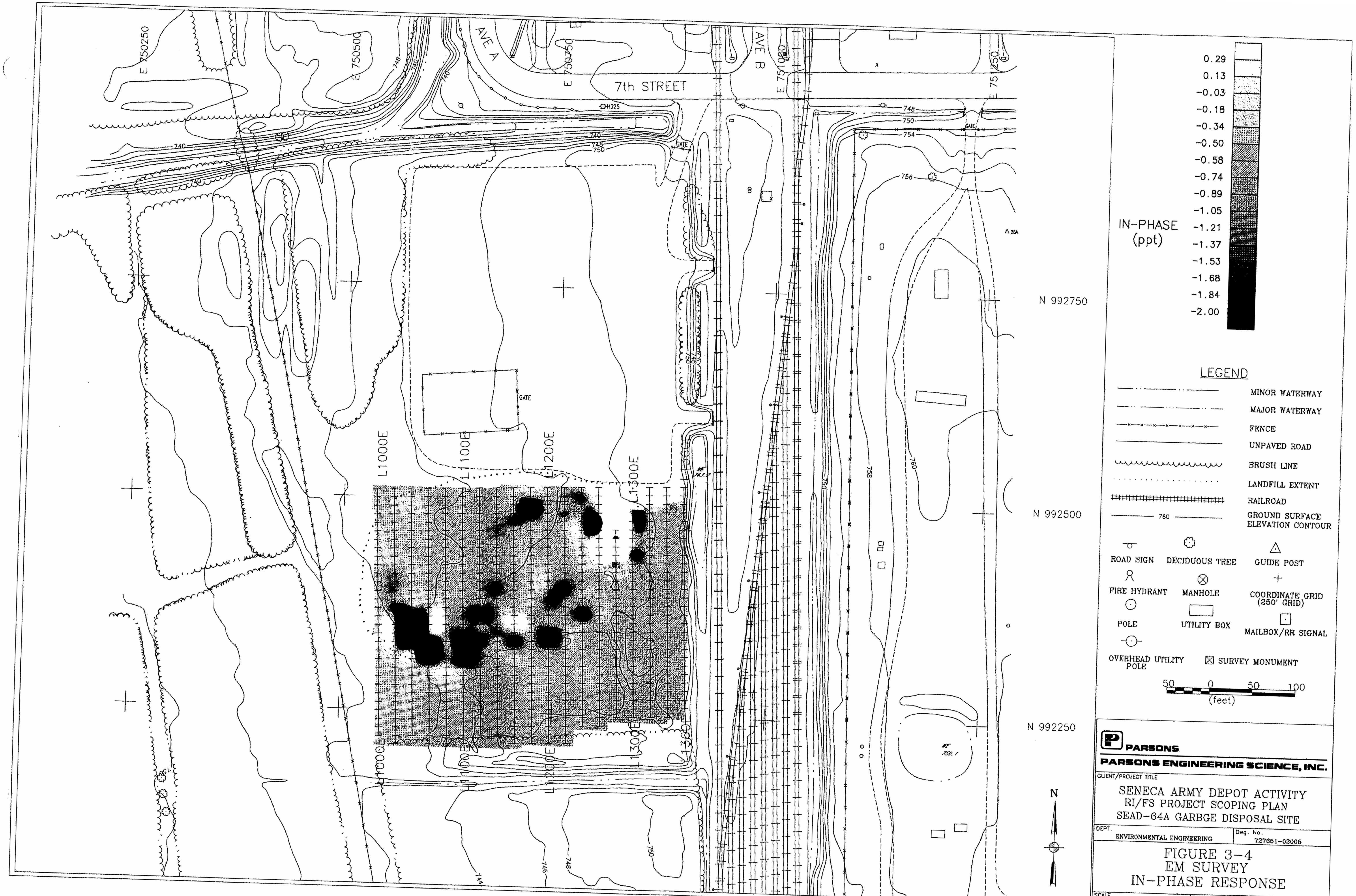
Test Pitting Program

A total of three test pits were excavated in SEAD-64A to characterize the sources of the geophysical anomalies. All three test pits (TP64A-1, TP64A-2, and TP64A-3) were excavated in the suspected landfill area at EM and GPR anomalies (Figure 3-1). The test pit logs are presented in Appendix A.

TP64A-1 was excavated in the disposal pit identified by GPR in the northeast section of the landfill. Crushed, empty metal canisters, originally 12 inches in diameter and 14 inches long, as well as railroad ties and construction debris, were the majority of the fill material from this excavation. Stencilling on the canisters indicated that they had, at one time, contained magnesium powder. The base of the fill at this location was measured at three feet three inches below the ground surface.

TP64A-2 was excavated in the disposal pit identified by GPR located in the center section of the landfill. Large slabs of reinforced concrete and sections of asphalt were found during the excavation. Lenses of dark gray silt were also noted in the test pit. A two foot ten inch thick fill layer was identified at this location.

TP64A-3 was excavated at the EM anomaly in the southwestern section of the landfill. Buried drainage culverts, wire, municipal waste, and construction debris were encountered. The base of fill at this location was measured at two feet eight inches below grade.



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SEAD-64A GARBGE DISPOSAL SITE

DEPT.
ENVIRONMENTAL ENGINEERING

Dwg. No.
727651-02005

FIGURE 3-4
EM SURVEY
IN-PHASE RESPONSE

SCALE
1" = 100'

DATE
JUNE 1995

REV
A

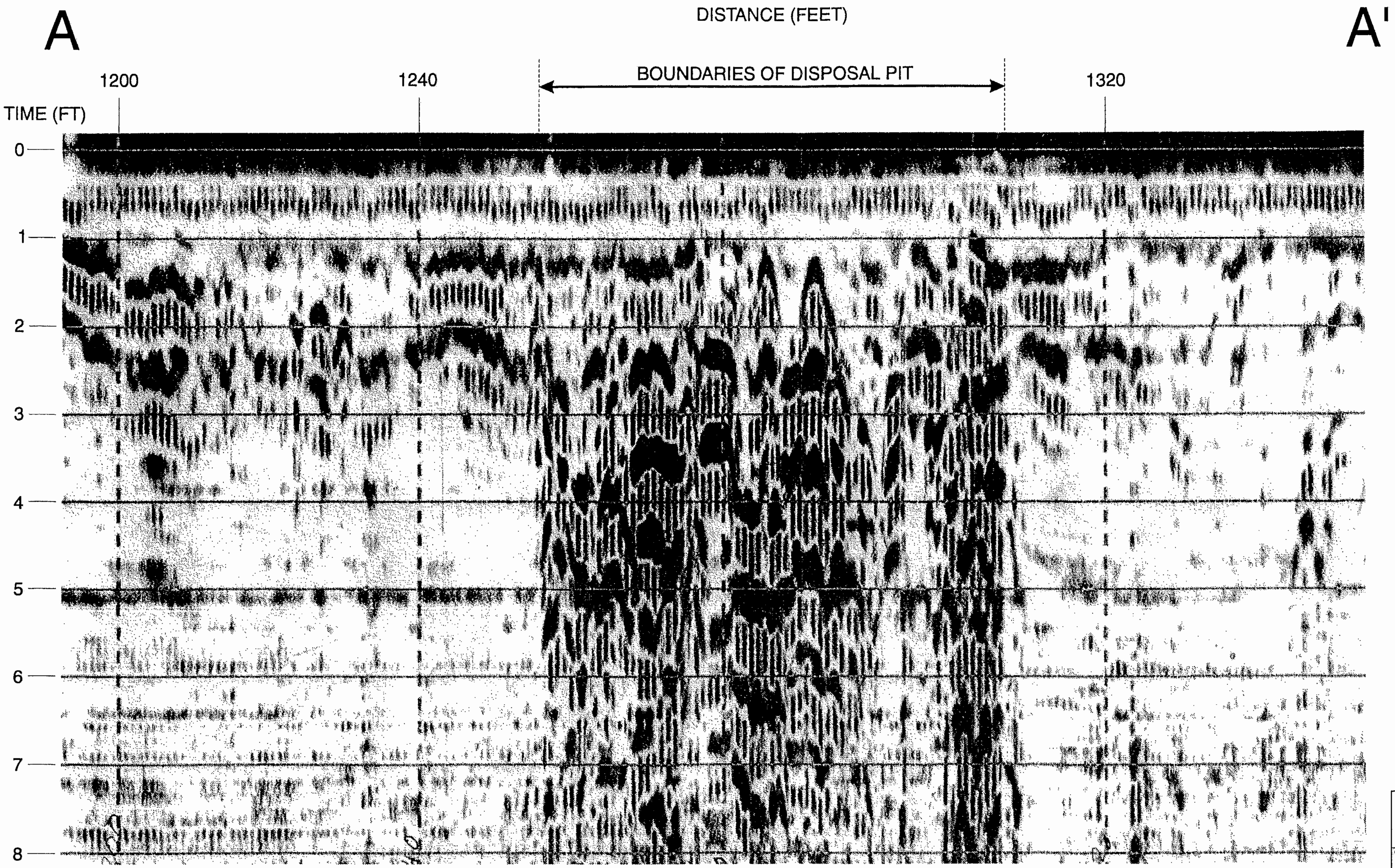

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FIGURE 3-5
GPR PROFILE A-A'

SCALE NA
DATE JUNE 1995

R:\GRAPHICS\SENECA\RADAR\FIG3-4.CDR

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FIGURE 3-6
THICKNESS OF FILL

SCALE 1" = 100'

DATE JUNE 1995

REV A

Soils excavated from the test pits were continuously screened for volatile organic compounds and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 microRhems per hour of radiation) were observed during the excavation.

3.1.2.4 Site Hydrology and Hydrogeology

Surface water flow at SEAD-64A is controlled by the local topography as shown in Figure 3-1. There is a topographic high along the east side of SEAD-64A, as defined by the 750 foot contour, that separates the site from the intermittent surface water body in the drainage channel to the east. Surface water flows primarily westward following the regional topographic slope in this area. There are no sustained surface water bodies present, although intermittent drainage channels are present to the east and south of the site.

As part of the ESI program, four monitoring wells were installed and groundwater elevations were measured. The monitoring well installation and development reports are presented in Appendices B and C, respectively. MW64A-1A was not developed or sampled during the ESI because it was installed at the wrong location. The elevations are listed in Table 3-2. Groundwater elevation contours are shown in Figure 3-7. Based on these data, the groundwater flow direction is primarily southwest across SEAD-64A.

3.2.1.5 Chemical Analysis Results

Soil and groundwater were sampled as part of the ESI conducted at SEAD-64A in 1994. The results of the investigation were presented in the report titled "Expanded Site Inspection, Seven Low Priority AOCs, SEADs 60, 62, 63, 64(A,B,C, and D), 67, 70, and 71" which was issued in April 1995. A total of 12 surface and subsurface soil samples were collected at SEAD-64A on and in the immediate vicinity of the landfill. Groundwater from three monitoring wells was also sampled as part of this investigation. The following sections describe the nature and extent of contamination identified at SEAD-64A in soil and groundwater.

<u>Soil</u>

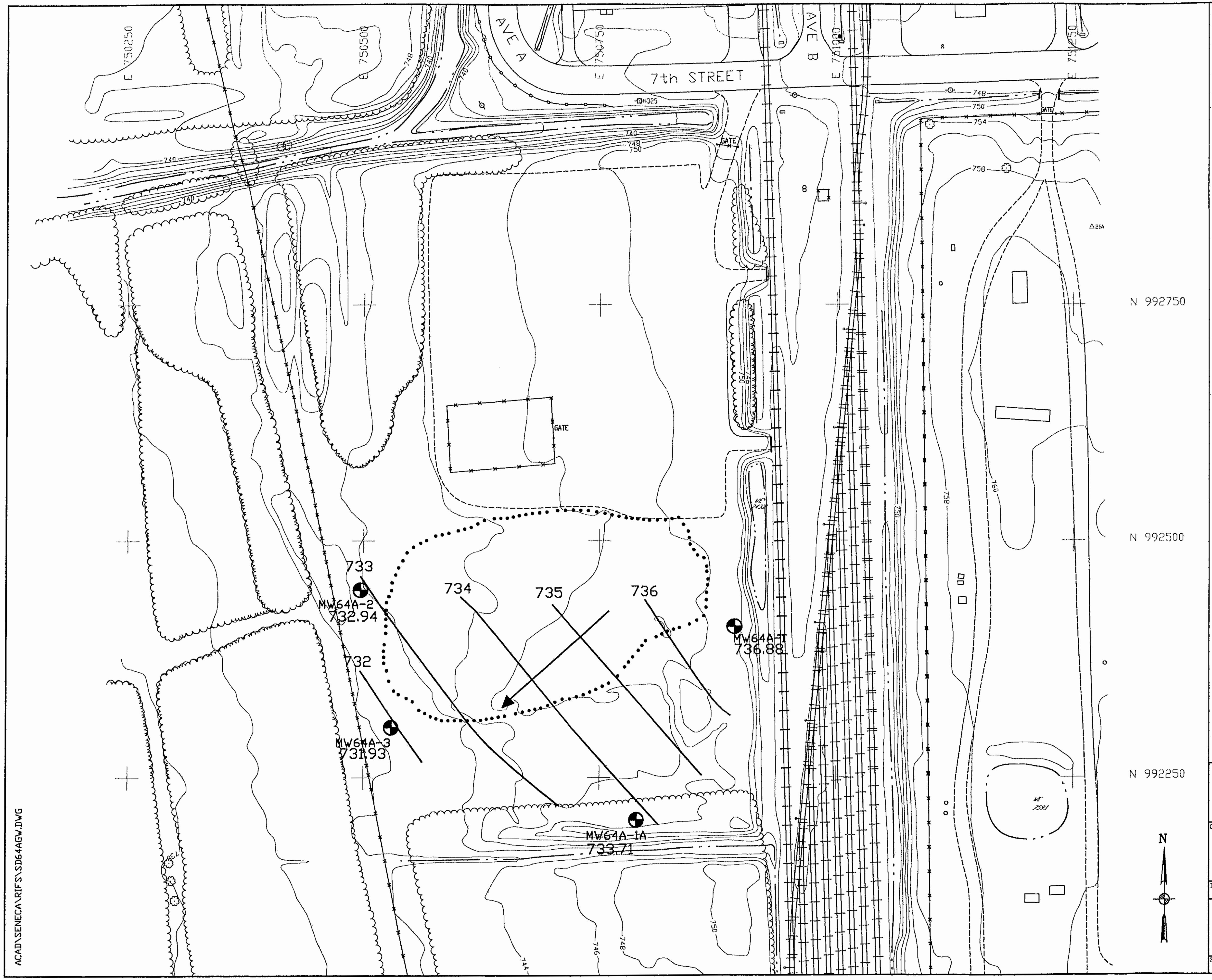
The analytical results for the 12 soil samples collected as part of the investigation of SEAD-64A are presented in Table 3-3. These data are compared to the criteria in the Technical and

TABLE 3-2

SENECA ARMY DEPOT ACTIVITY
SEAD-64A PROJECT SCOPING PLAN
GROUNDWATER ELEVATION SUMMARY FROM ESI

MONITORING WELL NUMBER	TOP OF PVC CASING ELEVATION (MSL)	WELL DEVELOPMENT			SAMPLING			WATER LEVEL MEASUREMENTS		
		DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)	DATE	DEPTH TO GROUNDWATER TOC (FT)	GROUNDWATER ELEVATION (MSL)
MW64A-1	747.30	5/23/94	10.86	736.44	7/18/94	11.11	736.19	7/6/94 7/26/94	9.14 10.42	738.16 736.88
MW64A-2	740.98	5/23/94	7.42	733.56	7/21/94	7.28	733.70	7/6/94 7/26/94	6.45 8.04	734.53 732.94
MW64A-3	739.85	5/23/94	6.59	733.26	7/7/94	6.01	733.84	7/6/94 7/26/94	5.77 7.92	734.08 731.93
MW64A-1A	745.77	NA	NA	NA	NA	NA	NA	7/6/94 7/26/94	11.02 12.06	734.75 733.71

Note: MW64A-1A was not developed or sampled because it was not installed at the appropriate location for the ESI.



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD64A GARBAGE DISPOSAL SITE

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	727651-02005

FIGURE 3-7
GROUNDWATER ELEVATION MAP

SCALE	DATE	REV
1" = 100'	JUNE 1995	A

TABLE 3-3

SENECA ARMY DEPOT ACTIVITY
SEAD-64A PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

	MATRIX					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-64	SEAD-64	SEAD-64	SEAD-64	SEAD-64	SEAD-64
	DEPTH (FEET)					0-0.2	2-4	6-8	0-0.2	2-4	4-7
	SAMPLE DATE					05/27/94	05/27/94	05/27/94	06/10/94	06/10/94	06/10/94
	ES ID		FREQUENCY		NUMBER	SB64A-1-00	SB64A-1-02	SB64A-1-04	SB64A-2-00	SB64A-2-02	SB64A-2-03
	LAB ID		OF		ABOVE	222484	222485	222502	223894	223895	223896
	SDG NUMBER	MAXIMUM	DETECTION	TAGM	TAGM	44410	44410	44410	44725	44725	44725
COMPOUND	UNITS										
VOLATILE ORGANICS											
Trichloroethene	ug/Kg	1	8%	700	0	12 U	12 U	11 U	11 U	11 U	12 U
Benzene	ug/Kg	2	8%	60	0	12 U	12 U	11 U	11 U	11 U	12 U
Toluene	ug/Kg	2	8%	1500	0	12 U	12 U	11 U	11 U	11 U	12 U
SEMIVOLATILE ORGANICS											
Phenol	ug/Kg	44	8%	NA	NA	1000 U	400 U	360 U	2300 U	3700 U	370 U
Naphthalene	ug/Kg	3800	25%	13000	0	1000 U	400 U	360 U	340 J	3800	370 U
2-Methylnaphthalene	ug/Kg	2900	33%	36400	0	54 J	400 U	360 U	150 J	2900 J	370 U
Acenaphthylene	ug/Kg	400	33%	41000	0	250 J	400 U	360 U	400 J	310 J	370 U
Acenaphthene	ug/Kg	1300	33%	50000*	0	140 J	400 U	360 U	250 J	1300 J	370 U
Dibenzofuran	ug/Kg	1400	25%	6200	0	90 J	400 U	360 U	120 J	1400 J	370 U
Fluorene	ug/Kg	4100	42%	50000*	0	260 J	36 J	360 U	350 J	4100	370 U
Phenanthrene	ug/Kg	15000	50%	50000*	0	2300	290 J	360 U	2700	15000	23 J
Anthracene	ug/Kg	1900	42%	50000*	0	540 J	58 J	360 U	1100 J	1900 J	370 U
Carbazole	ug/Kg	780	42%	50000*	0	720 J	39 J	360 U	420 J	780 J	370 U
Di-n-butylphthalate	ug/Kg	290	8%	8100	0	1000 U	400 U	360 U	2300 U	3700 U	370 U
Fluoranthene	ug/Kg	11000	50%	50000*	0	5700	470	360 U	6900	11000	26 J
Pyrene	ug/Kg	8700	50%	50000*	0	4400	340 J	360 U	5400	8700	50 J
Benzo(a)anthracene	ug/Kg	5600	42%	220	4	3600	180 J	360 U	5600	4000	370 U
Chrysene	ug/Kg	4800	50%	400	4	3400	180 J	360 U	4800	4500	22 J
bis(2-Ethylhexyl)phthalate	ug/Kg	13000	75%	50000*	0	1000 U	41 J	40 J	13000	3700 U	52 J
Benzo(b)fluoranthene	ug/Kg	9600	42%	1100	3	6600 J	320 J	360 U	9600 J	3700 UJ	370 UJ
Benzo(k)fluoranthene	ug/Kg	5900	33%	1100	1	1000 UJ	400 UJ	360 U	2300 UJ	5900 J	37 J
Benzo(a)pyrene	ug/Kg	5400	58%	61	5	3000	180 J	360 U	5400	3100 J	21 J
Indeno(1,2,3-cd)pyrene	ug/Kg	3500	50%	3200	1	1900	92 J	360 U	3500	1500 J	370 U
Dibenz(a,h)anthracene	ug/Kg	1500	50%	14	6	1200	70 J	360 U	1500 J	820 J	370 U
Benzo(g,h,i)perylene	ug/Kg	4000	58%	50000*	0	1100	140 J	24 J	4000	1500 J	370 U
PESTICIDES/PCB											
Heptachlor epoxide	ug/Kg	1.9	8%	20	0	4.1 UJ	2.1 UJ	1.8 UJ	3.6 U	1.9 U	1.9 U
Endosulfan I	ug/Kg	33	42%	900	0	22 J	5.1 J	1.8 UJ	33 J	7.8 J	1.9 U
Dieldrin	ug/Kg	7.5	17%	440	0	5.9 J	4 UJ	3.6 UJ	7.5 J	3.7 U	3.7 U
4,4'-DDE	ug/Kg	9	25%	2100	0	4.5 J	4 UJ	3.6 UJ	9 J	3.7 U	3.7 U
4,4'-DDD	ug/Kg	3.7	8%	2900	0	8 UJ	4 UJ	3.6 UJ	3.7 J	3.7 U	3.7 U
Endosulfan sulfate	ug/Kg	5	17%	1000	0	8 UJ	4 UJ	3.6 UJ	5 J	3.7 U	3.7 U
4,4'-DDT	ug/Kg	24	33%	2100	0	4.6 J	4 UJ	3.6 UJ	24 J	4.4 J	3.7 U
alpha-Chlordane	ug/Kg	6.3	25%	540	0	4.2 J	2.1 UJ	1.8 UJ	6.3 J	1.9 U	1.9 U

TABLE 3-3

SENECA ARMY DEPOT ACTIVITY
SEAD-64A PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

COMPOUND	MATRIX	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-64	SEAD-64	SEAD-64	SEAD-64	SEAD-64	SEAD-64
	DEPTH (FEET)					0-0.2	2-4	6-8	0-0.2	2-4	4-7
	SAMPLE DATE					05/27/94	05/27/94	05/27/94	06/10/94	06/10/94	06/10/94
	ES ID					SB64A-1-00	SB64A-1-02	SB64A-1-04	SB64A-2-00	SB64A-2-02	SB64A-2-03
	LAB ID					222484	222485	222502	223894	223895	223896
	SDG NUMBER					44410	44410	44410	44725	44725	44725
	UNITS										
METALS											
Aluminum	mg/Kg	19800	100%	14593	6	11800	17100	12800	11800	18400	12400
Antimony	mg/Kg	4.3	25%	3.59	1	0.36 J	0.26 UJ	0.26 UJ	4.3 J	0.2 UJ	0.19 UJ
Arsenic	mg/Kg	8.4	100%	7.5	2	4.7	6	8.4	5.8	7.1	4.8
Barium	mg/Kg	133	100%	300	0	59.3	133	53.7	96.3	90.9	68.7
Beryllium	mg/Kg	0.8	100%	1	0	0.54 J	0.8 J	0.55 J	0.55 J	0.78 J	0.54 J
Cadmium	mg/Kg	1	92%	1	0	0.45 J	0.48 J	0.33 J	1	0.72 J	0.7 J
Calcium	mg/Kg	72400	100%	101904	0	36300	4450	4580	62800	4040	64900
Chromium	mg/Kg	35.5	100%	22	7	19.7	23.9	21.4	35.5	27	17.5
Cobalt	mg/Kg	14	100%	30	0	10.6	10.3	14	10.3	9.5	8.9
Copper	mg/Kg	56.3	100%	25	3	23.3	20.1	24.6	56.3	23.5	24.3
Iron	mg/Kg	35900	100%	26627	7	25500	28600	35900	23000	30000	21200
Lead	mg/Kg	391	100%	30	1	18.5	14.5	11.1	391	10.1	10.7
Magnesium	mg/Kg	14800	100%	12222	1	6940	4510	5420	8000	5610	11900
Manganese	mg/Kg	968	100%	669	2	528	968	619	517	310	405
Mercury	mg/Kg	0.1	100%	0.1	0	0.04 J	0.06 J	0.03 J	0.1	0.09 J	0.02 J
Nickel	mg/Kg	36.1	100%	34	1	33.3	29.2	36.1	31.1	31.5	26.5
Potassium	mg/Kg	2820	100%	1762	9	1530 J	2070 J	1150 J	2060 J	2820 J	2170 J
Selenium	mg/Kg	1.7	83%	2	0	0.98	0.94 J	0.82 J	0.49 J	0.72 J	0.39 U
Sodium	mg/Kg	92.1	75%	104	0	50.9 J	22.1 J	39.2 J	78.4 J	39.4 J	85.5 J
Thallium	mg/Kg	0.42	8%	0.28	1	0.26 U	0.38 U	0.39 U	0.33 U	0.3 U	0.27 U
Vanadium	mg/Kg	33.5	100%	150	0	20	29.3	19.1	25.4	31.1	20.8
Zinc	mg/Kg	167	100%	83	6	83	87	106	167	76.7	61.2
OTHER ANALYSES											
Total Solids	%W/W					81.5	81.9	92.1	94.4	89	89.4

TABLE 3-3

SENECA ARMY DEPOT ACTIVITY
SEAD-64A PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

	MATRIX					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-64	SEAD-64	SEAD-64	SEAD-64	SEAD-64	SEAD-64
	DEPTH (FEET)					0-0.2	0-2	2-3	0-0.2	2-4	4-6
	SAMPLE DATE					06/10/94	06/10/94	06/10/94	04/02/94	04/02/94	04/02/94
	ES ID					SB64A-3-00	SB64A-3-01	SB64A-3-02	MW64A-1.00	MW64A-1.02	MW64A-1.03
	LAB ID					223897	223906	223907	216351	216352	216353
	SDG NUMBER	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	44725	44748	44748	43257	43257	43257
COMPOUND	UNITS										
VOLATILE ORGANICS											
Trichloroethene	ug/Kg	1	8%	700	0	1 J	11 U	12 U	13 U	12 U	12 U
Benzene	ug/Kg	2	8%	60	0	12 U	2 J	12 U	13 U	12 U	12 U
Toluene	ug/Kg	2	8%	1500	0	12 U	2 J	12 U	13 U	12 U	12 U
SEMIVOLATILE ORGANICS											
Phenol	ug/Kg	44	8%	NA	NA	44 J	370 U	370 U	450 U	390 U	370 U
Naphthalene	ug/Kg	3800	25%	13000	0	51 J	370 U	370 U	450 U	390 U	370 U
2-Methylnaphthalene	ug/Kg	2900	33%	36400	0	52 J	370 U	370 U	450 U	390 U	370 U
Acenaphthylene	ug/Kg	400	33%	41000	0	170 J	370 U	370 U	450 U	390 U	370 U
Acenaphthene	ug/Kg	1300	33%	50000*	0	50 J	370 U	370 U	450 U	390 U	370 U
Dibenzofuran	ug/Kg	1400	25%	6200	0	390 U	370 U	370 U	450 U	390 U	370 U
Fluorene	ug/Kg	4100	42%	50000*	0	120 J	370 U	370 U	450 U	390 U	370 U
Phenanthrene	ug/Kg	15000	50%	50000*	0	680	370 U	370 U	450 U	390 U	370 U
Anthracene	ug/Kg	1900	42%	50000*	0	230 J	370 U	370 U	450 U	390 U	370 U
Carbazole	ug/Kg	780	42%	50000*	0	110 J	370 U	370 U	450 U	390 U	370 U
Di-n-butylphthalate	ug/Kg	290	8%	8100	0	390 U	370 U	370 U	290 J	390 U	370 U
Fluoranthene	ug/Kg	11000	50%	50000*	0	1500	370 U	370 U	450 U	390 U	370 U
Pyrene	ug/Kg	8700	50%	50000*	0	1200	370 U	370 U	450 U	390 U	370 U
Benzo(a)anthracene	ug/Kg	5600	42%	220	4	1200	370 U	370 U	450 U	390 U	370 U
Chrysene	ug/Kg	4800	50%	400	4	970	370 U	370 U	450 U	390 U	370 U
bis(2-Ethylhexyl)phthalate	ug/Kg	13000	75%	50000*	0	140 J	21 J	370 U	750	280 J	320 J
Benzo(b)fluoranthene	ug/Kg	9600	42%	1100	3	1500	29 J	370 U	450 U	390 U	370 U
Benzo(k)fluoranthene	ug/Kg	5900	33%	1100	1	550	25 J	370 U	450 U	390 U	370 U
Benzo(a)pyrene	ug/Kg	5400	58%	61	5	1200	35 J	370 U	450 U	390 U	370 U
Indeno(1,2,3-cd)pyrene	ug/Kg	3500	50%	3200	1	930	27 J	370 U	450 U	390 U	370 U
Dibenz(a,h)anthracene	ug/Kg	1500	50%	14	6	390 J	19 J	370 U	450 U	390 U	370 U
Benzo(g,h,i)perylene	ug/Kg	4000	58%	50000*	0	1000	27 J	370 U	450 U	390 U	370 U
PESTICIDES/PCB											
Heptachlor epoxide	ug/Kg	1.9	8%	20	0	1.9 J	1.9 U	1.9 UJ	2.3 U	2 U	1.9 U
Endosulfan I	ug/Kg	33	42%	900	0	23 J	1.9 U	1.9 UJ	2.3 U	2 U	1.9 U
Dieldrin	ug/Kg	7.5	17%	440	0	3.9 U	3.7 U	3.7 UJ	4.5 U	3.9 U	3.7 U
4,4'-DDE	ug/Kg	9	25%	2100	0	3 J	3.7 U	3.7 UJ	4.5 U	3.9 U	3.7 U
4,4'-DDD	ug/Kg	3.7	8%	2900	0	3.9 U	3.7 U	3.7 UJ	4.5 U	3.9 U	3.7 U
Endosulfan sulfate	ug/Kg	5	17%	1000	0	3.7 J	3.7 U	3.7 UJ	4.5 U	3.9 U	3.7 U
4,4'-DDT	ug/Kg	24	33%	2100	0	5	3.7 U	3.7 UJ	4.5 U	3.9 U	3.7 U
alpha-Chlordane	ug/Kg	6.3	25%	540	0	2.9 J	1.9 U	1.9 UJ	2.3 U	2 U	1.9 U

TABLE 3-3

SENECA ARMY DEPOT ACTIVITY
SEAD-64A PROJECT SCOPING PLAN
SOIL ANALYSIS RESULTS FROM ESI

	MATRIX					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	LOCATION					SEAD-64	SEAD-64	SEAD-64	SEAD-64	SEAD-64	SEAD-64
	DEPTH (FEET)					0-0.2	0-2	2-3	0-0.2	2-4	4-6
	SAMPLE DATE					06/10/94	06/10/94	06/10/94	04/02/94	04/02/94	04/02/94
	ES ID		FREQUENCY		NUMBER	SB64A-3-00	SB64A-3-01	SB64A-3-02	MW64A-1.00	MW64A-1.02	MW64A-1.03
	LAB ID		OF		ABOVE	223897	223906	223907	216351	216352	216353
	SDG NUMBER	MAXIMUM	DETECTION	TAGM	TAGM	44725	44748	44748	43257	43257	43257
COMPOUND	UNITS										
METALS											
Aluminum	mg/Kg	19800	100%	14593	6	16500	14500	15000	16100	19800	12600
Antimony	mg/Kg	4.3	25%	3.59	1	0.24 UJ	0.25 UJ	0.21 UJ	0.23 J	0.2 UJ	0.2 UJ
Arsenic	mg/Kg	8.4	100%	7.5	2	5.7	6.1	5.9	7.1	8.2	5
Barium	mg/Kg	133	100%	300	0	109	103	86.1	83.7	91.2	62.3
Beryllium	mg/Kg	0.8	100%	1	0	0.74 J	0.72 J	0.65 J	0.68 J	0.74 J	0.53 J
Cadmium	mg/Kg	1	92%	1	0	0.83 J	0.4 J	0.32 J	0.11 J	0.02 U	0.12 J
Calcium	mg/Kg	72400	100%	101904	0	27600	3560	3130	7210	4300	72400
Chromium	mg/Kg	35.5	100%	22	7	23.7	20.8 J	22.1 J	23	25	19
Cobalt	mg/Kg	14	100%	30	0	9.1 J	11.3	11	11.8	11.3	9.1 J
Copper	mg/Kg	56.3	100%	25	3	21	23.4	25.8	25.5	21	23.7
Iron	mg/Kg	35900	100%	26627	7	24600	26700	26800	28500	28000	22600
Lead	mg/Kg	391	100%	30	1	24.4	13.6 R	10.8 R	21.6	13.6	15.4
Magnesium	mg/Kg	14800	100%	12222	1	5870	4410	5190	5480	5010	14800
Manganese	mg/Kg	968	100%	669	2	664	753	556	558	604	402
Mercury	mg/Kg	0.1	100%	0.1	0	0.05 J	0.05 J	0.04 J	0.05 J	0.03 J	0.02 J
Nickel	mg/Kg	36.1	100%	34	1	26.5	29	33.9	32.2	28.6	26.7
Potassium	mg/Kg	2820	100%	1762	9	2430 J	1630 J	2210 J	2590 J	2260 J	2700 J
Selenium	mg/Kg	1.7	83%	2	0	0.73 J	0.91 J	0.83	0.96	1.7	0.34 U
Sodium	mg/Kg	92.1	75%	104	0	42.8 J	21.9 J	16.4 U	27.5 U	31.8 U	92.1 J
Thallium	mg/Kg	0.42	8%	0.28	1	0.35 U	0.37 U	0.31 U	0.42 J	0.32 U	0.32 U
Vanadium	mg/Kg	33.5	100%	150	0	33.5	25.6	25	27.6	32.2	22.8
Zinc	mg/Kg	167	100%	83	6	92.7	77.4	82.8	104	87.1	64.9
OTHER ANALYSES											
Total Solids	%W/W					83.5	87.7	88	74.3	84.5	90.4

NOTES:
- a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
- b) NA = Not Available.
- c) U = The compound was not detected below this concentration.
- d) J = The reported value is an estimated concentration.
- e) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
- f) R = The data was rejected during the data validation process.

Administrative Guidance Memorandum (TAGM): Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC, 1992). The following sections describe the nature and extent of contamination in SEAD-64A soils. The sample locations are shown in Figure 3-1.

Volatile Organic Compounds

Three volatile organic compounds were detected in two of the 12 soil samples collected. They were found at concentrations of 1 to 2 μg/kg which were well below their respective criteria.

Semivolatile Organic Compounds

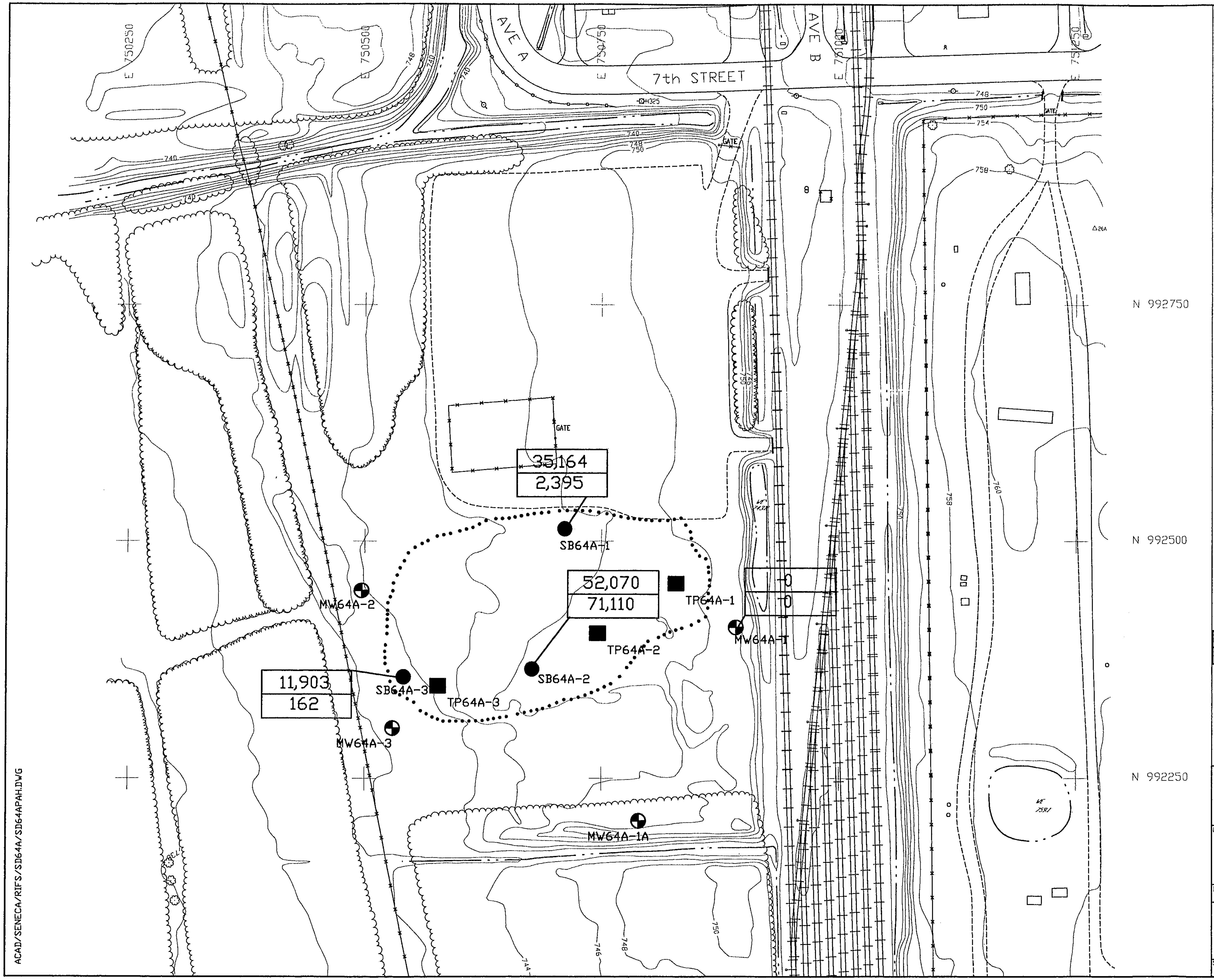
A total of 22 semivolatile organic compounds (SVOs), primarily polynuclear aromatic hydrocarbons (PAHs), were found at varying concentrations in the soil samples collected at SEAD-64A.

The PAHs were detected in and directly below the landfill material from the two borings located on the landfill. The concentrations were generally less than 6,000 μg/kg. The highest concentration was 15,000 μg/kg of phenanthrene in the 2- to 4-foot sample from SB64A-2 which is directly below the fill material. No PAHs were detected in the background samples from MW64A-1. TAGM exceedances were noted for benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenz(a,h)anthracene. The concentrations of PAHs in soil are shown in Figure 3-8.

Four other SVOs were also detected: phenol, dibenzofuran, bis(2-ethylhexyl) phthalate, and di-n-butylphthalate. These compounds were detected at concentrations less than their criteria.

Pesticides and PCBs

Eight pesticides were detected in the nine soil samples obtained from the three borings (SB64A-1, 2, and 3) at concentrations less than their criteria. Pesticides were detected primarily in the 0 to 0.2-foot soil samples. No pesticides were detected in the background soil samples from MW64A-1.



N

LEGEND

—··—··—	MINOR WATERWAY
—···—···—	MAJOR WATERWAY
—x—x—x—	FENCE
-------	UNPAVED ROAD
︶︶︶︶	BRUSH LINE
••••••••	LANDFILL EXTENT
########	RAILROAD
—— 760 ——	GROUND SURFACE ELEVATION CONTOUR

ROAD SIGN
DECIDUOUS TREE
△ GUIDE POST
FIRE HYDRANT
⊗ MANHOLE
+ COORDINATE GRID (250' GRID)
○ POLE
▭ UTILITY BOX
⊡ MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
☒ SURVEY MONUMENT

MONITORING WELL
☒ SURVEY MONUMENT
● SOIL BORING
■ TEST PIT

11,903	TOTAL PAHs (0–0.2')
162	TOTAL PAHs (0.2–4')

NOTE: All concentrations are reported in micrograms per Kilogram.

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD64A GARBAGE DISPOSAL SITE

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 727651-02005

FIGURE 3–8
TOTAL PAHs IN SOILS
FROM 0–0.2' AND 0.2–4'

SCALE 1" = 100'
DATE JUNE 1996
REV A

Metals

A variety of metals were found at concentrations just slightly above their criteria. The majority of these exceedances appear to reflect natural variations in site soils. The exceptions to this are the metals copper, lead, and zinc which were all reported at concentrations at least two times their criteria in the surface soil sample collected at SB64A-2.

Groundwater

Groundwater samples from three monitoring wells were collected as part of the ESI conducted at SEAD-64A. The summary of chemical analyses is presented in Table 3-4. The following sections describe the nature and extent of groundwater contamination identified at SEAD-64A.

Volatile Organic Compounds

No volatile organic compounds were detected in the three groundwater samples collected at SEAD-64A.

Semivolatile Organic Compounds

No semivolatile organic compounds were detected in the three groundwater samples collected at SEAD-64A.

Pesticides and PCBs

No pesticides or PCBs were detected in the three groundwater samples collected at SEAD-64A.

Metals

Groundwater from MW64A-2, located hydraulically downgradient of the landfill, had metals concentrations 1.5 to 9 times higher than concentrations found in the background well. The second downgradient groundwater sample from MW64A-3 had metals concentrations similar to the background well, MW64A-1.

TABLE 3-4

SENECA ARMY DEPOT ACTIVITY
SEAD-64A PROJECT SCOPING PLAN
GROUNDWATER ANALYSIS RESULTS FROM ESI

	MATRIX								
	LOCATION						WATER	WATER	WATER
	SAMPLE DATE						SEAD-64	SEAD-64	SEAD-64
	ES ID				FEDERAL	NUMBER	07/19/94	07/21 & 22/94	07/07/94
	LAB ID		FREQUENCY		DRINKING	ABOVE	MW64A-1	MW64A-2	MW64A-3
	SDG NUMBER		OF	NY AWQS	WATER	LOWEST	227451	227730, 227732	226306
COMPOUND	UNITS	MAXIMUM	DETECTION	CLASS GA	MCL	CRITERIA	45448	45448	45257
				(a)	(h)				
METALS									
Aluminum	ug/L	1710	100%	NA	50-200 *	3	398	1710	379
Barium	ug/L	74.5	100%	1000	2000	0	42 J	74.5 J	53.4 J
Calcium	ug/L	148000	100%	NA	NA	NA	109000	148000	143000
Chromium	ug/L	3.8	100%	50	100	0	0.49 J	3.8 J	0.46 J
Cobalt	ug/L	4.7	33%	NA	NA	NA	0.5 U	4.7 J	0.5 U
Copper	ug/L	1.4	100%	200	1000 *	0	0.61 J	1.4 J	0.97 J
Iron	ug/L	3340	100%	300	300 *	3	773 J	3340 J	539
Magnesium	ug/L	23400	100%	NA	NA	NA	16800	23400	20700
Manganese	ug/L	2040	100%	300	50 *	1	28.3	2040	40.6
Mercury	ug/L	0.06	100%	2	2	0	0.04 J	0.06 J	0.04 J
Nickel	ug/L	9.6	100%	NA	100	0	1 J	9.6 J	1.9 J
Potassium	ug/L	15000	100%	NA	NA	NA	1790 J	15000 J	2010 J
Sodium	ug/L	13000	100%	20000	NA	0	2180 J	13000	10000
Thallium	ug/L	3.3	33%	NA	2	1	1.9 U	3.3 J	1.9 U
Vanadium	ug/L	3	100%	NA	NA	NA	1.3 J	3 J	0.65 J
Zinc	ug/L	16	100%	300	5000 *	0	3.9 J	16 J	5.8 J
OTHER ANALYSES									
pH	Standard Units						7.4	7.4	7
Conductivity	umhos/cm						500	950	620
Temperature	°C						15	21.6	13.6
Turbidity	NTU						15	80	120

NOTES:
- a) NY State Class GA Groundwater Regulations
- b) NA = Not Available
- d) U = The compound was not detected below this concentration.
- e) J = The reported value is an estimated concentration.
- f) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
- g) R = The data was rejected during the data validation process.
- h) Federal Primary and Secondary(*) Drinking Water Maximum Contaminant Levels (40 CFR 141.61-62 and 40 CFR 143.3)

Four metals, aluminum, iron, manganese, and thallium were found in the groundwater samples at concentrations above either the NYSDEC Class GA or the Federal Primary and Secondary Drinking Water Standards. Aluminum exceeded the maximum Federal Secondary Drinking Water Maximum Contaminant Level (MCL) (50 μg/L) in all three samples with results ranging from 379 μg/L to 1710 μg/L. Iron was found in all three wells at concentrations above the criteria values of 300 μg/L. The iron concentrations were between 539 μg/L and 3,340 μg/L. One manganese sample exceeded both state and federal criteria values with a concentration of 2040 μg/L at MW64A-2. Thallium had an estimated concentration of 3.3 μg/L at MW64A-2, exceeding the federal standard of 2 μg/L.

3.1.3 Environmental Fate of Constituents

The potential contaminants of concern at SEAD-64A are semivolatile organic compounds, primarily PAHs, and metals.

The following discussion is meant to present general information on the fate of these potential contaminants of concern, and where possible, site-specific characteristics are presented. Further discussion of these potential contaminants of concern, and all contaminants of concern at SEDA, is provided in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

3.1.3.1 Semivolatile Organic Compounds

The following information was obtained from the document, "Management and Manufactured Gas Plant Sites, Volume III, Risk Assessment," Gas Research Institute (GRI), May 1988, GRI-87/0260.3. A summary of fate and transport parameters for semivolatile organics is presented in Table 3-5.

PAH compounds have a high affinity for organic matter and low water solubility. Water solubility tends to decrease and affinity for organic matter tends to increase with increasing molecular weight. Therefore, naphthalene is much more soluble in water than is benzo(a)pyrene. When present in soil or sediments, PAHs tend to remain bound to the soil particles and dissolve slowly into the groundwater or the water between the soil particles in the vadose zone. Because of the high affinity for organic matter, the physical fate of the

TAL [illegible] -5

SENECA ARMY DEPOT ACTIVITY
SEAD-64A PROJECT SCOPING PLAN
SUMMARY OF FATE AND TRANSPORT PARAMETERS FOR SELECTED ORGANIC COMPOUNDS

COMPOUND	SOLUBILITY (mg/l)	VAPOR PRESSURE (mmHg)	HENRY'S LAW CONSTANT (atm-m³/mol)	Koc (ml/g)	Kow	HALF - LIFE (days)	BCF
Semivolatile Organic Compounds							
Phenol	93000	0.341	4.54E-07	1.42E+01	2.88E+01	3-5	1.4-2
2-Methylphenol	25000	0.24	1.50E-06	2.74E+02	8.91E+01	1-3	
4-Methylphenol		0.11	4.43E-07	2.67E+02	8.51E+01	1-3	
2,4-Dimethylphenol	4200	0.0573	2.38E-06	2.22E+02	2.63E+02	1-3	9.5-150
Benzoic Acid	2700			2.48E+02	7.41E+01		
Naphthalene	31.7	0.23	1.15E-03	1.30E+03	2.76E+03	1-110	44-95
2-Methylnaphthalene	25.4	0.0083	5.80E-05	8.50E+03	1.30E+04	1-3	
2-Chloronaphthalene	6.74	0.017	4.27E-04	4.16E+03	1.32E+04		
2,6-Dinitrotoluene	1320	0.018	3.27E-06	9.20E+01	1.00E+02	4	4.6
Acenaphthene	3.42	0.00155	9.20E-05	4.60E+03	1.00E+04		
Dibenzofuran				4.16E+03	1.32E+04		
2,4-Dinitrotoluene	240	0.0051	5.09E-06	4.50E+01	1.00E+02	5	
Diethylphthalate	896	0.0035	1.14E-06	1.42E+02	3.16E+02	1-3	14-117
Fluorene	1.69	0.00071	6.42E-05	7.30E+03	1.58E+04		
N-Nitrosodiphenylamine	113		1.40E-06	6.50E+02	1.35E+03	4	65-217
Hexachlorobenzene	0.006	0.000019	6.81E-04	3.90E+03	1.70E+05		
Phenanthrene	1	0.00021	1.59E-04	1.40E+04	2.88E+04	1-200	
Anthracene	0.045	0.000195	1.02E-03	1.40E+04	2.82E+04		
Di-n-butylphthalate	13	0.00001	2.82E-07	1.70E+05	3.98E+05	1-3	89-1800
Fluoranthene	0.206	0.0177	6.46E-06	3.80E+04	7.94E+04	140-440	
Pyrene	0.132	2.50E-06	5.04E-06	3.80E+04	7.59E+04	9-1900	
Butylbenzylphthalate	2.9	8.60E-06	1.20E-06	2.84E+04	5.89E+04		663
Benzo(a)anthracene	0.0057	1.50E-07	1.16E-06	1.38E+06	3.98E+05	240-680	
Chrysene	0.0018	6.30E-09	1.05E-06	2.00E+05	4.07E+05	160-1900	
Bis(2-Ethylhexyl)phthalate	0.285	2.00E-07	3.61E-07	5.90E+03	9.50E+03	Neg. Deg.	
Di-ni-octylphthalate	3			2.40E+06	1.58E+09		
Benzo(b)fluoranthene	0.014	5.00E-07	1.19E-05	5.50E+05	1.15E+06	360-610	
Benzo(k)fluoranthene	0.0043	5.10E-07	3.94E-05	5.50E+05	1.15E+06	910-1400	
Benzo(a)pyrene	0.0012	0.000568	1.55E-06	5.50E+06	1.15E+06	220-530	
Indeno(1,2,3-cd)pyrene	0.00053	1.00E-10	6.86E-08	1.60E+06	3.16E+06	600-730	
Dibenz(a,h)anthracene	0.0005	5.20E-11	7.33E-08	3.30E+06	6.31E+06	750-940	
Benzo(g,h,i)perylene	0.0007	1.03E-10	5.34E-08	1.60E+06	3.24E+06	590-650	

Notes:
Koc = organic carbon partition coefficient
Kow = octanol-water partition coefficient
BCF = bioconcentration factor
Neg. Deg. = Negligible Biodegradation

References:
1. IRP Toxicology Guide
2. Basics of Pump-and-Treat Ground-Water Remediation Technology (EPA, 1990).
3. Handbook of Environmental Fate and Exposure Data (Howard, 1989).
4. Soil Chemistry of Hazardous Materials (Dragun, 1988)
5. Hazardous Waste Treatment, Storage, and Disposal Facilities, Air Emissions Models (EPA, 1989).
6. USATHAMA, 1985
7. Values for Koc not found were estimated by: logKoc = 0.544logKow + 1.377 (Dragun, 1988).

chemicals is usually controlled by the transport of particulates. Thus, soil, sediment, and air represent important media for the transport of PAHs.

Because of their high affinity for organic matter, PAH compounds are readily taken up (bioaccumulated) by living organisms. However, organisms have the ability to metabolize the chemicals and to excrete the polar metabolites. This ability varies among organisms. Fish appear to have well-developed systems for metabolizing PAHs and excreting them. Shellfish (bi-valves) appear to be less able to metabolize the compounds. As a result, PAH concentrations are usually low in fish tissue and higher in shellfish tissue.

Natural processes can alter PAH concentrations in the environment. Biodegradation due to microorganisms, is an important process affecting the concentrations of PAHs in soil, sediment, and water. Volatilization is another important process. It occurs more readily for the lighter molecular weight PAHs that the higher molecular weight PAHs.

3.1.3.2 Heavy Metals

Fate and Transport Factors

In general, metals tend to be persistent and relatively insoluble in the environment. The behavior of heavy metals in soil is unlike organic compounds. For example, volatilization of metals from soil is not considered a realistic mechanism for contaminant migration and is not considered here. However, leaching and sorption will be considered.

Leaching of heavy metals from soil is controlled by numerous factors. The most important consideration for leaching of heavy metals is the chemical form (base metal or cation) present in the soil. The leaching of metals from soil is substantial if the metal exists as a soluble salt. Metallic salts have been identified as a component of such items as tracer ammunition, ignitor compositions, incendiary ammunition, flares, colored smoke and primer explosive compositions. In particular, barium nitrate, lead stearate, lead carbonate, and mercury fulminate are potential heavy metal salts or complexes which are components of ammunition that may have been tested or disposed of at SEDA. During the burning of these materials, a portion of these salts oxidize to their metallic oxide forms. In general, metal oxides are considered less likely to leach metallic ions than metallic salts. Upon contact with surface water or precipitation, the heavy metal salts may be dissolved, increasing their mobility and increasing the potential for leaching to the groundwater.

Heavy metals may also exist in the base metallic form as a component of the projectiles tested or disposed of at SEDA. Bullets are composed mainly of lead, which may contain trace amounts of cadmium and selenium. Objects composed of these metals, such as bullets or projectiles, will dissolve slowly.

Oxidation and reduction, another mechanism, involves valence state changes to the metal ions and has a large influence on fate mechanisms. A good example of the variation in contaminant fate and transport due to oxidation and reduction changes is iron. Iron (Fe) normally exists in one of two valence states, +2 and +3 [Fe(II) and Fe(III)]. Fe(II) is more soluble than Fe(III); therefore, it has a greater mobility. The valence can also affect the toxicity of a compound. For example, chromium +6 is more toxic than chromium +3.

Soil pH can also affect metal migration. If the soil pH is greater than 6.5, most metals are fairly immobile, particularly those normally present as cations. At higher pH values, metals form insoluble carbonate and hydroxide complexes. In acidic soils (pH less than 5), metals are more mobile. For example, the surface soil at the OB Grounds which has undergone an RI/FS, has pH values ranging from 5 to 8.4 (SCS, 1972). The subsurface soil is more alkaline with measured pH values ranging from 7 to 9. Therefore, metals at the OB Grounds would be expected to be present primarily in insoluble forms.

Fate and Transport of Selected Metals

More information regarding the fate and transport of copper, lead, and zinc, which were detected in the soil at concentrations at least two times their criteria, is presented below.

Copper is considered to be among the more mobile of the heavy metals in water and soil. Seasonal fluctuations have been observed in surface water copper concentrations, with higher levels in fall and winter, and lower levels in the spring and summer. Several processes determine the fate of copper in aquatic environments, such as formation of complexes, especially with humic substances; sorption to hydrous metal oxides, clays, and organic materials; and bioaccumulation. Organic complexes of copper are more easily adsorbed on clay and other surfaces than the free form. The aquatic fate of copper is highly dependent on factors such as pH, oxidation-reduction potential, concentration of organic matter, and the presence of other metals. With regard to the latter, it has been demonstrated that co-precipitation of copper with hydrous oxides of iron effectively scavenges copper from solution, although in most surface waters organic materials prevail over inorganic ions in complexing copper. Copper is not expected to volatilize from water. Since copper is an essential nutrient, it is strongly accumulated by all plants and animals, but is probably not biomagnified. The degree of persistence of copper in soil depends on the soil characteristics and the forms of copper present. For example, organic complexing agents can bind with copper to reduce its mobility. Copper can form various inorganic complexes which also reduce its mobility. Copper is not expected to volatilize from soil.

Lead is extremely persistent in both water and soil. Environmental fate processes may transform one lead compound to another; however, lead is generally present in the +2 oxidation state, and will form lead oxides. It is largely associated with suspended solids and sediment in aquatic systems, and it occurs in relatively immobile forms in soil. Lead, which has been released to soil may become airborne as a result of fugitive dust generation.

The primary fate for zinc is adsorption to soil, sediment, and suspended solids in water. Zinc can complex with various organic and inorganic ligands in an aqueous environment which gives it some mobility. Zinc is an essential element and therefore, is accumulated by all organisms. Zinc concentrations in air are relatively low except near industrial sources. Volatilization is not an important process from soil or water.

3.1.4 Data Summary and Conclusions

The results of the ESI conducted at SEAD-64A indicate that a small landfill on site has impacted the soil and groundwater quality.

The soils have been impacted by the waste material that was landfilled on site. The fill material (typically 2 to 3 feet thick) and underlying soil contain polynuclear aromatic hydrocarbons which are present at concentrations above their criteria. Concentrations of heavy metals above their criteria were present in all of the soil samples, though no consistent pattern in their occurrences was evident. This is attributed to natural soil variations. One exception was a landfill surface soil sample that contained concentrations of copper, lead, and zinc at least two times their criteria.

The landfill is affecting the groundwater based on the increased metals concentrations in the downgradient groundwater samples. These metals include aluminum, iron, manganese, and thallium. No organic compounds analyzed for were detected in the groundwater samples.

3.2 PRELIMINARY IDENTIFICATION OF POTENTIAL RECEPTORS AND EXPOSURE SCENARIOS

This section will identify the source areas, release mechanisms, potential exposure pathways, and likely human and environmental receptors at SEAD-64A using the conceptual site model.

This section also discusses the current understanding of site risk for SEAD-64A based on the data gathered for the ESI. This information is used to assess whether sources of contamination, release mechanisms, exposure routes, and receptor pathways developed in the conceptual site model are valid or if they may be eliminated from further consideration prior to conducting the risk assessment.

This is a generic discussion. The future use scenario and the required degree of cleanup will be proposed on a site-by-site basis as part of each feasibility study. The future plans for each site will be taken into account at that time. Currently, the Army has no plans to change the use of this facility or to transfer the ownership.

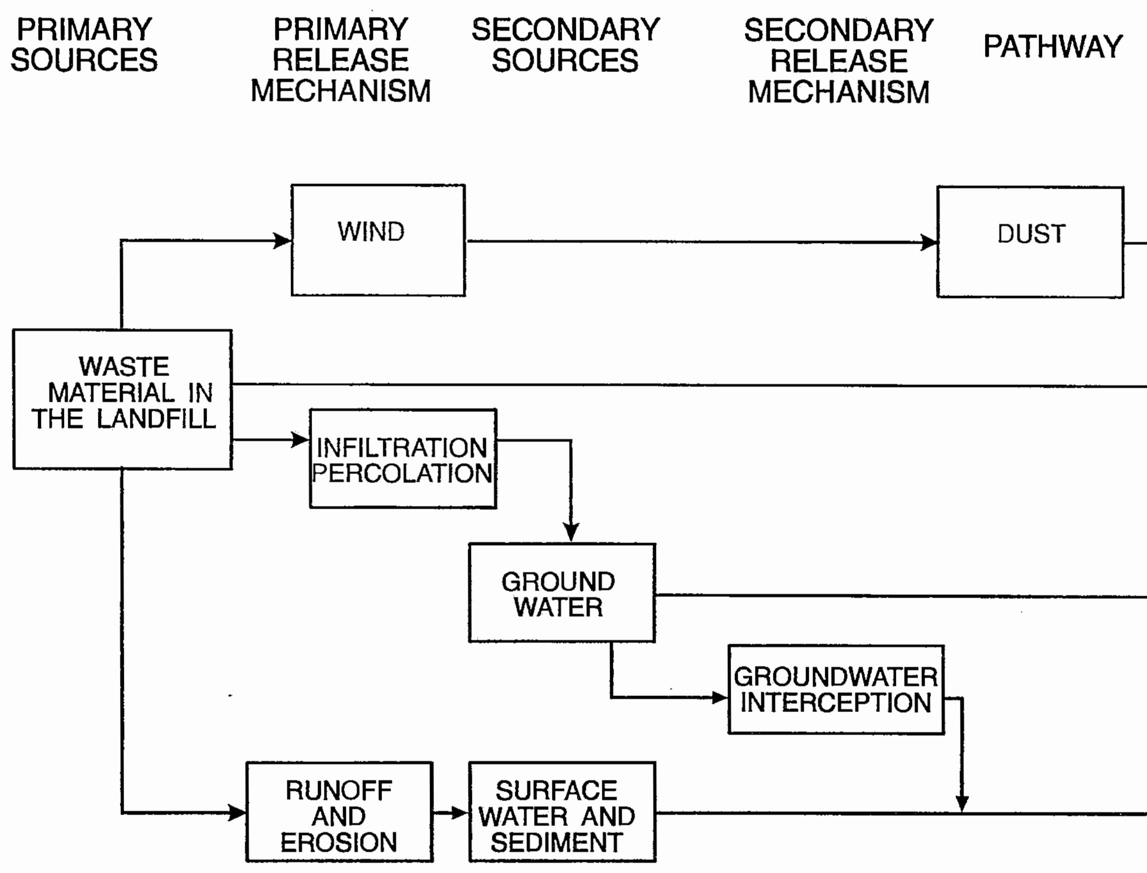
3.2.1 Potential Source Areas and Release Mechanisms

The primary source area identified during the ESI at SEAD-64A was the waste material in the landfill. The constituents of concern for this source are PAHs and heavy metals.

The primary release mechanisms from the waste material are surface water runoff, infiltration of precipitation, and wind erosion. Wind erosion is expected to be a minor mechanism since the site is vegetated. Groundwater, surface water, and sediment are secondary sources. Groundwater discharge to surface water is a secondary release mechanism.

3.2.2 Potential Exposure Pathways and Receptors - Current Uses

The potential exposure pathways from sources to receptors are shown schematically in Figure 3-9. The landfill at SEAD-64A is not enclosed by a fence; therefore, human and vehicular access to the site is restricted to SEDA on-site workers who enter the SEDA facility at the main gates.



EXPOSURE ROUTE	RECEPTOR			
	HUMAN		BIOTA	
	FUTURE ON-SITE RESIDENT	CURRENT SITE WORKERS AND VISITORS	TERRESTRIAL	AQUATIC
INHALATION	●	●	●	NA
DERMAL CONTACT	●	●	●	NA
INGESTION	●	●	●	NA
DERMAL CONTACT	●	●	●	NA
INGESTION	●	NA	NA	NA
INHALATION	●	NA	NA	NA
DERMAL CONTACT	●	NA	NA	NA
INGESTION	●	●	●	●
DERMAL CONTACT	●	●	●	●

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD64A GARBAGE DISPOSAL SITE

DEPT. ENVIRONMENTAL ENGINEERING
DWG NO. 727651-02005

FIGURE 3-9
EXPOSURE PATHWAY SUMMARY

SCALE NA
DATE JUNE 1995

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There are two primary current receptor populations for potential releases of contaminants from SEAD-64A:

1. SEDA workers who may visit the site (This is not an active site; therefore, these receptors are periodic); and
2. Terrestrial and aquatic biota on or near the site.

The exposure pathways and media of exposure are described below as they may affect the various receptors.

The numerical assumptions that will be used in the risk assessment for the current uses exposure scenario are listed in Table 4-1 of the Generic Installation RI/FS Workplan.

3.2.2.1 Ingestion and Dermal Exposure Due to Surface Water Runoff and Sediment

Human receptors of impacted surface water and sediment include on-site workers who may incidentally ingest or come in contact with the surface water and sediment in the drainage channels. Terrestrial biota that drink from and come in contact with impacted surface waters may be affected. Aquatic biota in the surface water and sediment may also be affected.

3.2.2.2 Soil Ingestion and Dermal Contact

Incidental ingestion of the waste material and soil is a potential exposure pathway for on-site workers and terrestrial biota. Dermal contact with the waste material and soil is potential pathway for on-site workers and terrestrial biota.

3.2.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

Ingestion of, inhalation of, and dermal contact with groundwater are not potential exposure pathways for on-site workers or terrestrial biota. The groundwater beneath the site is not used currently as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated.

3.2.2.4 Dust Inhalation and Dermal Contact

Inhalation and dermal contact with impacted dust is a potential exposure pathway for on-site workers and terrestrial biota.

3.2.3 Potential Exposure Pathways and Receptors - Future Use

For future uses of SEAD-64A, on-site residents would be added to the above-mentioned receptors. For the ingestion of soil, surface water, and sediment, the most susceptible receptor would be children. Dermal contact with soil is a potential exposure pathway for future on-site adults and children. Ingestion of groundwater is a potential route of exposure to all future on-site residents assuming on-site groundwater is used as their water supply. Inhalation of and dermal contact with fugitive dust is also a potential route of exposure for all on-site future residents.

The numerical assumptions that will be used in the risk assessment for the future uses exposure scenario are listed in Table 4-1 of the Generic Installation RI/FS Workplan.

3.3 SCOPING OF POTENTIAL REMEDIAL ACTION ALTERNATIVES

Based on sampling data gathered during the ESI, the media of concern at SEAD-64A for protection of human health and the environment and compliance with ARARs are:

- surface and subsurface soils containing semivolatiles;
- groundwater containing metals;
- surface water and sediment in the drainage channels that may contain semivolatiles and metals.

Human health concerns for SEAD-64A would focus primarily on inhalation and dermal contact of surficial soils for current site usage. For future site usage, ingestion of groundwater may be an additional human health concern as well as compliance with ARARs.

A comprehensive list of remedial response action alternatives as they pertain to SEDA is provided in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

3.4 PRELIMINARY IDENTIFICATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

Identification and refinement of ARARs will be performed during the RI/FS process. As additional data is collected regarding the nature and extent of contamination, site specific conditions, and potential use of various remedial technologies, additional ARARs will be selected and existing ARARs will be reviewed for their applicability. These data will be reported within the SEAD-64A RI/FS report.

A comprehensive list of ARARs as they pertain to SEDA is provided in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

3.5 DATA QUALITY OBJECTIVES (DQOs)

The RI investigation at SEAD-64A will conform with all the stated DQOs. Chemical analysis of soil and groundwater samples will generally require Level IV quality data.

The DQOs as they pertain to SEDA are discussed in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

3.6 DATA GAPS AND DATA NEEDS

3.6.1 Rationale for the Remedial Investigation

A conceptual site model was developed for the ESI Work Plan identifying potential source area release mechanisms and receptor pathways at SEAD-64A. The ESI results were used to refine the conceptual site model and determine additional data requirements for a complete evaluation of risks to human health and the environment, compliance with the DQOs and ARARs, and the development of preliminary remedial action alternatives.

The ESI data indicate the landfill at SEAD-64A could affect soil, groundwater, surface water, and sediment. Borings will be performed on the landfill to evaluate the type and thickness of waste material, evaluate whether the soil below the waste material has been affected and observe the subsurface conditions. Test pits will be excavated to confirm the extent of the landfill. A soil gas survey will be used to evaluate whether volatile organic compounds are present in the ladfilled material. Surface soil samples downgradient from the landfill will be obtained to determine whether runoff from the landfill has affected them. Groundwater from monitoring wells further downgradient will be collected to determine the extent of contaminants. Surface water and sediment samples will be obtained from the drainage channels east and south of the landfill to determine whether the landfill has affected these media.

3.6.2 Soil Data

- Determine the thickness and extent of the waste material in the SEAD-64A area using test pits and borings. Collect samples and analyze them for the baseline risk assessment and the feasibility study.

- Determine the depth of affected soil below the waste material using soil borings.

- Evaluate the effect of runoff and erosion from the landfill on the surface soil downgradient of the landfill. Chemically analyze samples of surface soil west and south of the landfill.

- Chemically analyze surface soil samples from the landfill to evaluate the quality of potential dust.

- Perform a soil gas survey over the extent of the landfill to evaluate the potential for VOCs in the waste material.

- Compare SEAD-64A data to sitewide soil background data that has been compiled from 57 samples obtained from the ESIs performed at 25 SEADs and Remedial Investigations at the OB Grounds and Ash Landfill.

- Collect soil samples for a number of physical parameters, including permeability, grain size, moisture content, and Total Organic Carbon to establish potential remedial alternatives.

- Establish a database to determine compliance with ARARs, to perform a baseline risk assessment, and to develop remedial action alternatives.

3.6.3 Groundwater Data

- Assess the type and extent of contaminants in the groundwater downgradient from the landfill.

- Determine the hydraulic conductivity of the aquifer to assess contaminant migration and potential remedial actions.

- Obtain another background groundwater sample at SEAD-64A for chemical analysis to allow comparison with other SEAD-64A groundwater data.

- Establish a database to determine compliance with ARARs, to perform a baseline risk assessment, and to develop remedial action alternatives.

3.6.4 Surface Water/Sediment Data

- Obtain samples of surface water and sediment from the drainage channels south and east of the landfill to evaluate whether material in the landfill affects these media.

- Analyze surface water and sediment samples for general chemical parameters to evaluate potential remedial alternatives and compare the surface water quality to state standards.

- Establish a database to determine compliance with ARARs, to perform a baseline risk assessment, and to develop remedial action alternatives.

3.6.5 Ecological Data

- Perform an ecological investigation to systematically document visual observations between obvious and potentially impacted and non-impacted areas.

- Establish a database for environmental compliance with ARARs or clean-up goals to perform a baseline risk assessment and to develop remedial action alternatives.

4.0 TASK PLAN FOR THE RI

This section describes the tasks required for completion of the Remedial Investigation (RI) at SEAD-64A. These include the following:

- Pre-field Activities
- Field Investigations
- Data Reduction, Interpretation, and Assessment
- Data Reporting
- Task Plan Summary

4.1 PRE-FIELD ACTIVITIES

Pre-field activities include the following:

- A site inspection to familiarize key project personnel with site conditions and finalize direction and scope of field activities.
- A comprehensive review of the Health and Safety Plan with field team members so that the hazards that might occur and preventative and protective measures for personnel are understood.
- An inspection of all equipment necessary for field activities to insure proper functioning and usage.
- A comprehensive review of sampling and work procedures with field team members.

4.2 FIELD INVESTIGATIONS

The following field investigations will be performed to complete the RI characterization of SEAD-64A:

- Soil investigation (soil gas survey and soil borings),
- Groundwater investigation (overburden wells),
- Surface water/sediment investigation
- Ecological investigation, and
- Surveying.

4.2.1 Soil Investigation

4.2.1.1 Soil Gas Survey

A soil gas survey will be performed at SEAD-64A to evaluate whether VOCs are present in the soil vapor. Soil gas samples will be collected on a 50 foot grid within the extent of the landfill (Figure 4-1). Sample probes will be driven into the waste material. The soil vapor will be extracted from the probe and collected directly into a syringe. The soil gas samples will then be analyzed for VOCs in the field using a Photovac 10S50 portable gas chromatograph. A map will be developed showing the concentrations of VOCs in the soil gas.

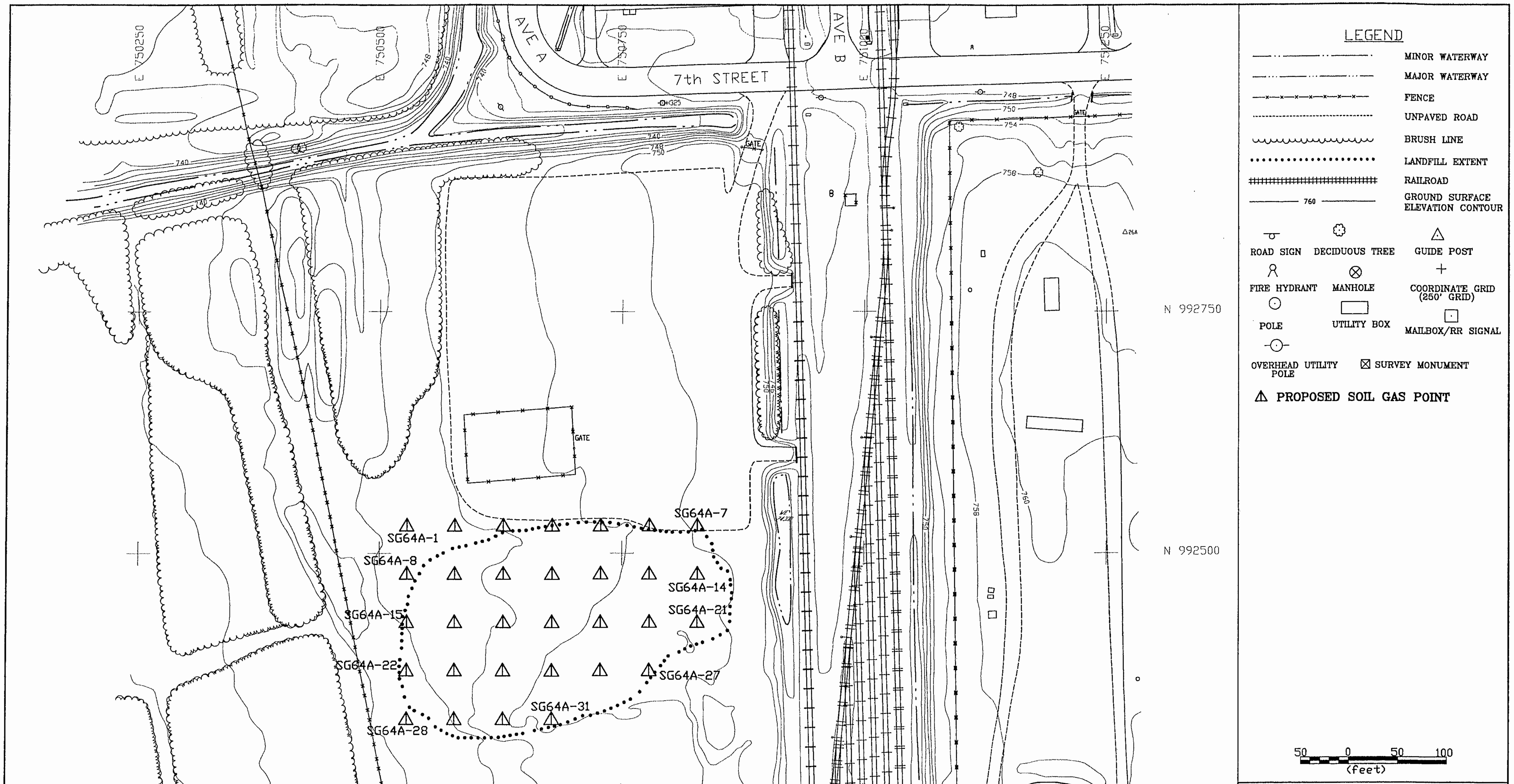
Soil gas survey procedures are described in Appendix D, Field Sampling and Analysis Plan.

4.2.1.2 Soil Boring and Test Pit Program

Twelve soil borings will be drilled at the locations shown in Figure 4-2. Nine borings will be located within the known extent of the landfill. The fill thickness data from the borings will be used to refine the fill thickness plan shown in Figure 3-6. Three soil borings will be drilled north of the landfill to determine whether buried waste material extends under the storage area.

The purpose of the 12 soil borings is to determine the thickness of the waste material, observe the subsurface soils, measure the depth to bedrock, and obtain samples of the waste and underlying soil for chemical analysis. Subsurface samples will be collected continuously to the groundwater table. Three soil samples will be collected for chemical analysis from each soil boring. The samples will be collected from a depth of 0-0.2',from just above the water table, and from an intermediate depth.

At three of the soil boring locations, the soil below the water table will be sampled continuously with split spoons to auger refusal to determine depth to bedrock. These locations are marked with an "R" on Figure 4-2. Auger refusal for this project is defined in Appendix D, Field Sampling and Analysis Plan.



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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD64A GARBAGE DISPOSAL SITE

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 727651-02005

FIGURE 4-1
PROPOSED SOIL GAS
SAMPLING LOCATIONS

SCALE 1" = 100'
DATE JUNE 1995
REV A

LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
LANDFILL EXTENT
RAILROAD
760 GROUND SURFACE ELEVATION CONTOUR
ROAD SIGN
DECIDUOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
COORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
☒ SURVEY MONUMENT

● EXISTING MONITORING WELL
⊕ PROPOSED MONITORING WELL
▲ EXISTING SOIL BORING
▬ EXISTING TEST PIT
△ PROPOSED SOIL BORING
△ PROPOSED SURFACE SOIL
⊞ PROPOSED SURFACE WATER /SEDIMENT
R BORING TO REFUSAL
→ GROUNDWATER FLOW DIRECTION

50 0 50 100
(feet)

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CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
RI/FS PROJECT SCOPING PLAN
SEAD64A GARBAGE DISPOSAL SITE

DEPT. ENVIRONMENTAL ENGINEERING	Dwg. No. 727651-02005

FIGURE 4-2
PROPOSED SAMPLING LOCATIONS

SCALE 1" = 100'	DATE JUNE 1995	REV A

ACAD\SENECA\RIFS\SD64A\SD64APSP.DWG

At two soil boring locations within the landfill, three subsurface soil samples will be collected and submitted for both chemical and physical analysis. The soil samples will be collected as follows: one near the surface, one intermediate sample, and one immediately below the water table.

The soil boring procedures and the sampling criteria used for the selection of soil samples are described in Appendix D, Field Sampling and Analysis Plan.

4.2.1.3 Surface Soil Sampling

Ten surface soil samples will be obtained at five paired locations downslope of the landfill as shown in Figure 4-2. These samples will be used to determine if runoff from the landfill transported contaminants downgradient of the landfill. The five pairs will be located ideally in drainage swales or other low linear features leading from the landfill where surface runoff may collect. If there are no low areas, then the five pairs will be located around the landfill as shown on Figure 4-2. In each pair, the sample closest to the landfill will be approximately 25 feet downslope from the edge of the landfill. The second sample will be located approximately 50 feet further downslope from the first sample.

The procedure for sampling surface soil is described in Appendix D, Field Sampling and Analysis Plan.

4.2.1.4 Soil Sampling Summary

Ten surface soil samples will be obtained downslope of the landfill. One surface, and two subsurface soil samples will be collected from each of the 12 borings resulting in 36 soil samples. In total, 46 soil samples will be collected for chemical testing. In addition, six subsurface soil samples from two of the soil borings on the landfill will be analyzed for general chemical and physical parameters.

Soil samples will be analyzed for the parameters listed in Section 4.2.5.

4.2.2 Groundwater Investigation

4.2.2.1 Monitoring Well Installation and Sampling

The purpose of the monitoring well installation program is to define the horizontal extent of groundwater impacts and determine the background groundwater quality.

A total of seven new overburden monitoring wells will be installed at SEAD-64A at the locations shown in Figure 4-2. The borings for these wells will be continuously sampled to competent rock. A monitoring well will then be installed in the boring and screened over the entire length of the overburden aquifer. These wells and the four existing wells will be developed before they are sampled. Two separate rounds of groundwater sampling will be performed.

Groundwater from the 11 monitoring wells on site will be sampled for the parameters listed in Section 4.2.5. Installation, development, and sampling procedures for overburden wells are provided in Appendix D, Field Sampling and Analysis Plan.

4.2.2.2 Aquifer Testing

Slug tests will be performed at the 11 monitoring wells on site to determine the hydraulic conductivity of the aquifer. Three rounds of water level measurements will also be performed to allow for the development of a groundwater elevation contour map. Water levels will be measured before well development and before the first and second rounds of groundwater sampling.

The procedures for slug testing (hydraulic conductivity determination) and water level measurement are provided in Appendix D, Field Sampling and Analysis Plan.

4.2.3 Surface Water/Sediment Investigation

Four samples of surface water and sediment will be obtained from the two nearby drainage channels. Two samples will be obtained from the drainage channel located south of the landfill and two samples will be collected from the drainage channel located east of the landfill. The sampling locations are shown on Figure 4-2.

Surface water and sediment sampling procedures are described in Appendix D, Field Sampling and Analysis Plan.

4.2.4 Ecological Investigation

The following procedure for the ecological investigation was developed from the New York State Department of Environmental Conservation (NYSDEC) Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (1994). The purpose of the ecological investigation is to determine if aquatic and terrestrial resources have been affected by a release of contaminants from the site. The investigation will be completed in two parts. The first part will be the site description, which will involve the accumulation of data describing the physical characteristics of the site, as well as the identification of aquatic and terrestrial resources present or expected to be present at the site. The second part will be the contaminant-specific impact analysis, which involves the determination of whether the identified aquatic and terrestrial resources have been impacted by contaminants that have been released at the site. The second part of the ecological investigation is dependent upon the chemical analyses of the samples collected for the RI.

4.2.4.1 Site Description

The purpose of the site description is to determine whether aquatic and terrestrial resources are present at the site and if they were present at the site prior to contaminant introduction; and if they were present prior to contaminant introduction, to provide the appropriate information to design a remedial investigation of the resources. The information to be gathered includes site maps, descriptions of aquatic and terrestrial resources at the site, the assessment of the value of the aquatic and terrestrial resources, and the appropriate contaminant-specific and site-specific regulatory criteria applicable to the remediation of the identified aquatic and terrestrial resources.

A topographic map showing the site and documented aquatic and terrestrial resources within a two mile radius from the site will be obtained. The aquatic and terrestrial resources of concern are Significant Habitats as defined by the New York State Natural Heritage Program; habitats supporting endangered, threatened or rare species or species of concern; regulated wetlands; wild and scenic rivers; significant coastal zones; streams; lakes; and other major resources.

A map showing the major vegetative communities within a half mile radius of the site will be developed. The major vegetative communities will include wetlands, aquatic habitats, NYSDEC Significant Habitats, and areas of special concern. These covertypes will be identified using the NYSDEC Natural Heritage Program descriptions and classifications of natural communities.

To describe the covertypes at the site, the abundance, distribution, and density of the typical vegetative species will be identified. To describe the aquatic habitats at the site, the abundance and distribution of aquatic vegetation will be identified. The physical characteristics of the aquatic habitats will also be described and will include parameters such as the water chemistry, water temperature, dissolved oxygen content, depth, sediment chemistry, discharge, flow rate, gradient, stream-bed morphology, and stream classification.

The aquatic and terrestrial species that are expected to be associated with each covertype and aquatic habitat will be determined. In particular, endangered, threatened and rare species, as well as species of concern, will be identified. Alterations in biota, such as reduced vegetation growth or quality will be described. Alterations in, or absence of, the expected distribution or assemblages of wildlife will be described.

A qualitative assessment will be conducted evaluating the ability of the area within a half mile of the site to provide a habitat for aquatic and terrestrial species. The factors that will be considered will include the species' food requirements and the seasonal cover, bedding sites, breeding sites and roosting sites that the habitats provide.

The current and potential use of the aquatic and terrestrial resources of the site by humans will be assessed. Included with the assessment of the site, the area within a half mile of the site, documented resources within two miles of the site, and documented resources downstream of the site that are potentially affected by contaminants will also be assessed. Human use of the resources that will be considered will be activities such as hunting, fishing, wildlife observation, scientific studies, agriculture, forestry, and other recreational and economic activities.

The appropriate regulatory criteria will be identified for the remediation of aquatic and terrestrial resources and will include both site-specific and contaminant-specific criteria.

4.2.4.2 Contaminant-Specific Impact Analysis

Information from the site description developed in Section 4.2.4.1 and from the characterization of the contaminants at the site developed from the results of the RI will be used to assess the impacts of contaminants on aquatic and terrestrial resources. The impact analysis will involve three steps, each using progressively more specific information and fewer conservative assumptions and will depend upon the conclusion reached at the previous step regarding the degree of impact. If minimal impact can be demonstrated at a specific step, additional steps will not be conducted.

Pathway Analysis

A pathway analysis will be performed identifying aquatic and terrestrial resources, contaminants of concern and potential pathways of contaminant migration and exposure. After performing the pathway analysis, if no significant resources or potential pathways are present, or if results from field studies show that contaminants have not migrated to a resource along a potential pathway, the impact on aquatic and terrestrial resources will be considered to be minimal and additional impact analyses will not be performed.

Criteria-Specific Analysis

Presuming that the presence of contaminated resources and pathways of migration of site-related contaminants has been established, the contaminant levels identified in the field investigation will be compared with available numerical criteria or criteria developed according to methods established as part of the criteria. If contaminant levels are below criteria, the impact on resources will be considered to be minimal and additional impact analyses will not be performed. If numerical criteria are exceeded or if they do not exist and cannot be developed, an analysis of the toxicological effects will be performed.

Analysis of Toxicological Effects

The analysis of toxicological effects is based on the assumption that the presence of contaminated resources and pathways of migration of site-related contaminants has been established. The purpose of the analysis of toxicological effects is to assess the degree to which contaminants have affected the productivity of a population, a community, or an ecosystem and the diversity of species assemblages, species communities or an entire ecosystem through direct toxicological and indirect ecological effects.

A number of approaches are available to conduct an analysis of toxicological effects. One or more of the four following approaches will be used to assess the toxicological effects.

- **Indicator Species Analysis**–A toxicological analysis for a indicator species will be used if the ecology of the resource and the exposure scenarios are simple. This approach assumes that exposure to contaminants is continuous throughout the entire life cycle and does not vary among individuals.
- **Population Analysis**–A population level analysis is relevant to and will be used for the evaluation of chronic toxicological effects of contaminants to an entire population or to the acute toxicological effect of contaminant exposure limited to specific classes of organisms within a population.
- **Community Analysis**– A community with highly interdependent species including highly specialized predators, highly competitive species, or communities whose composition and diversity is dependent on a key-stone species, will be analyzed for alternations in diversity due to contaminant exposure.
- **Ecosystem Analysis**–If contaminants are expected to uniformly affect physiological processes that are associated with energy transformation within a specific trophic level, an analysis of the effects of contaminant exposure on trophic structure and trophic function within an ecosystem will be performed. Bioconcentration, bioaccumulation, biomagnification, etc., are concepts that may be used to evaluate the potential effects of contaminant transfer on trophic dynamics.

4.2.5 Analytical Program

A total of 46 soil samples, 22 groundwater samples and 4 surface water/sediment samples will be collected for chemical and physical testing.

All the samples from the 12 borings (36 samples), the 22 groundwater samples, 4 surface water samples, and 4 sediment samples will be analyzed for the following: TCL volatile organic compounds (EPA Method 524.2 for groundwater samples only), TCL semivolatile organic compounds, TCL pesticides/PCBs, TAL metals and cyanide according to the NYSDEC Contract Laboratory Program (CLP) Statement of Work (SOW), and total recoverable petroleum hydrocarbons (TRPH) by EPA Method 418.1.

The 10 surface soil samples obtained at locations off the landfill will be analyzed for the TCL semivolatile organic compounds and the TAL metals and cyanide according to the NYSDEC CLP SOW.

Six subsurface soil samples from two soil borings on the landfill will be analyzed for grain size (including the distribution in the silt and clay fractions), Total Organic Carbon (TOC), Cationic Exchange Capacity (CEC), pH, and density.

The 22 groundwater samples will be analyzed in the field for pH, temperature, specific conductivity, dissolved oxygen, and oxidation-reduction potential. The following analyses will be performed by the laboratory: alkalinity, ferrous iron, sulfate, sulfide, nitrate, TOC, biological oxygen demand (BOD), hardness, total dissolved solids (TDS), and chemical oxygen demand (COD).

The four surface water samples will be analyzed in the field for pH, temperature, specific conductivity, and dissolved oxygen. The following analyses will be performed by the laboratory: total suspended solids (TSS), TDS, alkalinity, hardness, ammonia, nitrate/nitrite, phosphate, TOC, and turbidity.

The four sediment samples will be analyzed by the laboratory for grain size, TOC, CEC, pH, and density.

A summary of the analyses to be performed at SEAD-64A is provided in Table 4-1.

4.2.6 Surveying

Surveying will be performed at SEAD-64A for the following purposes:

1. Mapping the direction and computing the velocity of groundwater movements;
2. Locating the environmental sampling points;
3. Estimating the volume of impacted soils and sediments which may require a remedial action;

Table 4-1

Summary of Sampling and Analyses
Seneca Army Depot Activity
SEAD-64A

	VOCs		SVOCs	Pesticides/PCBs	Metals	TRPH	Grain Size*	pH	Hardness	TOC
MEDIA	TCL NYSDEC CLP	EPA 524.2	TCL NYSDEC CLP	TCL NYSDEC CLP	TAL NYSDEC CLP	Method 418.1	ASTM or Similar Method	Method 150.1	Method 130.2	Method 415.1
Surface Soil	0	0	10	0	10	10	0	0	0	0
Soil from Borings	36	0	36	36	36	36	6	6	0	6
Groundwater	0	22	22	22	22	22	0	22	22	22
Surface water	4	0	4	4	4	4	0	4	4	4
Sediment	4	0	4	4	4	4	4	4	0	4

Notes:
1) * Grain size analysis includes determination of the grain size distribution within the silt and clay size fraction.
2) QA/QC sampling requirements are described in Appendix C, Section 5.3 of the Generic Installation RI/FS Workplan.

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4. Mapping the extent of any impacted groundwater above established ARAR limits; and
5. Mapping the extent of the landfill.

The location, identification, coordinates, and elevations of all the control points recovered and/or established at the site and all of the soil gas survey points, soil borings, monitoring wells (new and existing), surface soil sampling points, and surface water/sediment sampling locations will be surveyed and plotted on a topographic map to show their location with respect to surface features within the project area. The landfill boundary will also be surveyed and plotted on the topographic map.

Site surveys will be performed in accordance with good land surveying practices and will conform to all pertinent state laws and regulations governing land surveying. The surveyor will be licensed and registered in New York.

The site field survey requirements are presented in Appendix D, Field Sampling and Analysis Plan.

4.3 DATA REDUCTION, ASSESSMENT, AND INTERPRETATION

Data reduction, assessment, and interpretation is discussed in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

4.4 BASELINE RISK ASSESSMENT

The baseline risk assessment is discussed in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

4.5 DATA REPORTING

Data reporting is discussed in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

4.6 TASK PLAN SUMMARY

Detailed task plan summaries that indicate the number and type of samples to be collected at SEAD-64A are provided in Table 4-1.

General information about the Task Plan Summary is presented in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

5.0 TASK PLAN FOR THE FS

The task plan for the FS is presented in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

5.1 DEVELOPMENT OF REMEDIAL ACTION OBJECTIVES

A discussion of the development of remedial action objectives for the FS is presented in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

5.2 DEVELOPMENT OF REMEDIAL RESPONSE ALTERNATIVES

A discussion of the development of remedial response alternatives for the FS is presented in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

5.3 SCREENING OF REMEDIAL ACTION ALTERNATIVES

A discussion regarding the screening of remedial action alternatives for the FS is presented in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

5.4 DETAILED ANALYSIS OF REMEDIAL ACTION ALTERNATIVES

A discussion of the detailed analysis of remedial action alternatives for the FS is presented in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

5.5 TASK PLAN SUMMARY FOR THE FS

The task plan summary for the FS is presented in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

6.0 PLANS AND MANAGEMENT

The purpose of this Work Plan is to present and describe the activities that will be required for the site remedial investigation/feasibility study at SEAD-64A. The Field Sampling and Analysis Plan (Appendix D) details procedures that will be used during the field activities. Included in this plan are procedures for sampling soil, sediments, surface water, biota, and groundwater. Also included in this plan are procedures for developing and installing monitoring wells, measuring water levels, and packaging and shipping samples.

The Health and Safety Plan (Appendix E) details procedures to be followed during field activities to protect personnel involved in the field program.

The Chemical Data Acquisition Plan (Appendix F) describes the procedures to be implemented to assure the collection of valid data. It also describes the laboratory and field analytical procedures which will be used during the RI.

6.1 SCHEDULING

The proposed schedule for performing the RI/FSs at SEAD-64A are presented in Figures 6-1 and 6-2.

6.2 STAFFING

A discussion of the staffing for the RI/FS to be conducted at SEAD-64A is presented in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan.

Table 6-1
SEAD-64A RI Field Investigation Schedule
Seneca Army Depot Activity

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7/28/1995

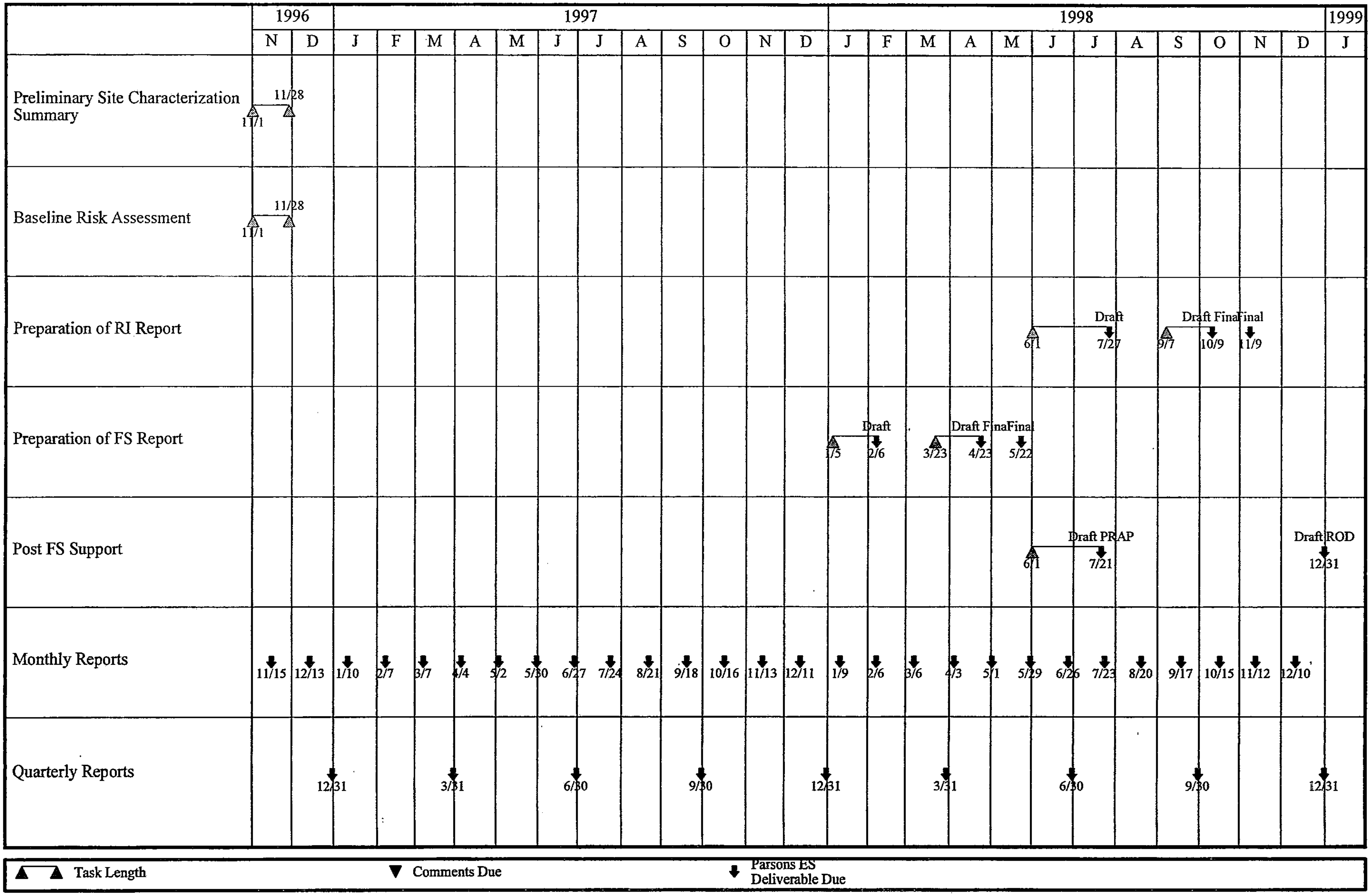
	1996						
	June	July	August	September	October	November	December
Mark Sample Locations	▲ 6/3						
Surface Water / Sediment Sampli and Runoff Delineation	▲ 6/4						
Ecological Investigation	▲ 6/5 ▲ 6/10	▲ 7/15 ▲ 7/17					
Surface Soil Sampling	▲ 6/11 ▲ 6/17						
Soil Borings	▲ 6/18 ▲ 6/23						
Monitoring Well Installation and Development	▲ 6/24	▲ 7/5					
Groundwater Sampling		▲ 7/15 ▲ 7/20			▲ 10/14 ▲ 10/19		
Water Level Measurements		▲ 7/8 ▲ 7/15			▲ 10/14		
Aquifer Testing		▲ 7/21 ▲ 7/23					
Sample Analysis	▲ 6/5	▲ 7/12 ▲ 7/16 ▲ 7/26			▲ 10/15 ▲ 10/25		
Data Validation		▲ 7/15 ▲ 7/23 ▲ 7/29 ▲ 7/30			▲ 10/26 ▲ 10/27		
Surveying		▲ 7/15 ▲ 7/19					
Field Activity Reports	⬇ 6/28	⬇ 7/26			⬇ 10/18	⬇ 11/5	
Field Sampling Letter Report						⬇ 11/27	

▲ ▲ Task Length ▼ Comments Due ⬇ Parsons ES Deliverable Due

Table 6-2
SEAD-64A RI/FS Schedule: Risk Assessment and Reports
Seneca Army Depot Activity

Page 1 of 1

7/28/1995



APPENDIX A

ESI BORING AND TEST PIT LOGS

LOG OF BORING NO. SB64A-1

PROJECT: **SEVEN LOW PRIORITY AOCs**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**
ASSOCIATED UNIT/AREA: **SEAD-64A**
PROJECT NO: **720518-01000**
DATE STARTED: **05/27/94**
DATE COMPLETED: **05/27/94**
DRILLING CONTRACTOR: **EMPIRE SOILS INVESTIGATIONS**
DRILLING METHOD: **HOLLOW STEM AUGER**
SAMPLING METHOD: **3" SPLIT SPOONS**

DEPTH TO WATER (ft): **NA**
BORING LOCATION (N/E): **992513.0 750711.2**
REFERENCE COORDINATE SYSTEM: **New York State Plane**
GROUND SURFACE ELEVATION (ft): **NA**
DATUM: **NAD 1983**
INSPECTOR: **FO**
CHECKED BY: **FO**

This log is part of the report prepared by Engineering-Science, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations.

Sample Number	Blow Counts (# Blows per 6")	Sample Advance (ft)	Sample Recovery (ft)	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	3 4 5 5	2.00	1.3	0	BGD	0.6		Gray-brown SILT, some(-) organic material, little Clay, trace very fine Sand, trace fine to medium Shale, loose, moist.	ML
						1 1.3		Light brown SILT, little very fine Sand, trace fine to medium Shale, trace(-) Cobbles, trace(-) brick, loose, dry.	ML
						2.0		No Recovery	-
.02	7 7 8 9	2.00	1.3	0	BGD	2 2.7		Brown very fine SAND + SILT, trace(-) fine Shale fragments, trace(-) organic material, loose, dry.	ML
						3 3.3		Light brown SILT, some very fine Sand, trace fine to medium Shale fragments, loose, dry.	ML
						4.0		No Recovery	-
.03	80 80 100/.2	1.20	1.1	0	BGD	4 4.8		Light brown SILT, little very fine Sand, trace(+) fine to medium Shale fragments, loose, moist.	ML
						5 5.1		Fractured SHALE, trace iron staining, dry, wetness at 4.8'.	-
						6.0		No Recovery	-
.04	42 18 38 100/.2	1.70	1.7	0	BGD	6 6.6		Gray fractured/weathered SHALE, moist.	-
						7 7.3		Gray-light brown CLAY + SILT, little(+) fine to medium Shale fragments, little(-) very fine Sand, stiff, moist to wet.	ML
								Gray, highly weathered, laminated SHALE, loose, dry.	-

BORING TERMINATED AT 7.7'

NOTES: Bottom of overburden at 4.8'. The following samples were collected for chemical analysis: SB64A-1.00(0-2"), SB64A-1.02(2'-4'), SB64A-.04(6'-8').

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LOG OF BORING SB64A-1

Sheet 1 of 1

LOG OF BORING NO. SB64A-2

PROJECT:	SEVEN LOW PRIORITY AOCs	DEPTH TO WATER (ft):	6.9
PROJECT LOCATION:	SENECA ARMY DEPOT, ROMULUS NY	BORING LOCATION (N/E):	992364.6 750676.3
ASSOCIATED UNIT/AREA:	SEAD-64A	REFERENCE COORDINATE SYSTEM:	New York State Plane
PROJECT NO:	720518-01000	GROUND SURFACE ELEVATION (ft):	NA
DATE STARTED:	06/10/94	DATUM:	NAD 1983
DATE COMPLETED:	06/10/94	INSPECTOR:	KK,LK
DRILLING CONTRACTOR:	EMPIRE SOILS INVESTIGATIONS	CHECKED BY:	FO
DRILLING METHOD:	HOLLOW STEM AUGER		
SAMPLING METHOD:	2" & 3" SPLIT SPOONS		

This log is part of the report prepared by Engineering-Science, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations.

Sample Number	Blow Counts (# Blows per 6")	Sample Advance (ft)	Sample Recovery (ft)	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	7 16 7 8	2.00	1.7	0	BGD	0.6		Brown very fine to fine SAND, some fine gray Shale fragments and Gravel, trace organic, loose, dry. FILL	SW
						0.9		Highly weathered, highly fractured coarse gray SHALE fragments, trace(+) very fine to fine Sand, dry. FILL	GW
						1.5		Fine to medium SAND, some fine gray Shale fragments, little medium gray Shale fragments, trace very fine Sand, loose, slightly moist. FILL	SW
						1.7		AA, moist. BOTTOM OF FILL	SW
						2.0		No Recovery	-
.02	7 6 6 8	2.00	1.8	0	BGD	3.3		Light brown SILT + very fine SAND, little(+) fine to medium gray Shale fragments, trace organics, trace very fine mica chips, soft to medium stiff, moist to wet.	ML
						3.8		Brown SILT + very fine SAND, trace very fine mica chips, trace fine gray Shale fragments, soft to medium dense, moist to wet.	ML
						4.0		No Recovery	-
.03	7 8 22 16	2.00	1.7	0	BGD	5.0		AA, (3.3-3.8').	ML
						5.2		Fractured SHALE COBBLE.	-
						5.7		AA, (3.3-3.8) some fine to medium gray Shale fragments.	ML
						6.0		No Recovery	-
.04	20 24 80 100/.3	1.80	1.6	0	BGD	6.9		AA(5.2'-5.7') moist to wet.	ML
						7.2		AA, saturated.	ML
						7.3		Highly weathered, fractured gray SHALE, saturated.	
						7.6		AA, dry.	-
								No Recovery	-

BORING TERMINATED AT 7.8'
AUGER REFUSAL

NOTES: Bottom of fill at 1.7'. Bottom of overburden at 7.2'. The following samples were collected for chemical analysis: SB64A-2.00(0-2"), SB64A-2.02(2'-4'), SB64A-2.03(4'-6').

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LOG OF BORING SB64A-2

Sheet 1 of 1

Sheet 1 of 1

LOG OF BORING NO. SB64A-3

PROJECT: **SEVEN LOW PRIORITY AOCs**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**
ASSOCIATED UNIT/AREA: **SEAD-64A**
PROJECT NO: **720518-01000**
DATE STARTED: **06/10/94**
DATE COMPLETED: **06/10/94**
DRILLING CONTRACTOR: **EMPIRE SOILS INVESTIGATIONS**
DRILLING METHOD: **HOLLOW STEM AUGER**
SAMPLING METHOD: **3" SPLIT SPOONS**

DEPTH TO WATER (ft): **3.0**
BORING LOCATION (N/E): **992356.5 750540.9**
REFERENCE COORDINATE-SYSTEM: **New York State Plane**
GROUND SURFACE ELEVATION (ft): **NA**
DATUM: **NAD 1983**
INSPECTOR: **KK,LR**
CHECKED BY: **FO**

This log is part of the report prepared by Engineering-Science, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations.

Sample Number	Blow Counts (# Blows per 6")	Sample Advance (ft)	Sample Recovery (ft)	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	3 5 7 7	2.00	1.8	0	BGD	0.4		Brown very fine SAND, little organics, little fine to medium gray Shale fragments and Gravel, loose, dry.	SW
						1 1.8		Light brown very fine SAND + SILT, trace fine gray Shale fragments, trace fine mica chips.	ML
						2.0		No Recovery	-
.02	6 5 7 14	2.00	1.9	0	BGD	2 2.6		AA, (.4'-1.8').	ML
						3.0		Olive gray to light brown SILT, some very fine Sand, some fine gray Shale fragments, trace medium gray Shale fragments, medium stiff, moist to wet.	ML
						3 3.9		Grading from AA, (2.6-3.0') to light brown Silt and very fine Sand, some fine gray Shale fragments, trace fine Sand, medium stiff, saturated.	ML
						4.0		No Recovery	
.03	12 100/.4	0.90	0.9	0	BGD	4 4.3		AA, (3.0-3.9').	ML
						4.9		Gray highly fractured, highly weathered SHALE.	-
						5		No Recovery	-

BORING TERMINATED AT 5.5'
AUGER REFUSAL

NOTES: Bottom of overburden at 4.3'. The following samples were collected for chemical analysis: SB64A-3.00(0-2"), SB64A-3.01(2"-2'), SB64A-3.02(2'-4').

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LOG OF BORING SB64A-3

Sheet 1 of 1

Sheet 1 of 2

LOG OF BORING NO. MW64A-1

PROJECT: **SEVEN LOW PRIORITY AOCs**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**
ASSOCIATED UNIT/AREA: **SEAD-64A**
PROJECT NO: **720518-01000**
DATE STARTED: **04/02/94**
DATE COMPLETED: **04/02/94**
DRILLING CONTRACTOR: **EMPIRE SOILS INVESTIGATIONS**
DRILLING METHOD: **HOLLOW STEM AUGER**
SAMPLING METHOD: **3" SPLIT SPOONS**

DEPTH TO WATER (ft): **6.0**
BORING LOCATION (N/E): **992409.1 750892.2**
REFERENCE COORDINATE SYSTEM: **New York State Plane**
GROUND SURFACE ELEVATION (ft): **745.8**
DATUM: **NAD 1983**
INSPECTOR: **FO**
CHECKED BY: **FO**

This log is part of the report prepared by Engineering-Science, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations.

Sample Number	Blow Counts (# Blows per 6")	Sample Advance (ft)	Sample Recovery (ft)	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	3 9 9 8	2.00	1.4	0	BGD	0.3		Brown SILT, little organic material, trace fine Shale fragments.	ML
						1.4		Light brown SILT, trace Clay, trace fine to coarse Shale fragments, loose, moist	ML
						2.0		No Recovery	-
.02	8 8 10 12	2.00	1.2	0	BGD	3.2		Light brown SILT, trace very fine to fine Shale fragments, trace coarse Shale fragments, trace very fine Sand (2.9-3.2'), loose, moist.	ML
						4.0		No Recovery	-
.03	8 19 21 16	2.00	1.6	0	BGD	4.2		Pink-brown SILT + CLAY, trace fine to medium Shale fragments, loose, moist to wet.	ML
						5.6		Gray-brown SILT, trace(+) fine to medium Shale fragments, trace weathered Shale, dry, dry to moist.	ML
						6.0		No Recovery	-
.04	82 100/.1	0.60	0.6	0	BGD	6.4		Light brown very fine SAND, some(-) Silt, trace very fine Shale fragments, loose, saturated.	SM
						6.6		Gray fractured, slightly weathered SHALE, wet to saturated.	-
						8.0		No Recovery	-
.05	47 100/.25	0.75	0.6	0	BGD	8.6		Gray highly fractured, weathered SHALE, wet between fracture planes.	-
						10		No Recovery	-

NOTES: Bottom of overburden at 6.4'. The following samples were collected for chemical analysis: MW64A-1.00(0-2"), MW64A-1.02(2'-3.2'), MW64A-1.03(4'-5.6').

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LOG OF BORING MW64A-1

Sheet 1 of 2

PROJECT: **SEVEN LOW PRIORITY AOCs**
PROJECT NO: **720518-01000**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**

GROUND SURFACE ELEVATION: **745.8**
INSPECTOR: **FO**
CHECKED BY: **FO**

This log is part of the report prepared by Engineering-Science, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations.

Sample Number	Blow Counts (# Blows per 6")	Sample Advance (ft)	Sample Recovery (ft)	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.06	100/.2	0.20	0	0	BGD			No Recovery	-
								BORING TERMINATED AT 10.7' AUGER REFUSAL	

NOTES: Bottom of overburden at 6.4'. The following samples were collected for chemical analysis: MW64A-1.00(0-2"), MW64A-1.02(2'-3.2'), MW64A-1.03(4'-5.6').

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LOG OF BORING MW64A-1

LOG OF BORING NO. MW64A-1A

PROJECT: **SEVEN LOW PRIORITY AOCs**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**
ASSOCIATED UNIT/AREA: **SEAD-64A**
PROJECT NO: **720518-01000**
DATE STARTED: **03/31/94**
DATE COMPLETED: **03/31/94**
DRILLING CONTRACTOR: **EMPIRE SOILS INVESTIGATIONS**
DRILLING METHOD: **HOLLOW STEM AUGER**
SAMPLING METHOD: **3" SPLIT SPOONS**

DEPTH TO WATER (ft): **6.0**
BORING LOCATION (N/E): **992205.5 750789.3**
REFERENCE COORDINATE-SYSTEM: **New York State Plane**
GROUND SURFACE ELEVATION (ft): **744.5**
DATUM: **NAD 1983**
INSPECTOR: **FO**
CHECKED BY: **FO**

This log is part of the report prepared by Engineering-Science, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations.

Sample Number	Blow Counts (# Blows per 6")	Sample Advance (ft)	Sample Recovery (ft)	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	2 6 10 9	2.00	1.4	0	BGD	0.7		Brown SILT, some organic material, trace medium Shale fragments, moist.	ML
						1.4		Brown SILT, little Clay, trace(+) Shale fragments, trace organic material, loose, moist.	ML
						2.0		No Recovery	-
.02	10 10 9 10	2.00	1.6	0	BGD	3.0		Light brown CLAY, some Silt, trace fine Shale fragments (bedded/horizontal fracture planes), moist.	CL
						3.6		Light brown SILT, trace very fine Shale, trace organic material, loose, dry to moist	ML
						4.0		No Recovery	-
.03	9 12 18 20	2.00	1	0	BGD	5.0		Light brown SILT, slightly weathered, fractured Shale at 5', dry to moist.	ML
						6.0 ▼		No Recovery	-
.04	24 12 8 10	2.00	0.3	0	BGD	6.3		Light brown SILT, some very fine Sand, trace weathered Shale, saturated at tip.	ML
						8.0		No Recovery	-
.05	54 72 72 81	2.00	1.8	0	BGD	9.1		Gray weathered SHALE, trace Silt + Clay, saturated.	-
						9.8		Weathered SHALE + SILT + CLAY, trace(+) banded iron staining, moist.	-

NOTES: Bottom of overburden at 6.3'. No samples were collected for chemical analysis.

PROJECT: **SEVEN LOW PRIORITY AOCs**
PROJECT NO: **720518-01000**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**

GROUND SURFACE ELEVATION: **744.5**
INSPECTOR: **FO**
CHECKED BY: **FO**

This log is part of the report prepared by Engineering-Science, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations.

Sample Number	Blow Counts (# Blows per 6")	Sample Advance (ft)	Sample Recovery (ft)	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.06	110/.5	0.50	0.5	0	BGD	10.0	- - -	Dark gray weathered, highly fractured SHALE, saturated.	-
						10.3	- - -	AA, (10-10.3), dry	-
						10.5		No Recovery	-
						11			
						12.0			
.07	100/.25	0.25	0.2	0	BGD	12 12.2	- - -	Dark gray weathered, highly fractured SHALE, dry.	-
								No Recovery	-

BORING TERMINATED AT 12.3'

NOTES: Bottom of overburden at 6.3'. No samples were collected for chemical analysis.

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LOG OF BORING MW64A-1A

Sheet 2 of 2

Sheet 1 of 1

LOG OF BORING NO. MW64A-2

PROJECT: **SEVEN LOW PRIORITY AOCs**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**
ASSOCIATED UNIT/AREA: **SEAD-64A**
PROJECT NO: **720518-01000**
DATE STARTED: **04/01/94**
DATE COMPLETED: **04/01/94**
DRILLING CONTRACTOR: **EMPIRE SOILS INVESTIGATIONS**
DRILLING METHOD: **HOLLOW STEM AUGER**
SAMPLING METHOD: **3" SPLIT SPOONS**

DEPTH TO WATER (ft): **5.3**
BORING LOCATION (N/E): **992447.6 750496.9**
REFERENCE COORDINATE SYSTEM: **New York State Plane**
GROUND SURFACE ELEVATION (ft): **739.2**
DATUM: **NAD 1983**
INSPECTOR: **FO**
CHECKED BY: **FO**

This log is part of the report prepared by Engineering-Science, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations.

Sample Number	Blow Counts (# Blows per 6")	Sample Advance (ft)	Sample Recovery (ft)	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	3 6 8 10	2.00	0.4	0	BGD	0.4		Brown SILT, little organic material, trace fine Gravel, gray Shale at tip of spoon.	ML
						2.0		No Recovery	-
.02	9 9 15 10	2.00	1.3	0	BGD	2.9		Light brown SILT, some Clay, trace fine Shale fragments, medium stiff, moist	ML
						3.3		Light brown SILT + very fine SAND, trace(+) Clay, saturated. Fine Shale + coarse Gravel at tip, saturated, wet to saturated at: (2.2-2.8), (2.9-3.3).	ML
						4.0		No Recovery	-
.03	6 8 11 50	2.00	1.6	0	BGD	4.9		Light brown very fine SAND + SILT, trace Shale fragment, loose, wet with trace saturated lenses.	ML
						5.3		AA, (4-4.9') trace fine to medium Shale fragments, wet to saturated.	ML
						5.6		Dark gray, very fractured, slightly weathered SHALE, trace iron staining, saturated.	-
						6.0		No Recovery	-
.04	62 100/.4	0.90	0.9	0	BGD	6.9		AA(5.3'-5.6'), fracture planes filled with gray-brown Clay, saturated.	-
						8.0		No Recovery	-
.05	100/.2	0.20	.2	0	BGD			Dark gray fractured SHALE.	-

BORING TERMINATED AT 8.2'
AUGER REFUSAL

NOTES: Bottom of overburden at 5.3'. No samples were collected for chemical analysis.

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LOG OF BORING MW64A-2

Sheet 1 of 1

LOG OF BORING NO. MW64A-3

PROJECT: **SEVEN LOW PRIORITY AOCs**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**
ASSOCIATED UNIT/AREA: **SEAD-64A**
PROJECT NO: **720518-01000**
DATE STARTED: **04/01/94**
DATE COMPLETED: **04/01/94**
DRILLING CONTRACTOR: **EMPIRE SOILS INVESTIGATIONS**
DRILLING METHOD: **HOLLOW STEM AUGER**
SAMPLING METHOD: **3" SPLIT SPOONS**

DEPTH TO WATER (ft): **4.0**
BORING LOCATION (N/E): **992302.2 750529.2**
REFERENCE COORDINATE SYSTEM: **New York State Plane**
GROUND SURFACE ELEVATION (ft): **737.8**
DATUM: **NAD 1983**
INSPECTOR: **FO**
CHECKED BY: **FO**

This log is part of the report prepared by Engineering-Science, Inc. for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations.

Sample Number	Blow Counts (# Blows per 6")	Sample Advance (ft)	Sample Recovery (ft)	VOC Screen-PID (ppm)	Rad Screen (cps)	Depth (ft)	Macro Lithology	DESCRIPTION	USCS
.01	1 2 5 6	2.00	1.1	0	BGD	0.6		Brown SILT, little organic material, trace fine Shale fragments, loose, wet.	ML
						1.1		AA, light brown with trace organic material.	ML
						2.0		No Recovery	-
.02	7 8 8 12	2.00	1.7	0	BGD	3.3		Gray-brown SILT, trace(+) Clay, very fine Shale fragments, trace fine to medium Shale, trace(-) organic material, loose, trace wet lenses.	ML
						3.7		Gray-brown SILT, little fine to medium Shale fragments, trace very fine Sand, trace weathered Siltstone (3.3-3.5'), loose, wet to saturated.	ML
						4.0		No Recovery	-
.03	53 100/.15	0.65	0.6	0	BGD	4.6		Dark gray, highly fractured, weathered SHALE, trace iron staining, trace fossils, trace Silt + Clay between fracture planes, saturated.	-
						6.0		No Recovery	-
.04	50 100/.15	0.65	0.5	0	BGD	6.3		Gray, very fractured + moderately weathered SHALE, little gray Silt + Clay, wet.	-
						6.5		Gray, highly fractured + very weathered SHALE + SILT + CLAY, trace(+) mottling, moist to wet.	-
						8.0		No Recovery	-
.05	50 100/.2	0.70	0.5	0	BGD	8.5		Gray, highly weathered SHALE, wet to saturated between fracture plane.	-
								No Recovery	-
								BORING TERMINATED AT 8.7'	

NOTES: Bottom of overburden at 4'. No samples were collected for chemical analysis.

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LOG OF BORING MW64A-3

PAGE 1 OF 2

TEST PIT REPORT

ENGINEERING–SCIENCE, INC.	**CLIENT:** USACOE	**TEST PIT #:** TP64A1

PROJECT: 15 SWMU ESI
LOCATION: ROMULUS, NY

JOB NUMBER: 720518
EST. GROUND ELEV.
INSPECTOR: JWC/ABS
CONTRACTOR: ES/ESI
START DATE: 6/8/94
COMPLETION DATE: 6/8/94
CHECKED BY:
DATE CHECKED:

TEST PIT DATA

LENGTH	WIDTH	DEPTH	EXCAVATION/SHORING METHOD
20'5"	2'10"	5'6"	BACKHOE

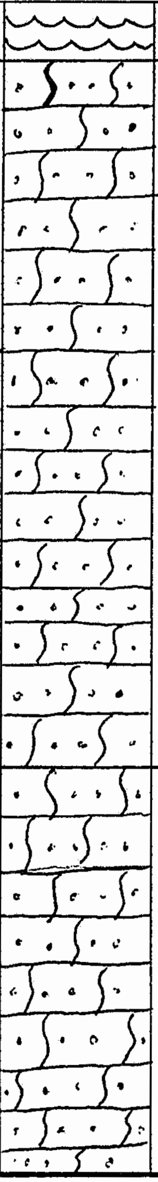
MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE
OVM-580B	10.0 eV	0 PPM	1545pm/ 6/8/94
VICTOREEN-190	PANCAKE	10-15 µR/Hr	1545pm/ 6/8/94

QA/QC DUPLICATE SAMPLE: YES or [✓ NO]
Duplicate Sample Number:
MRD Sample Number:

QA/QC Rinsate Sample Number:

COMMENTS:



SCALE (FT)	VOC/ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
	0ppm				Top Soil	
1 2 3	0ppm BKGD				3" DARK GrAY SilT with Shale ClASTS and Fill Debris	Objects Found: AN Canisters (~12" DiAm x 14" Long); Rail Ties; 6'L x 12" Diam CulverT; metal LAttice
4 5	0ppm BKGD				3' 3" Olive Gray SilT with Few Shale ClasTS	

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS TEST PIT #: TP64A-1

TEST PIT REPORT

ENGINEERING–SCIENCE, INC. **CLIENT:**

TEST PIT #: TP64A-1

MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE

DATE START:
DATE FINISH:

INSPECTOR: JWC / ABS
CONTRACTOR:

SCALE (FT)	VOC./ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
					5'6" BAse of PiT weAThered Shale with OLive grAY SiLT	

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS

TEST PIT #: TP64A-1

TEST PIT REPORT

ENGINEERING-SCIENCE, INC. **CLIENT:** SEAD **TEST PIT #:** 64A-2

PROJECT: SEAD 64A IS SWMU Investigations
LOCATION: TEST PIT #2

JOB NUMBER: 720518
EST. GROUND ELEV.
INSPECTOR: JMC/AS
CONTRACTOR: ES/Empire
START DATE: 6/9/94
COMPLETION DATE: 6/9/94
CHECKED BY:
DATE CHECKED:

TEST PIT DATA

LENGTH	WIDTH	DEPTH	EXCAVATION/SHORING METHOD
18'L	2.5'W	6'6"D	BACKHOE

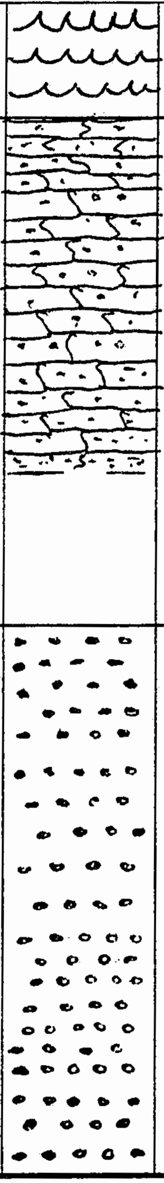
MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE
OVM-580B	10.0eV	0 ppm	
VICTOREEN-190		BGDD	

QA/QC DUPLICATE SAMPLE: YES or NO
Duplicate Sample Number:
MRD Sample Number:

QA/QC Rinsate Sample Number:

COMMENTS:



SCALE (FT)	VOC/RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
					Top Soil	
6"	0ppm				Lt. gray Silt and ~~[illegible]~~ Shale Clasts (1"-3"); Large (3'x3') ~~Concrete~~ Reinforced Concrete Slabs. Also present were Lenses of Dark Gray Silt.	
1						
2					Same As Above with Asphalt pieces	
2'10" Base of Fill					Olive Gray Silt	
3	0ppm					
4						
5						

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS TEST PIT #:

PAGE 2 OF 2

TEST PIT REPORT

ENGINEERING–SCIENCE, INC. CLIENT:

TEST PIT #: 64A-2

MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE

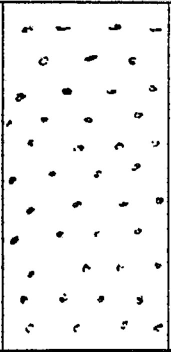
DATE START:

DATE FINISH:

INSPECTOR:

CONTRACTOR:

SCALE (FT)	VOC/ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
6						
Bottom of pit						



SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS TEST PIT #:

G:\123DATA\FIELDFMS\TSTPITP2.WK3

PAGE 1 OF 2

TEST PIT REPORT

ENGINEERING–SCIENCE, INC.

CLIENT: SEAD

TEST PIT #: 64A - 3

PROJECT: SEAD 15 SWMU Investigations

LOCATION: TEST PIT #3 TP64A-3

JOB NUMBER: 720518

EST. GROUND ELEV.:

INSPECTOR: JNC/AS

CONTRACTOR: ES/Empire

START DATE: 6/9/94

COMPLETION DATE: 6/9/94

CHECKED BY:

DATE CHECKED:

TEST PIT DATA

LENGTH	WIDTH	DEPTH	EXCAVATION/SHORING METHOD
25'	2.5'	6.0'	BACKHOE

MONITORING DATA

INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE

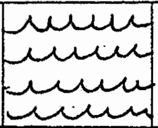
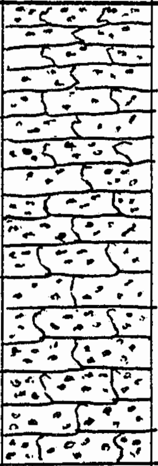
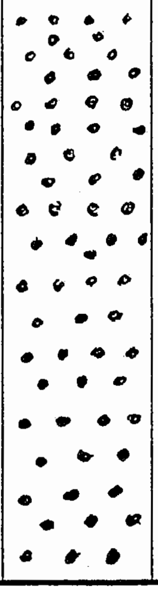
QA/QC DUPLICATE SAMPLE: YES or [✓ NO]

Duplicate Sample Number:

MRD Sample Number:

QA/QC Rinsate Sample Number:

COMMENTS:

SCALE (FT)	VOC./ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
	0ppm				Top Soil	
8" 1 2	0ppm				Light Brown Silt, some shale clasts, with: culvert, Asphalt, Constantine wire, Panelling, car Seat, Hot wheels car	
2'8" 3 4 5	0ppm				BASE OF Fill Olive Gray Silt, some shale clasts	

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS TEST PIT #:

TEST PIT REPORT

ENGINEERING–SCIENCE, INC. **CLIENT:**

TEST PIT #: 64A-3

MONITORING DATA

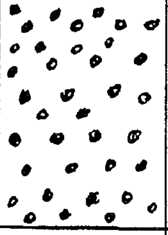
INSTRUMENT	DETECTOR	BACKGROUND	TIME/DATE

DATE START:

DATE FINISH:

INSPECTOR:

CONTRACTOR:

SCALE (FT)	VOC/ RAD.	SAMPLE NUMBER	SAMPLE DEPTH RANGE	STRATA SCHEMATIC	DESCRIPTION OF MATERIALS (BURMEISTER METHODOLOGY)	REMARKS
					Bottom of Hole 6'	
6.0'						

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS

TEST PIT #:

APPENDIX B

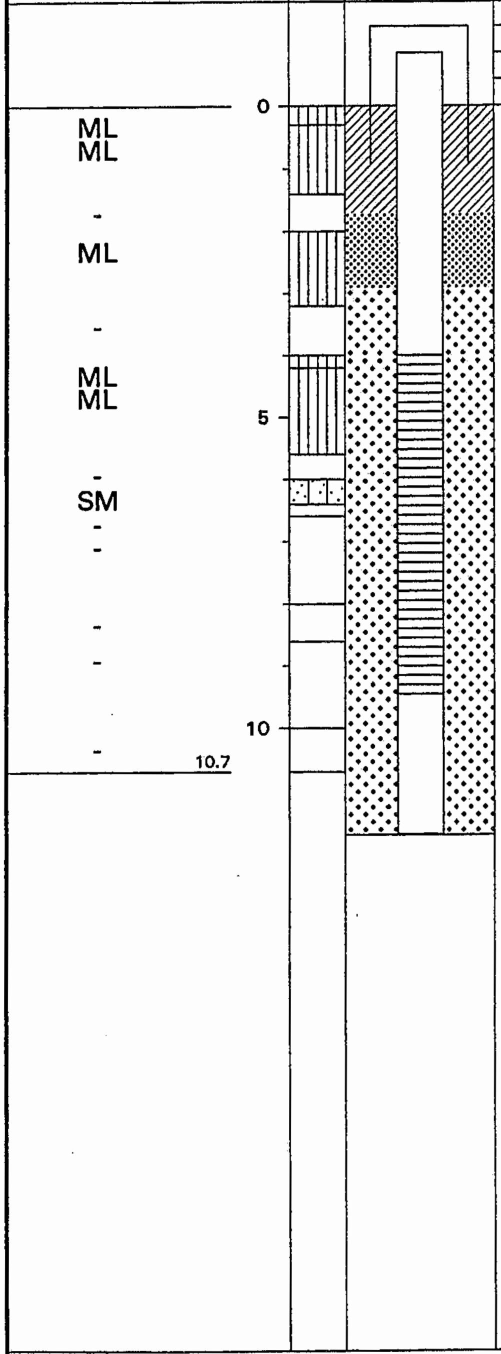
ESI MONITORING WELL INSTALLATION DIAGRAMS

COMPLETION REPORT OF WELL No. MW64A-1

PROJECT: **SEVEN LOW PRIORITY AOCs**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**
DRILLING CONTRACTOR: **EMPIRE SOILS INVESTIGATIONS**
DRILLING METHOD: **HOLLOW STEM AUGER**
WELL INSTALLATION STARTED: **04/02/94**
WELL INSTALLATION COMPLETED: **04/02/94**

WELL LOCATION (N/E): **992409.1 750892.2**
REFERENCE COORDINATE SYSTEM: **New York State Plane**
GROUND SURFACE ELEVATION (ft): **745.8**
DATUM: **NAD 1983**
GEOLOGIST: **F. O'LOUGHLIN**
CHECKED BY: **FO**

STRATA — MICRO DESCRIPTION (from boring log) | DEPTH (ft) | SYMBOL | WELL DETAILS



DEPTH (ft)		ELEVATION (ft)
	TPC	
	TR	
	TC	
0.0	GS	745.8
1.7	TBS	744.1
2.9	TSP	742.9
4.0	TSC	741.8
9.6	BSC	736.2
11.7	POW	734.1

WELL CONSTRUCTION DETAILS

PROTECTIVE COVER
Diameter: **4**
Type: **RISER**
Interval: **3.5**

RISER
Diameter: **2**
Type: **SCH. 40-PVC**
Interval: **5**

SCREEN
Diameter: **2**
Type: **SCH. 40-PVC/0.010**
Interval: **5, 1**

SURFACE SEAL
Type: **CEMENT**
Interval: **1.7**

GROUT
Type: **N/A**
Interval: **N/A**

SEAL
Type: **BENTONITE PELLETS**
Interval: **1.2**

SANDPACK
Type: **#1, #3**
Interval: **7.8**

WELL DEVELOPMENT DATA
Date: **7/10/94**
Method: **BAIL/PUMP**
Duration: **48 DAYS**
Rate:
Final Measurements:

WATER LEVELS

	Date	Time	Depth,TR
▽	5/23	1045	10.86
▼	5/24	0725	11.71
▽	7/9	1400	10.50
▽			
▽			
▼			

pH	Temperature (degrees C)	Conductivity (micromhos/cm)	Turbidity (NTU)
7.07	13.8	460	3.6

LEGEND

▨	SURFACE SEAL	●	GRAVEL	TPC	TOP OF PROTECTIVE CASING
▩	GROUT	⁘	SAND	TR	TOP OF WELL RISER
░	SEAL	▥	SILT	GS	GROUND SURFACE
⁘	SANDPACK	▨	CLAY	TBS	TOP BENTONITE SEAL
		☒	NO RECOVERY	TSP	TOP OF SANDPACK
				TSC	TOP OF SCREEN
				BSC	BOTTOM OF SCREEN
				TD	TOTAL DEPTH
				POW	POINT OF WELL

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Romulus, New York

COMPLETION REPORT OF
WELL No. MW64A-1

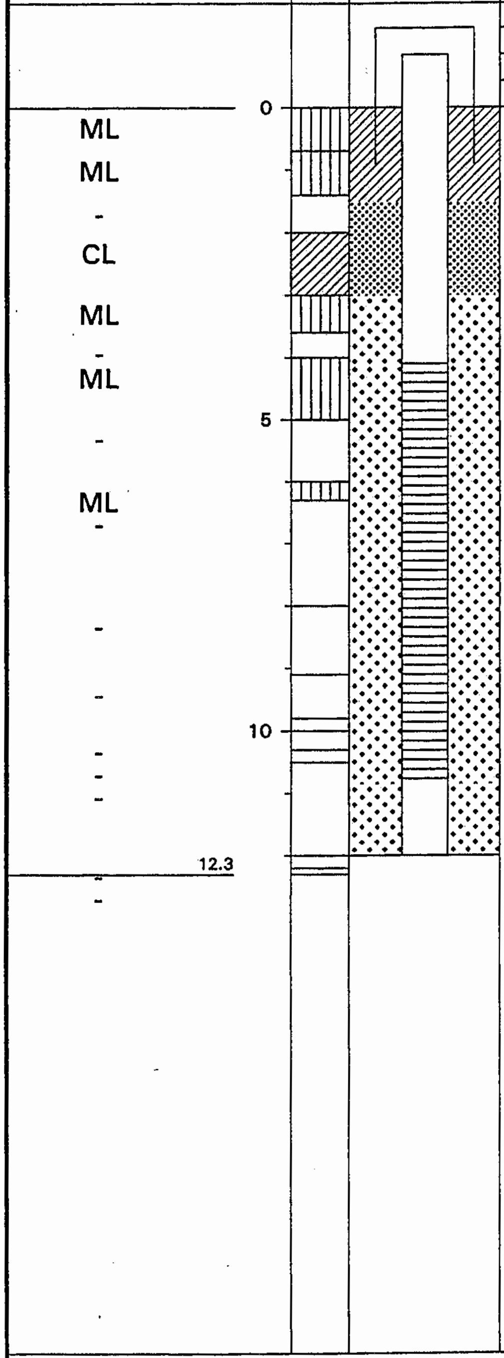
Sheet 1 of 1

COMPLETION REPORT OF WELL No. MW64A-1A

PROJECT:	SEVEN LOW PRIORITY AOCs	WELL LOCATION (N/E):	992205.5 750789.3
PROJECT LOCATION:	SENECA ARMY DEPOT, ROMULUS NY	REFERENCE COORDINATE SYSTEM:	New York State Plane
DRILLING CONTRACTOR:	EMPIRE SOILS INVESTIGATIONS	GROUND SURFACE ELEVATION (ft):	744.5
DRILLING METHOD:	HOLLOW STEM AUGER	DATUM:	NAD 1983
WELL INSTALLATION STARTED:	03/31/94	GEOLOGIST:	F. O'LOUGHLIN
WELL INSTALLATION COMPLETED:	03/31/94	CHECKED BY:	FO

STRATA

MICRO DESCRIPTION (from boring log) | DEPTH (ft) | SYMBOL | WELL DETAILS



DEPTH (ft)		ELEVATION (ft)
	TPC	
	TR	
	TC	
0.0	GS	744.5
1.5	TBS	743.0
3.0	TSP	741.5
4.1	TSC	740.4
10.9	BSC	733.6
12.0	POW	732.5

WELL CONSTRUCTION DETAILS

PROTECTIVE COVER
Diameter: 4
Type: RISER
Interval: 3.5

RISER
Diameter: 2
Type: SCH. 40-PVC
Interval: 5

SCREEN
Diameter: 2
Type: SCH. 40-PVC/0.010
Interval: 4, 2

SURFACE SEAL
Type: CEMENT
Interval: 1.5

GROUT
Type: N/A
Interval: N/A

SEAL
Type: BENTONITE PELLETS
Interval: 1.5

SANDPACK
Type: #1, #3
Interval: 9

WELL DEVELOPMENT DATA
Date:
Method:
Duration:
Rate:
Final Measurements:

WATER LEVELS

Date	Time	Depth,TR

pH	Temperature (degrees C)	Conductivity (micromhos/cm)	Turbidity (NTU)

LEGEND

▨	SURFACE SEAL	●	GRAVEL	TPC	TOP OF PROTECTIVE CASING
▩	GROUT	⁙	SAND	TR	TOP OF WELL RISER
▦	SEAL	▥	SILT	GS	GROUND SURFACE
⁘	SANDPACK	▨	CLAY	TBS	TOP BENTONITE SEAL
		☒	NO RECOVERY	TSP	TOP OF SANDPACK
				TSC	TOP OF SCREEN
				BSC	BOTTOM OF SCREEN
				TD	TOTAL DEPTH
				POW	POINT OF WELL

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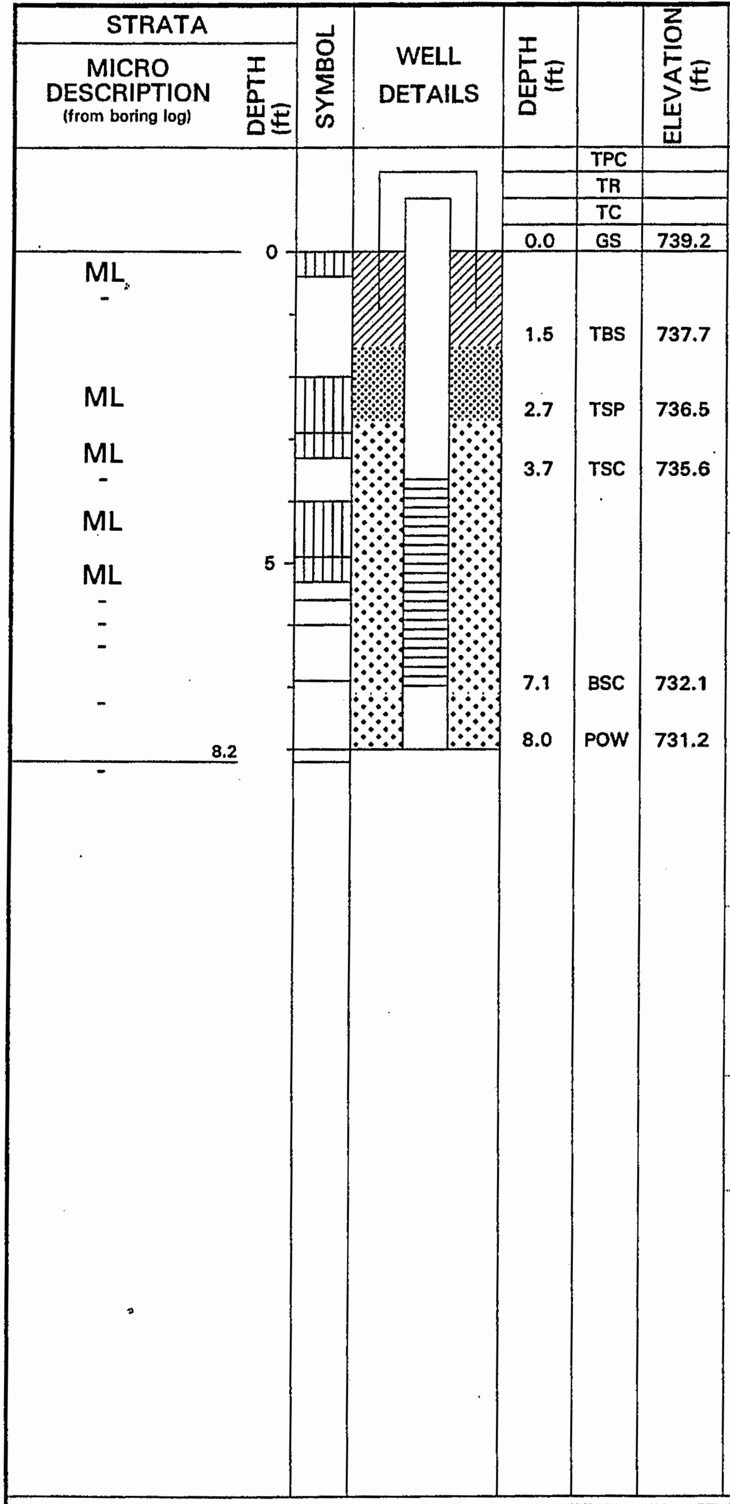
COMPLETION REPORT OF WELL No. MW64A-1A
Sheet 1 of 1

COMPLETION REPORT OF WELL No. MW64A-2

PROJECT:	**SEVEN LOW PRIORITY AOCs**	WELL LOCATION (N/E):	**992447.6 750496.9**
PROJECT LOCATION:	**SENECA ARMY DEPOT, ROMULUS NY**	REFERENCE COORDINATE SYSTEM:	**New York State Plane**
DRILLING CONTRACTOR:	**EMPIRE SOILS INVESTIGATIONS**	GROUND SURFACE ELEVATION (ft):	**739.2**
DRILLING METHOD:	**HOLLOW STEM AUGER**	DATUM:	**NAD 1983**
WELL INSTALLATION STARTED:	**04/01/94**	GEOLOGIST:	**F. O'LOUGHLIN**
WELL INSTALLATION COMPLETED:	**04/01/94**	CHECKED BY:	**FO**



DEPTH (ft)		ELEVATION (ft)
	TPC	
	TR	
	TC	
0.0	GS	739.2
1.5	TBS	737.7
2.7	TSP	736.5
3.7	TSC	735.6
7.1	BSC	732.1
8.0	POW	731.2

WELL CONSTRUCTION DETAILS

PROTECTIVE COVER
Diameter: **4**
Type: **RISER**
Interval: **3.5**

RISER
Diameter: **2**
Type: **SCH. 40-PVC**
Interval: **5**

SCREEN
Diameter: **2**
Type: **SCH. 40-PVC/0.010**
Interval: **1, 3**

SURFACE SEAL
Type: **CEMENT**
Interval: **1.5**

GROUT
Type: **N/A**
Interval: **N/A**

SEAL
Type: **BENTONITE CHIPS**
Interval: **1.2**

SANDPACK
Type: **#1, #3**
Interval: **5.3**

WELL DEVELOPMENT DATA
Date: **7/19/94**
Method: **BAIL/PUMP**
Duration: **57 DAYS**
Rate:
Final Measurements:

WATER LEVELS

Date	Time	Depth,TR
5/23	1330	7.42
7/10	1630	7.22
7/19	1520	9.40

pH	Temperature (degrees C)	Conductivity (micromhos/cm)	Turbidity (NTU)
6.78	18.9	1000	33

LEGEND

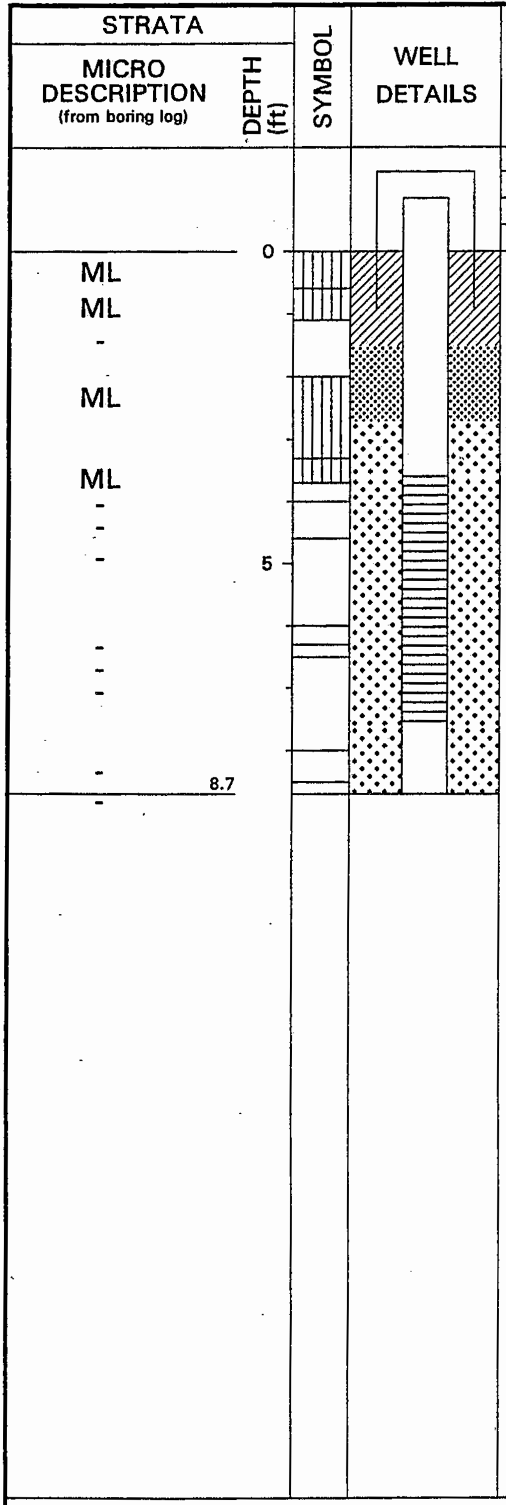
▨	SURFACE SEAL	●	GRAVEL	TPC	TOP OF PROTECTIVE CASING
▩	GROUT	⁘	SAND	TR	TOP OF WELL RISER
▒	SEAL	▥	SILT	GS	GROUND SURFACE
⁙	SANDPACK	▨	CLAY	TBS	TOP BENTONITE SEAL
		☒	NO RECOVERY	TSP	TOP OF SANDPACK
				TSC	TOP OF SCREEN
				BSC	BOTTOM OF SCREEN
				TD	TOTAL DEPTH
				POW	POINT OF WELL

Sheet 1 of 1

COMPLETION REPORT OF WELL No. MW64A-3

PROJECT: **SEVEN LOW PRIORITY AOCs**
PROJECT LOCATION: **SENECA ARMY DEPOT, ROMULUS NY**
DRILLING CONTRACTOR: **EMPIRE SOILS INVESTIGATIONS**
DRILLING METHOD: **HOLLOW STEM AUGER**
WELL INSTALLATION STARTED: **04/01/94**
WELL INSTALLATION COMPLETED: **04/01/94**

WELL LOCATION (N/E): **992302.2 750529.2**
REFERENCE COORDINATE SYSTEM: **New York State Plane**
GROUND SURFACE ELEVATION (ft): **737.8**
DATUM: **NAD 1983**
GEOLOGIST: **F. O'LOUGHLIN**
CHECKED BY: **FO**



DEPTH (ft)		ELEVATION (ft)
	TPC	
	TR	
	TC	
0.0	GS	737.8
1.5	TBS	736.3
2.7	TSP	735.1
3.6	TSC	734.2
7.6	BSC	730.2
8.7	POW	729.1

WELL CONSTRUCTION DETAILS

PROTECTIVE COVER
Diameter: **4**
Type: **RISER**
Interval: **3.5**

RISER
Diameter: **2**
Type: **SCH. 40-PVC**
Interval: **5**

SCREEN
Diameter: **2**
Type: **SCH. 40-PVC/0.010**
Interval: **4**

SURFACE SEAL
Type: **CEMENT**
Interval: **1.5**

GROUT
Type: **N/A**
Interval: **N/A**

SEAL
Type: **BENTONITE CHIPS**
Interval: **1.2**

SANDPACK
Type: **#1, #3**
Interval: **6**

WELL DEVELOPMENT DATA
Date: **5/23/94**
Method: **BAIL/PUMP**
Duration: **120 MIN**
Rate: **.400 L/MIN**

WATER LEVELS

	Date	Time	Depth,TR
▽	5/23	1350	6.59
▼	5/23	1610	7.03
▽			
▼			
▽			
▼			

Final Measurements:

pH	Temperature (degrees C)	Conductivity (micromhos/cm)	Turbidity (NTU)
7.09	10.9	460	3.24

LEGEND

▨	SURFACE SEAL	▣	GRAVEL
▩	GROUT	⁘	SAND
▦	SEAL	▥	SILT
⁙	SANDPACK	▨	CLAY
		☒	NO RECOVERY

TPC	TOP OF PROTECTIVE CASING
TR	TOP OF WELL RISER
GS	GROUND SURFACE
TBS	TOP BENTONITE SEAL
TSP	TOP OF SANDPACK
TSC	TOP OF SCREEN
BSC	BOTTOM OF SCREEN
TD	TOTAL DEPTH
POW	POINT OF WELL

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Romulus, New York

COMPLETION REPORT OF
WELL No. MW64A-3
Sheet 1 of 1

APPENDIX C

ESI MONITORING WELL DEVELOPMENT REPORTS

WELL DEVELOPMENT REPORT

ENGINEERING-SCIENCE, INC. CLIENT: USACOE WELL #: MW64A-1

PROJECT: 15 SWMU ESI (SEAD- MW64A)
LOCATION: SENECA ARMY DEPOT, ROMULUS, NY
DATE: 05-23-94
PROJECT NO.: 720518

DRILLING METHOD (s): Hollow Stem Auger
PUMP METHOD (s): Peristaltic
SURGE METHOD (s): Bailer, Teflon
INSTALLATION DATE: 4-2-94

INSPECTOR: Richard S. Moravec
CONTRACTOR:
CREW:
START DEVELOPMENT DATE: 05-23-94
END DEVELOPMENT DATE: 7/20/94

WATER DEPTH (TOC): 10.86 ft
WELL DIA. (ID CASING): 2.0" ~~ft~~
BORING DIAMETER: 8.5" ~~ft~~

INSTALLED POW DEPTH(~~BGS~~): 10.70' ft
MEASURED POW DEPTH(TOC): 10.96 ft
SILT THICKNESS: .00 ft
POW AFTER DEVELOPMENT: ~~11.96~~ E.U. ft
12.09' Revised 8/7/94

DIAMETER FACTORS (GAL/FT):

DIAMETER (IN):	[✓ 2]	3	4	5	6	7	8	9	10	11	12
GALLONS/FT:	[✓ 0.163]	0.367	0.654	1.02	1.47	2.00	2.61	3.30	4.08	4.93	5.87
							2.955				

STANDING VOLUME INSIDE WELL = WATER COLUMN X WELL DIAMETER FACTOR = 0.18 GAL. = A
1.12 0.163

STANDING WATER IN ANNULAR SPACE =
WATER COL. BELOW SEAL(ft) X (BORING DIAM. FACTOR − WELL DIAM. FACTOR) X 0.3 = .94 GAL. = B
1.12 2.955 0.163

SINGLE STANDING WATER VOLUME = A + B = ...18 + .94......... 1.12 GAL. = C

MINIMUM VOLUME TO BE REMOVED = 5 X C ....5 X 1.12......... 5.6 GALS.

DATE	ACTIVITY	STARTING H2O DEPTH	START TIME	END TIME	ELAPSED TIME	GALLONS REMOVED	pH	CONDUCTIVITY	TEMP	COLOR	Turbidity (NTU)	Ending Water Depth
5/23/94	Bail	10.86	1045	1050	5	0.3	7.47	500	14.9	Light Brown	458	10.65 Dry
5/24	Bail	11.71	0725	0730	5	.05	7.64	470	10.0	Cloudy	899	11.80
7-9	Bail	9.89'	1015	1035	20	1.2	7.11	500	13.9	Grey Cloudy	>100	11.62' Dry
7-9	Pump	10.50'	1400	14:20	20	0.5	7.08	530	16.4	Clearing	18	11.63 Dry
7-10	Pump	10.56	16:00	16:20	20	0.5	7.07	460	13.8	Clear	3.6	11.67 Dry
										Complete		
TOTALS/FINAL						2.55						

RECOVERY
GOOD FAIR [✓ POOR]

~~KEY # 2537~~ FD.

INVESTIGATION DERIVED WASTE (IDW)

DATE	7-9-94	7-10-94			
VOLUME	1.7 gal	0.5 gal			
DRUM #	MW64A-1-W	64A-1-W			

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS WELL #:

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p1

WELL DEVELOPMENT REPORT

ENGINEERING–SCIENCE, INC. | CLIENT: USACOE | WELL #: MW64A-2

PROJECT: 15 SWMU ESI (SEAD-64A)
LOCATION: SENECA ARMY DEPOT, ROMULUS, NY
DATE: 05-23-94
PROJECT NO.: 720518

DRILLING METHOD (s): Hollow Stem Auger
PUMP METHOD (s): Peristaltic
SURGE METHOD (s): Bailer - Teflon
INSTALLATION DATE: 4-1-94

INSPECTOR: Richard S. Moravec
CONTRACTOR: –
CREW: –
START DEVELOPMENT DATE: 05-23-94
END DEVELOPMENT DATE: 7/19

WATER DEPTH (TOC): 7.42 ft
WELL DIA. (ID CASING): 2.0" ~~ft~~
BORING DIAMETER: 8.5" ~~ft~~

INSTALLED POW DEPTH(~~TOC~~): 8.0 ft
MEASURED POW DEPTH(TOC): 9.48 ft
SILT THICKNESS: ft
POW AFTER DEVELOPMENT: ~~9.94~~ ~~10.54~~ ft
~~9.56~~ 9.63'
Revised 8/17/94

DIAMETER FACTORS (GAL/FT):

DIAMETER (IN):	[✓ 2]	3	4	5	6	7	8	9	10	11	12
GALLONS/ FT:	[✓ 0.163]	0.367	0.654	1.02	1.47	2.00	2.61	3.30	4.08	4.93	5.87
							2.955				

STANDING VOLUME INSIDE WELL = WATER COLUMN X WELL DIAMETER FACTOR = .34 GAL. = A
2.06 0.163

STANDING WATER IN ANNULAR SPACE =
WATER COL. BELOW SEAL(ft) X (BORING DIAM. FACTOR – WELL DIAM. FACTOR) X 0.3 = 1.73 GAL. = B
2.06 2.955 0.163

SINGLE STANDING WATER VOLUME = A + B = 0.34 + 1.73 2.07 GAL. = C

MINIMUM VOLUME TO BE REMOVED = 5 X C 5 x 2.07 10.33 GALS.

DATE	ACTIVITY	STARTING H20 DEPTH	START TIME	END TIME	ELAPSED TIME	GALLONS REMOVED	pH	CONDUCTIVITY	TEMP	COLOR	Turbidity (NTU)	Ending Water Depth
5/23/94	Bail	7.42	1330	1335	5	0.3	7.45	500	17.0	Dark Gray Brown	>1000	9.38
5/24	Bail	8.04	0740	0743	3	0.25	7.23	520	15.2	Dark Gray Brown	>1000	9.24
7/1	Pump	6.98	0945	1000	15	1	went dry				>100	
7/9	Bail	6.99'	09:00	09:20	20	0.3	6.98	680	16.1	DK Grey Brown	>1000	8.06'
7/9	Pump	8.06'	09:30	09:40	10	~~1.0~~ 0.2	7.03	650	15.8	A/A	>1000	Dry 9.26'
7/9	Bail	8.03'	10:55	11:00	5	.2	7.01	660	17.5	A/A	>100	Dry
7/9	Pump	7.18'	14:40	1500	20	.3	6.93	690	18.1	A/A	>1000	Dry
7/10	Pump	7.22'	16:30	16:50	20	.4	6.86	700	16.8	Slightly Clear	>100 ~175	
7/11	Pump	7.39'	10:10	1030	20	.4	6.84	750	16.5	Cloudy Brown	>100 cloudy	Dry 9.26'
	TOTALS/FINAL					3.35						

RECOVERY
GOOD FAIR [✓ POOR]

KEY # 2537

INVESTIGATION DERIVED WASTE (IDW)

DATE	7-7-94	7-9-94	7-10+11		
VOLUME	1gal	.5			
DRUM #	MW64A-2W				

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS WELL #: MW64A-2

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10.73

p. 2

WELL DEVELOPMENT REPORT

ENGINEERING-SCIENCE, INC. CLIENT: USACOE

WELL #: MW 64A-2

PROJECT: 15 SWMU ESI (SEAD-

LOCATION: SENECA ARMY DEPOT, ROMULUS, NY

DATE: 7-18-94

PROJECT NO.:

DRILLING METHOD (s):

PUMP METHOD (s):

SURGE METHOD (s):

INSTALLATION DATE:

INSPECTOR:

CONTRACTOR:

CREW:

START DEVELOPMENT DATE:

END DEVELOPMENT DATE:

10.24
.3
10.54

9.94

WATER DEPTH (TOC): ft

WELL DIA. (ID CASING): ft

BORING DIAMETER: ft

INSTALLED POW DEPTH(TOC): ft

MEASURED POW DEPTH(TOC): 9.48 ft

SILT THICKNESS: ft

POW AFTER DEVELOPMENT: ~~9.94~~ ~~10.54~~ 9.56 ft

DIAMETER FACTORS (GAL/FT):

DIAMETER (IN):	2	3	4	5	6	7	8	8.5	9	10	11	12
GALLONS/FT:	0.163	0.367	0.654	1.02	1.47	2.00	2.61	2.95	3.30	4.08	4.93	5.87

2.72 x .163

STANDING VOLUME INSIDE WELL = WATER COLUMN X WELL DIAMETER FACTOR = 7/19 .45 GAL. = A

9.26
3

STANDING WATER IN ANNULAR SPACE =
WATER COL. BELOW SEAL(ft) X (BORING DIAM. FACTOR – WELL DIAM. FACTOR) X 0.3 = 2.27 GAL. = B

SINGLE STANDING WATER VOLUME = A + B = ... 2.7 GAL. = C

MINIMUM VOLUME TO BE REMOVED = 5 X C .... GALS.

DATE	ACTIVITY	STARTING H2O DEPTH	START TIME	END TIME	ELAPSED TIME	GALLONS REMOVED	pH	CONDUCTIVITY	TEMP	COLOR	Turbidity (NTU)	Ending Water Depth
7/18	pump	8.54	1330	1334	4 min	0.1	6.67	420	20°C	brown	>200	Dry
7/19	pump	6.84	1440	1520	40	0.75	6.84	950	21.9	silty	152	8.4
7/19	pump	9.40	1520	1630	70	0.50	6.78	1000	18.9	clear	33	8.6
								COMPLETE				
TOTALS/FINAL						total 4.7 gal						

RECOVERY

GOOD FAIR [✓ POOR]

INVESTIGATION DERIVED WASTE (IDW)

DATE	7-18	7-19			
VOLUME	.1	1.25			
DRUM #	64A-2-W	64A-2			

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS WELL #: MW64A-2

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WELL DEVELOPMENT REPORT

ENGINEERING-SCIENCE, INC. CLIENT: USACOE WELL #: MW64A-3

PROJECT: 15 SWMU ESI (SEAD- 64A)
LOCATION: SENECA ARMY DEPOT, ROMULUS, NY

DATE: 05-23-94
PROJECT NO.: 720518

DRILLING METHOD (s): Hollow Stem Auger
PUMP METHOD (s): Peristaltic
SURGE METHOD (s): Bail-Teflon
INSTALLATION DATE: 4-1-94

INSPECTOR: Richard S. Moravec
CONTRACTOR: —
CREW: —
START DEVELOPMENT DATE: 05-23-94
END DEVELOPMENT DATE: 5/23/94

WATER DEPTH (TOC): 6.59 ft
WELL DIA. (ID CASING): 2.0" ~~ft~~
BORING DIAMETER: 8.5" ~~ft~~

INSTALLED POW DEPTH(~~TOC~~): 8.7 ft
MEASURED POW DEPTH(TOC): 10.49 ft
SILT THICKNESS: .01 ft
POW AFTER DEVELOPMENT: ~~10.48~~ rv. ft
10.6' Revised 8/17/94

DIAMETER FACTORS (GAL/FT):

DIAMETER (IN):	[✓ 2]	3	4	5	6	7	8	9	10	11	12
GALLONS/ FT:	[✓ 0.163]	0.367	0.654	1.02	1.47	2.00	2.61	3.30	4.08	4.93	5.87
							2.955				

STANDING VOLUME INSIDE WELL = WATER COLUMN X WELL DIAMETER FACTOR = .63 GAL. = A
3.85 0.163

STANDING WATER IN ANNULAR SPACE =
WATER COL. BELOW SEAL(ft) X (BORING DIAM. FACTOR − WELL DIAM. FACTOR) X 0.3 = 3.22 GAL. = B
3.85 2.955 0.163

SINGLE STANDING WATER VOLUME = A + B = .63 + 3.22 3.85 GAL. = C

MINIMUM VOLUME TO BE REMOVED = 5 X C 5 x 3.85 19.27 GALS.

	DATE	ACTIVITY	STARTING H20 DEPTH	START TIME	END TIME	ELAPSED TIME	GALLONS REMOVED	pH	CONDUCTIVITY	TEMP	COLOR	Turbidity (NTU)	Ending Water Depth	
1st Vol	5/23/94	Bail	6.59	1350	1410	20	4.0	7.10	450	10.5	Dk Brown	>1000	7.31	
	5/23	Bail	7.31	1415	1420	5	1.0	7.08	460	10.6	Dk Brown	>1000	7.75	
2nd Vol	5/23	Bail	6.64	1450	1455	5	3.0	7.16	480	10.8	Dark Brown	>1000	7.60	
3rd Vol	5/23	Pump	6.64	1510	1540	30	4.0	7.17	460	11.3	Cloudy	29.	7.02	400
4th Vol	5/23	Pump	7.02	1540	1610	30	4.0	7.09	460	10.8	Clear	4.94	7.03	400
5th Vol	5/23	Pump	7.03	1610	1640	30	4.0	7.09	460	10.9	Clear	3.24	7.04	400
	TOTALS/FINAL						20							

RECOVERY
GOOD [✓ FAIR] POOR

Key# 2537

INVESTIGATION DERIVED WASTE (IDW)

DATE					
VOLUME					
DRUM #					

SEE MASTER ACRONYM LIST FOR COMPLETE LISTING OF ABBREVIATIONS WELL #:

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APPENDIX D

FIELD SAMPLING AND ANALYSIS PLAN

Appendix D information is contained in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan

APPENDIX E

HEALTH AND SAFETY PLAN

Appendix E information is contained in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan

APPENDIX F

CHEMICAL DATA AQUISITION PLAN

Appendix F information is contained in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan

APPENDIX G

UNITED STATES DEPARTMENT OF INTERIOR FISH AND WILDLIFE SERVICES ENDANGERED AND THREATENED SPECIES LETTER

Appendix G information is contained in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan

APPENDIX H

RESPONSE TO REVIEW COMMENTS

APPENDIX I

SCOPE OF WORK

Appendix I information is contained in the Generic Installation RI/FS Workplan that serves as a supplement to this RI/FS Project Scoping Plan