00068

5

U.S. ARMY ENGINEER DIVISION
HUNTSVILLE, ALABAMA

DRAFT FINAL

EXPANDED SITE INSPECTION
SEVEN LOW PRIORITY AOCs
SEADs 60, 62, 63, 64(A, B, C, AND D), 67, 70, AND 71

VOLUME 1 OF 2

APRIL1996

EXPANDED SITE INSPECTION REPORT
SEVEN LOW PRIORITY AREAS OF CONCERN
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

720518

April 1996

TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

LIST OF APPENDICES

LIST OF TABLES

LIST OF TABLES
(Con't)

LIST OF TABLES
(Con't)

LIST OF FIGURES

LIST OF FIGURES (Cont'd)

LIST OF FIGURES (Cont'd)

LIST OF ACRONYMS

AET	Actual Evapotranspiration
AMC	U.S. Army Material Command
AOC	Areas of Concern
APCS	Air Pollution Control System
AQCR	Genesee-Finger Air Quality Control Region
ARAR	Applicable or Relevant and Appropriate Requirements
1,2-DCA	1,2-Dichloroethane
1,2-DCE	1,2-Dichloroethylene (total)
AA	Atomic absorption
AB/N's	Acid, base/neutrals
ASTM	American Society for Testing and Materials
B&B	Blasland and Bouck
Ba	Barium
BOD	Biological Oxygen Demand
bp	before present
CEC	Cation exchange capacity
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
Cl	Chloride
CLP	Contract Laboratory Program
cm	Centimeters
cm/sec	Centimeters per second
COD	Chemical Oxygen Demand
Cr	Chromium
Cu	Copper
$CaCO_3$	Calcium Carbonate
Cd	Cadmium
CRT	Cathode ray tube
DARCOM	Development and Readiness Command
DERA	Defense Environmental Restoration Account
DO	Dissolved oxygen
DOT	Department of Transportation
DRMO	Defense, Revitalization and Marketing Office
EM-31	Electromagnetic
EPA	Environmental Protection Agency

LIST OF ACRONYMS
(Cont'd)

ES	Engineering-Science, Inc.
ESE	Environmental Science and Engineering
ESI	Expanded Site Inspections
FS	Feasibility Study
ft	Feet
ft/ft	Feet per foot
ft/sec	Feet per second
ft/yr	Feet per year
GA	Classification: The best usage of Class GA waters is as a source of potable water supply. Class GA waters are fresh groundwaters
GAE	Geophysical anomaly excavations
GC	Gas chromatograph
gpm	Gallons per minute
GPR	Ground penetrating radar
GSSI	Geophysical Survey Systems, Inc.
HSWA	Hazardous and Solid Waste Amendments
IAG	Interagency Agreement
ICF	ICF Technology, Incorporated
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
MTBE	Methyl Tertiary Butyl Ether
MW	Monitoring Well
NA	Not analyzed or not available
NBS	National Bureau of Standards
NGVD	National Geologic Vertical Datum
NO_2/N	Nitrite-Nitrogen

LIST OF ACRONYMS
(Cont'd)

NO_3/N	Nitrate-Nitrogen
NPL	National Priority List
NSF	National Sanitation Foundation
NTU	Nephelometric turbidity units
NYSDEC	New York State Department of Environmental Conservation
OB	Open Burning
OD	Open Detonation
OVM	Organic Vapor Meter
Pb	Lead
PCB	Polychlorinated biphenyls
PID	Photoionization detector
ppm	parts per million
ppmv	parts per million per volume
PSCR	Preliminary Site Characterization Report
PT	Monitoring well
PVC	Polyvinyl chloride
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
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
Sec	Seconds
SIR	Subsurface interface
SO_4	Sulfate

LIST OF ACRONYMS
(Cont'd)

SOW	Statement of Work
ST	Soil moisture
Std.	Test methods
SS	Soil sample
SVO	Semivolatile Organic Compounds
SW	Surface water sample
SWMU	Solid Waste Management Unit
T1,2-DCE	trans-1,2-Dichloroethylene
TAGM	Technical and Administrative Guidance Memorandum
TAL	Target analyte list
TBP	Trial Burn Plan
TCE	Trichloroethylene
TCL	Target compound list
TDS	Total dissolved solids
TES	Target Environmental Services, Inc.
TKN	Total Kjeldah Nitrogen
TOC	Total Organic Carbon
TOX	Total Organic Halogens
TRPH	Total Recovered Petroleum Hydrocarbons
TS	Total Solids
TP	Test Pit
UCL	Upper Confidence Level
ug/g	Micrograms per gram
ug/wp	Micrograms per wipe
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

LIST OF ACRONYMS
(Cont'd)

UXO	Unexploded Ordnance
VC	Vinyl Chloride
VLF-EM	Very Low Frequency Electromagnetic
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound
Vs	Volt Second
Zn	Zinc

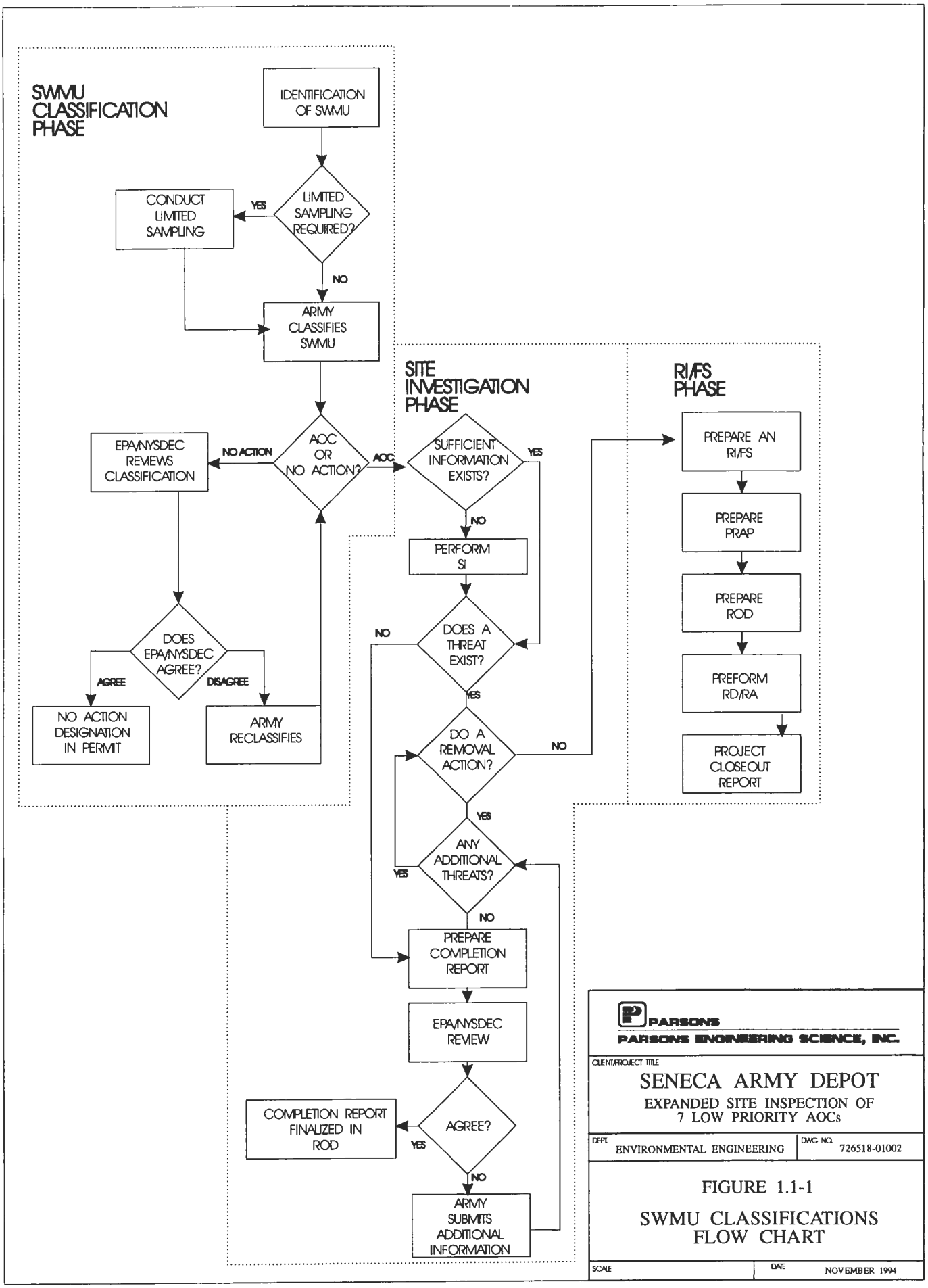
1.0 INTRODUCTION

Parsons Engineering Science, Inc. (Parsons ES) has been retained by the U.S. Army Corps of Engineers (USACOE) to conduct Expanded Site Inspections (ESI) at Solid Waste Management Units (SWMUs) that have been designated as Areas of Concern (AOC) within the Seneca Army Depot Activity (SEDA). This report describes the ESI activities at the following seven low priority AOCs:

- SEAD-60 - Oil Discharge Adjacent to Building 609
- SEAD-62 - Nicotine Sulfate Disposal Area
- SEAD-63 - Miscellaneous Components Burial Site
- SEAD-64 - Garbage Disposal Areas
- SEAD-67 - Dump Site East of Sewage Treatment Plant No. 4
- SEAD-70 - Fill Area Adjacent to Building T-2110
- SEAD-71 - Rumored Paint and Solvent Burial Pit

The purpose of this report is to discuss the physical characteristics of the sites, interpret the analytical results from the investigation programs, and identify any hazardous constituents or wastes that have been released to the environment at each of the seven AOCs. In accordance with the decision process outlined in the Interagency Agreement (IAG), ESIs were performed at SWMUs that were classified as AOCs. If the conclusion of this report is that an AOC poses a threat to human health, welfare, or the environment, the Army can perform a removal action to eliminate the threat or can conduct a Comprehensive Environmental Response Compensation and Liability Act (CERCLA) Remedial Investigation (RI).

This work has been performed according to the requirements of the New York State Department of Environmental Conservation (NYSDEC), the U.S. Environmental Protection Agency, Region II (EPA), and the IAG. The steps in this agreement are depicted in the SWMU Classification Flow Chart (Figure 1.1-1). The IAG sets forth an incremental agenda which begins with the initial identification of each SWMU and culminates with a Record of Decision (ROD) for each SWMU requiring a remedial action. In some instances, it may be clear that after conducting a preliminary investigation, a SWMU poses little or no threat to human health and the environment and enough evidence exists to eliminate this SWMU from further consideration by classifying this SWMU as a No-Action SWMU. In other cases, the SWMU will be investigated as an AOC.



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOCs

DEPT	DWG NO.
ENVIRONMENTAL ENGINEERING	726518-01002

FIGURE 1.1-1

SWMU CLASSIFICATIONS FLOW CHART

SCALE	DATE
	NOVEMBER 1994

R:\GRAPHICS\SENECA\FLOWCHRT.CDR(CVM)

Following this, a Remedial Investigation/Feasibility Study (RI/FS) may be required to gain enough data to prepare a ROD.

In accordance with Section 10.6 of the IAG, the Army is required to prepare a completion report for AOCs that pose no threat to public health or welfare or to the environment. The completion report provides certification and documentation that the AOC in question does not constitute a threat to public health, welfare or to the environment. If, following an ESI, an AOC was determined to pose no threat, then the ESI report will constitute the completion report.

The determination of whether a threat exists at an AOC will be based upon comparisons with State and Federal standards, guidelines, and criteria that are available. Exceedances of an appropriate standard, guideline, or criteria will be used as the indication that a threat may exist. A risk analysis will not be performed to quantify the threat. For those cases where no exceedances occur, the professional opinions and recommendations contained in the final report will constitute the completion report. For those AOCs that are determined to potentially pose a threat to public health or welfare or to the environment, an RI/FS will be performed if the threat cannot be eliminated via a removal action in accordance with paragraph 10.9 of the IAG.

1.1 SITE BACKGROUND

SEDA is a 10,587-acre facility in Seneca County, Romulus, New York, that has been owned by the United States Government and operated by the Department of the Army since 1941. The location map in Figure 1.1-2 identifies the location of SEDA. Since its inception in 1941, SEDA's primary mission has been the receipt, storage, maintenance, and supply of military items. This function includes the safe and efficient demilitarization of military ammunition and explosives by burning and detonation.

In May 1979, the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) began an environmental evaluation of SEDA. This evaluation was undertaken "to assess the environmental quality of SEDA with regard to the use, storage, treatment, and disposal of toxic and hazardous materials" and "define any conditions which may adversely affect the health and welfare or result in environmental degradation" (USATHAMA 1980). The report concluded that geological conditions are such that contaminants, if present, could migrate in surface or subsurface waters.

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOCs

DEPT.	DWG NO.
ENVIRONMENTAL ENGINEERING	726518-01002

FIGURE 1.1-2

LOCATION MAP

SCALE	DATE
1"= 8 MILES APPROX.	NOVEMBER 1994

R:\GRAPHICS\SENECA\LOCMAP.CDR(CVM)

In November 1986, SEDA applied for a Part B Resource Conservation and Recovery Act (RCRA) Permit to operate a hazardous waste storage facility (SWMU designation SEAD-1), a Polychlorinated Biphenyl (PCB) storage facility (SEAD-2) and a deactivation furnace (SEAD-17). The Open Burning (OB) facility and the Open Detonation (OD) facility (SEAD-23 and SEAD-45, respectively) are also currently under interim status. Under the RCRA Hazardous and Solid Waste Amendments of 1984 (HSWA), Part B Permits issued after November 8, 1984, require identification and corrective action at any SWMU located on the installation that is releasing hazardous constituents or hazardous wastes to the environment. This requirement applies to all SWMUs regardless of when the wastes were placed therein.

Closure under RCRA guidelines was deferred when SEDA was proposed for the National Priority List (NPL) in July 1989. In August 1990, SEDA was finalized and listed in Group 14 on the Federal Section of the National Priority List (NPL). Following finalization on the NPL, it was agreed that subsequent remediation of targeted problem sites would become regulated under CERCLA guidelines. The IAG was developed with the EPA Region II and NYSDEC to integrate the Army's RCRA corrective action obligations with CERCLA response obligations in order to facilitate overall coordination of investigations mandated at SEDA. Therefore, any required future investigations will be based on CERCLA guidelines and RCRA shall be considered an Applicable or Relevant and Appropriate Requirement (ARAR) pursuant to Section 121 of CERCLA.

As mandated by the EPA Region II and by NYSDEC, the U.S. Army Corps of Engineers commissioned the "Solid Waste Management Unit Classification Report" at SEDA (ERCE 1991). This report was finalized by Parsons ES on June 10, 1994. This work was performed to evaluate the effects of past solid waste management practices at identified SWMUs on the facility and to classify each SWMU as an area where "No Action is Required" or as an "Area of Concern." Areas of Concern include both (a) SWMUs where releases of hazardous substances may have occurred and (b) locations where there has been a threat of a release into the environment of a hazardous substance or constituent (including radionuclides). AOCs may include, but need not be limited to, former spill areas, landfills, surface impoundments, waste piles, land treatment units, transfer stations, wastewater treatment units, incinerators, container storage areas, scrap yards, cesspools and tanks with associated piping that are known to have caused a release into the environment or whose integrity has not been verified.

A total of 69 SWMUs and AOCs were originally identified in the ERCE SWMU Classification Report. Following the completion of the ERCE report, three additional SWMUs were added by the Army, bringing the total number of SWMU's at SEDA to 72. The total number of SWMUs and AOCs to be investigated has been finalized between the Army and NYSDEC/EPA and includes 24 No-Action SWMUs and 48 sites declared as AOCs. From these 48 AOCs, 7 low priority sites were investigated as part of this work scope. These seven AOCs are presented in Table 1.1-1.

The Army and the regulatory agencies are in agreement with respect to the classification of all seven low priority AOCs which are the focus of this report. The classification of all remaining SWMUs has been presented in the final SWMU Classification Report. The Army is investigating SWMUs that have been determined to be AOCs which pose the greatest potential risk to human health and the environment as determined by the findings of the SWMU Classification Report (ERCE 1991, ES 1994). The Army is proceeding on a worst case first basis. This report presents the findings of the investigations performed at the seven SWMUs that have been classified as low priority units.

1.1.1 General Description

SEDA is an active military facility constructed in 1941. The site is located approximately 40 miles south of Lake Ontario, near Romulus, New York (Figure 1.1-2). The facility is located in an uplands area, at an elevation of approximately 600 feet Mean Sea Level (MSL), that forms a divide separating two of the New York Finger Lakes, Cayuga Lake on the east and Seneca Lake on the west. Sparsely populated farmland covers most of the surrounding area. New York State Highways 96 and 96A adjoin SEDA on the east and west boundaries, respectively. Since its inception in 1941, SEDA's primary mission has been the receipt, storage, maintenance, and supply of military items. At the present time, SEDA is continuing to perform its primary mission. However, in October of 1995, SEDA was placed on the Base Realignment and Closure List (BRAC List) and studies are on-going to develop a community Reuse Plan for the Seneca Army Depot Activity facility. Figure 1.1-3 presents a plan view of SEDA.

1.1.1.1 Regional Geologic Setting

The Finger Lakes uplands area is underlain by a broad north-to-south trending series of rock terraces mantled by glacial till. As part of the Appalachian Plateau, the region is underlain by a tectonically undisturbed sequence of Paleozoic rocks consisting of shales, sandstones, conglomerates, limestones and dolostones. Figure 1.1-4 shows the regional geology of Seneca

TABLE 1.1-1

SEVEN AREAS OF CONCERN TO BE INVESTIGATED

Site/SWMU Identification	Description of Site
SEAD-60	Oil Discharge Adjacent to Building 609
SEAD-62	Nicotine Sulfate Disposal Area
SEAD-63	Miscellaneous Components Burial Site
SEAD-64	Garbage Disposal Areas (A, B, C and D)
SEAD-67	Dump Site East of Sewage Treatment Plant No. 4
SEAD-70	Fill Area Adjacent to Building T2110
SEAD-71	Rumored Paint and Solvent Burial Pit

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

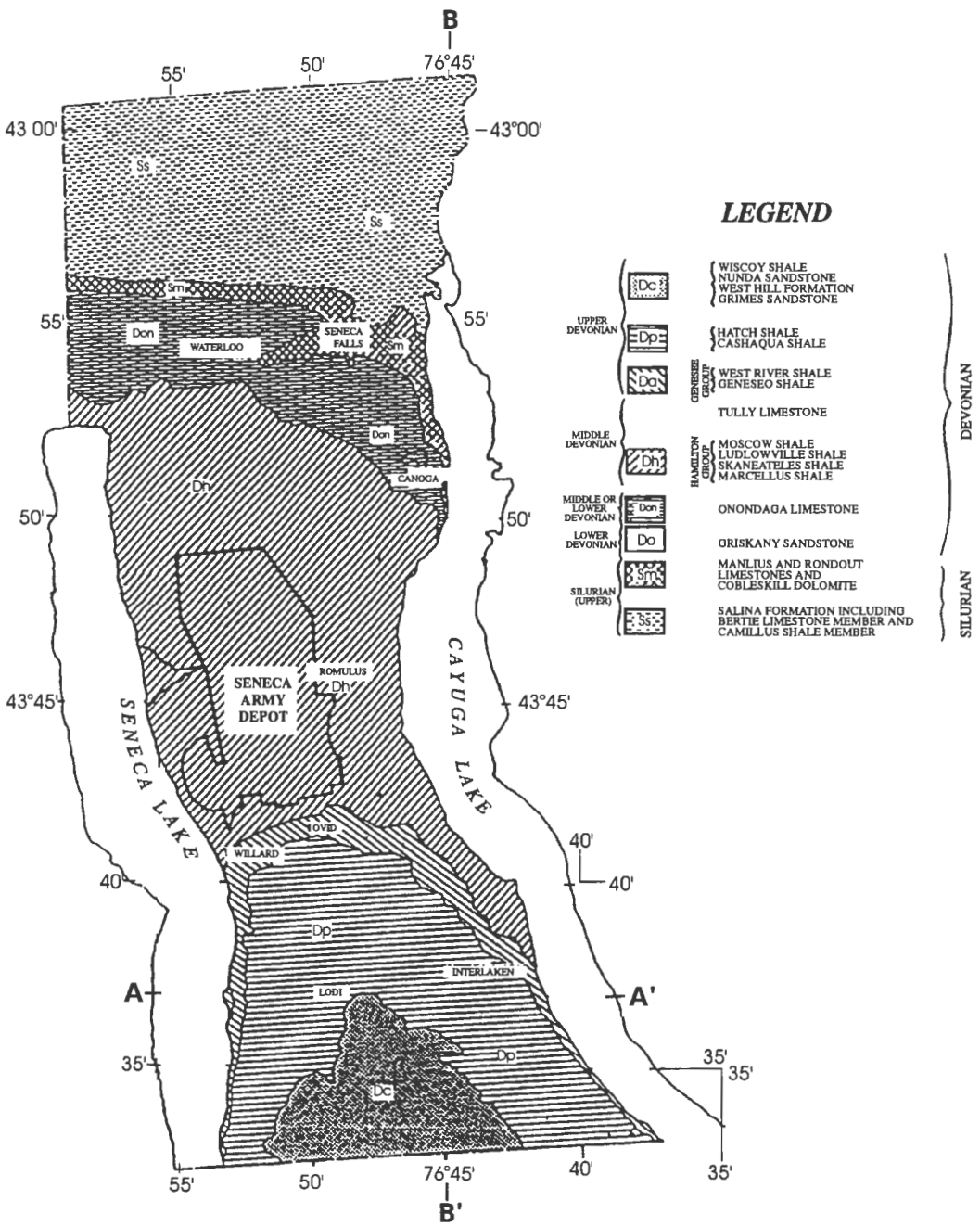
CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOCs

DEPT: ENVIRONMENTAL ENGINEERING | DWG NO: 720518-01002

FIGURE 1.1-3
SENECA ARMY DEPOT MAP

SCALE: 1" = 2000' | DATE: NOVEMBER 1994



SOURCE:MODIFIED FROM-THE GROUND WATER RESOURCES OF SENECA COUNTY, NEW YORK: MOZOLA, A.J., BULLETIN GW-26, ALBANY, NY, 1951

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 726518-01002

FIGURE 1.1-4

GEOLOGIC MAP OF SENECA COUNTY

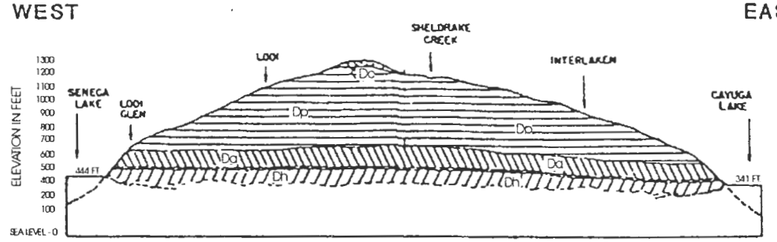
SCALE 1" = 5 MILES | DATE NOVEMBER 1994

R:\GRAPHICS\SENECA\GEOLOGIC.CDR(CVM)

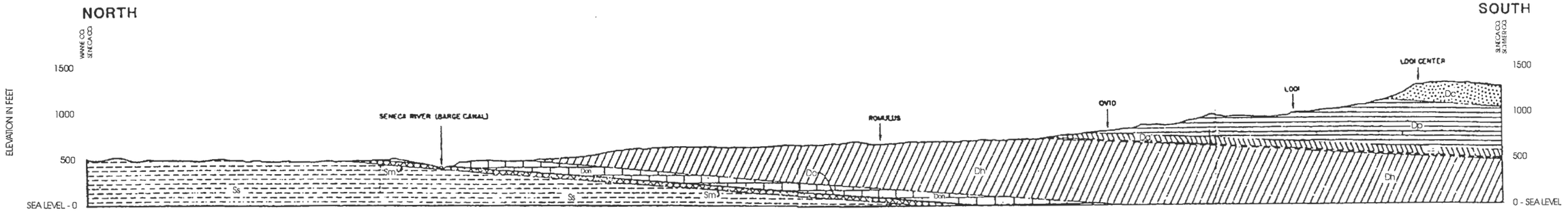
County. In the vicinity of SEDA, Devonian age (385 million years bp) rocks of the Hamilton group are monoclinally folded and dip gently to the south (Figure 1.1-5). No evidence of faulting or folding is present. The Hamilton Group is a sequence of limestones, calcareous shales, siltstones, and sandstones. These rocks were deposited in a shallow inland sea at the north end of the Appalachian Basin (Gray, 1991). Terrigenous sediments from topographic highs associated with the Acadian landmass of Western New England, eastern New York and Pennsylvania were transported to the west across a marine shelf (Gray, 1991). These sediments were deposited in a northeast-southwest trending trough whose central axis was near what is now the Finger Lakes (Gray, 1991).

The Hamilton Group, 600 to 1,500 feet thick, is divided into four formations. They are, from oldest to youngest, the Marcellus, Skaneateles, Ludlowville, and Moscow formations. The western portion of SEDA is generally located in the Ludlowville Formation while the eastern portion is located in the younger Moscow Formation. The Ludlowville and Moscow formations are characterized by gray, calcareous shales and mudstones and thin limestones with numerous zones of abundant invertebrate fossils that form geographically widespread encrinites, coral-rich layers, and complex shell beds. The Ludlowville Formation is known to contain brachiopods, bivalves, trilobites, corals and bryozoans (Gray, 1991). In contrast, the lower two formations (Skaneateles and Marcellus) consist largely of black and dark gray sparsely fossiliferous shales (Brett et al., 1991). Locally, the shale is soft, gray, and fissile. Figure 1.1-6 displays the stratigraphic section of Paleozoic rocks of Central New York. The shale is extensively jointed and weathered at the contact with overlying tills. Joint spacings are 1 inch to 4 feet in surface exposures. Prominent joint directions are N 60° E, N 30° W, and N 20° E, with the joints being primarily vertical. Corings performed on the upper 5 to 8 feet of the bedrock revealed low Rock Quality Designations (RQD's), i.e., less than 5 percent with almost 100 percent recovery (Metcalf & Eddy, 1989), suggesting a high degree of weathering.

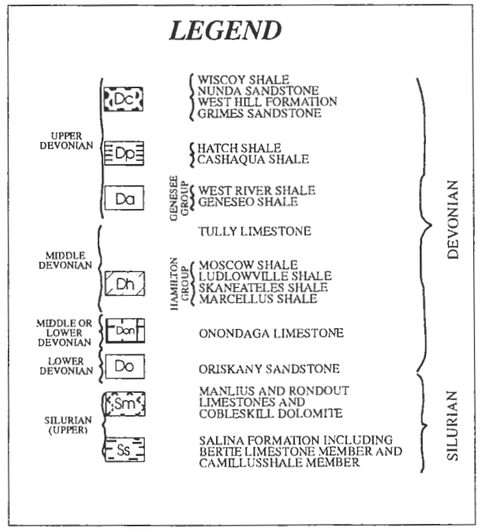
Pleistocene age (Wisconsin event, 20,000 bp) glacial till deposits overlie the shales. The physiographic map of Seneca County (Figure 1.1-7) presents an overview of the subsurface sediments present in the area. The site is shown on Figure 1.1-7 as lying on the western edge of a large glacial till plain between Seneca Lake and Cayuga Lake. The till matrix, the result of glaciation, varies locally but generally consists of horizons of unsorted silt, clay, sand, and gravel. The soils at the site contain varying amounts of inorganic clays, inorganic silts, and silty sands. In the central and eastern portions of SEDA, the till is thin and bedrock is exposed or within 3 feet of the surface. The thickness of the glacial till deposits at SEDA generally ranges from 1 to 15 feet.



EAST-WEST SECTION ALONG A-A'



NORTH-SOUTH SECTION ALONG 76°50' (B-B')



SCALE
1 0 1 2 3 MILES

SOURCE:MODIFIED FROM-THE GROUND WATER RESOURCES OF SENECA COUNTY, NEW YORK: MOZOLA, A.J., BULLETIN GW-26, ALBANY, NY, 1951

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOCs

DEPT ENVIRONMENTAL ENGINEERING | DWG NO. 726518-01002

FIGURE 1.1-5

REGIONAL GEOLOGIC CROSS SECTIONS

SCALE 1" = 12,000 MILES APPROXIMATE | DATE NOVEMBER 1994

R:\GRAPHICS\SENECA\GEOXSEC.CDR(CVM)

MESOZOIC — Lower Cretaceous

MESOZOIC INTRUSIVES

Kimberlite and alnoite dikes and diatremes

CONNEAUT GROUP
600-1000 ft. (180-300 m.)

Germania Formation-shale, sandstone; Whiteville Formation-shale, sandstone; Hinsdale Sandstone; Wellsville Formation-shale, sandstone; Cuba Sandstone.

CANADAWAY GROUP
800-1200 FT(240-370) m.)
Machias Formation-shale, siltsone; Rushford Sandstone; Caneadea, Canisteo, and Hume Shales; Canaseraga Sandstone; Stone Wales and Dunkirk Shales; in Pennsylvania: Towanda Foramtion-shale, sandstone,

JAVA GROUP
300-700 FT (90-210 m.)

Wiscoy Formation-sandstone, shale; Hanover and pipe creek shales.

WEST FALLS GROUP
1100-1600 ft. (340-490 m.)

Nunda Formation-sandstone, shale.
West Hill and fardeau Formations-shale, siltstone; Roricks Glen Shale; upper Beers Hill Shale: Grimes Siltstone.
lower Beers Hill Shale; Dunn Hill, Millport, and Moreland Shales.
Nunda Formation-sandstone, shale; West Hill Formation-shale, siltstone; Corning Shale.
"New Milford" Formation-sandstone, shale.
Gardeau formation-shale, siltstone; Roricks Galn Shale.
Slide Mountain Formation-sandstone, shale, conglomerate.
Beers Hill Shale; Grimes Siltstone; Dunn Hill, Millport, and Moreland Shales

SONYEA GROUP
200-1000 ft. (60-300 m.)

In west: Cashaqua and Middlesex Shales.
In east: Rye Point shale; Rock Stream ("Enfield") Siltstone; Pulteney, Sawmill Creek, John Creek, and Montour Shales.

GENESEE GROUP AND TULLY LIMESTONE
200-1000 ft. (60-300 m.)

West River Shale; Genundewa Limestone; Penn Yan and Geneseo Shales; all except Geneseo replaced eastwardly by Ithaca Formation-shale, siltstone and Sherburne Siltstone.
Oneonta Formation-shale, sandstone.
Unadilla Formation-shale, siltstone.
Tully Limestone.

HAMILTON GROUP
600-1500 ft. (180-460 m.)

Moscow Foramtion-In west: Windom and Kashong Shales, Menteth Limestone Members; In east: Cooperstown Shale Member, Portland Point Limstone Member.
Ludlowville Formation-In west: Deep Run Shale Tichenor Limestone, Wanakah and Ledyard Shale Members, Centerfield Limestone Member. In east: King Ferry Shale and other members, Stone Mill Sandstone Member.
Skaneateles Formation-In west: Levanna shale and Stafford Limestone Members; In east: Butternut, Pompey, and Delphi Station Shale Members, Mottville Sandstone Member.
Marcellus Fornation-In west: Oakta Creek Shale Member; In east: Cardiff and Chittenango Shale Members, Cherry Valley Linestone and Union Springs Shale Members.
Panther Mountain Formation-shale, siltstone, sandstone.

ONONDAGA LIMESTONE AND ORISKANY SANDSTONE
75-150 ft. (23-45 m.)

Onondaga Limestone-Seneca, Morehouse (cherty) and Nedrow Limestone Members, Edgecliff cherty Limestone Member, local bioherms.
Oriskany Sandstone.

HELDERBERG GROUP
0-200 ft. (0-60 m.)

Coeymans and Manlius Limestones; Rondout Dolostone.

AKRON DOLOSTONE, COBLESKILL LIMESTONE, AND SALINA GROUP
700-1000 FT. (210-200 M.)

Akron Dolostone; Bertie Formation-dolostone , shale.
Camillus and Syracuse Formatons-shale, dolostone, gypsum, salt.
Cobleskill Limestone; Bertie and camillus Formations-dolostone, shale.
Syracuse Formation-dolostone, shale, gypsum, salt.
Vernon Formation-shale, dolostone.

LOCKPORT GROUP
80-175 FT (25-55 m.)

Oak Orchard and Penfield Dolostones, both replaced eastwardly by Sconondoa Formation-limestone, dolostone.

CLINTON GROUP
150-325 FT (40-100 m.)

Decew Dolostone; Rochester Shale.
Irondequoit Limestone; Williamson Shale; Wolcott Furnace Hematite; Wolcott Limestone; Sodus Shale; Bear Creek Shale; Wallington Limestone; Furnaceville Hematite; Maplewood shale; Kodak Sandstone.
Herkimer Sandstone; Kirkland Hematite; Willowvale Shale; Westmoreland Hematite; Sauquoir Formation-sandstone shale; Oneida Conglomerate.

MEDINA GROUP AND QUEENSTON FORMATION
0-900 FT. (0-270 m.)
Medina Group: Grimb
sy Formation-sandstone, shale.
Queenston Formation-shale, siltstone.
Undifferentiated Medina Group and Queenston Formation.

LORRAINE GROUP
700-900 FT. (210-270 m.)

Oswega Sandstone.
Pufaski and Whetstone Gulf Formations-siltstoen, shale.

TRENTON GROUP
100-300 ft. (30-90 m.)

Utica Shale.

PALEOZOIC

- Upper Devonian
- Middle Devonian
- Lower Devonian
- Upper Silurian
- Lower Silurian
- Upper Ordovician
- Middle Ordovician

Hamilton group

MOSCOW SHALE	140±	Lower two-thirds of section is a fossiliferous, soft gray calcareous shale; upper third highly friable but less calcareous and fossiliferous. Staining by iron oxide very common. Concretions present ! greater abundance in lower beds, but irregular calcareous masses occur throughout section. Joints parallel, tightly sealed, trending N. 65° E. and N. 25° -30° W.
LUDLOWVILLE SHALE	140±	Lower beds are thinly laminated, light-colored, fossiliferous, shaly passage beds; overlain by hard calcareous black shales 5 to 12 inches thick and rich in corals and brachiopods; hard layers responsible for falls and cascades. Middle beds are less fossiliferous, soft gray arenaceous shales, rich in concretions, calcareous lenses, and occasional thin sandstone layers. Upper beds (Tichenor limestone member) are thin, irregularly bedded ray shales becoming light blue gray upon exposure, calcareous, coarsely textured, and fossiliferous. Joint parallel, 2 to 20 inches apart, well developed but tight.
SKANEATELES SHALE	185±	Basal beds composed of dark fissile shale. Upper shale more calcareous, grayish to bluish impure limestone layers. joint pattern N. 75° E. and N. 30° W.; diagonal joints N. 50° E. Joints sealed, parallel and spaced 6 inches to 4 feet apart.
MARCELLUS SHALE	50	Black, slatelike, bituminous shale with occasional limestone layers in sequence, containing zones rich in iron sulfides or calcareous conretions, often with septarian structures; very fissile, iron-stained and gray when weathered. Joint pattern N. 25° W., N. 65° E., 1 inch to 4 feet apart.

SOURCE:MODIFIED FROM-THE GROUND WATER RESOURCES OF SENECA COUNTY, NEW YORK: MOZOLA, A.J., BULLETIN GW-26, ALBANY, NY, 1951

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

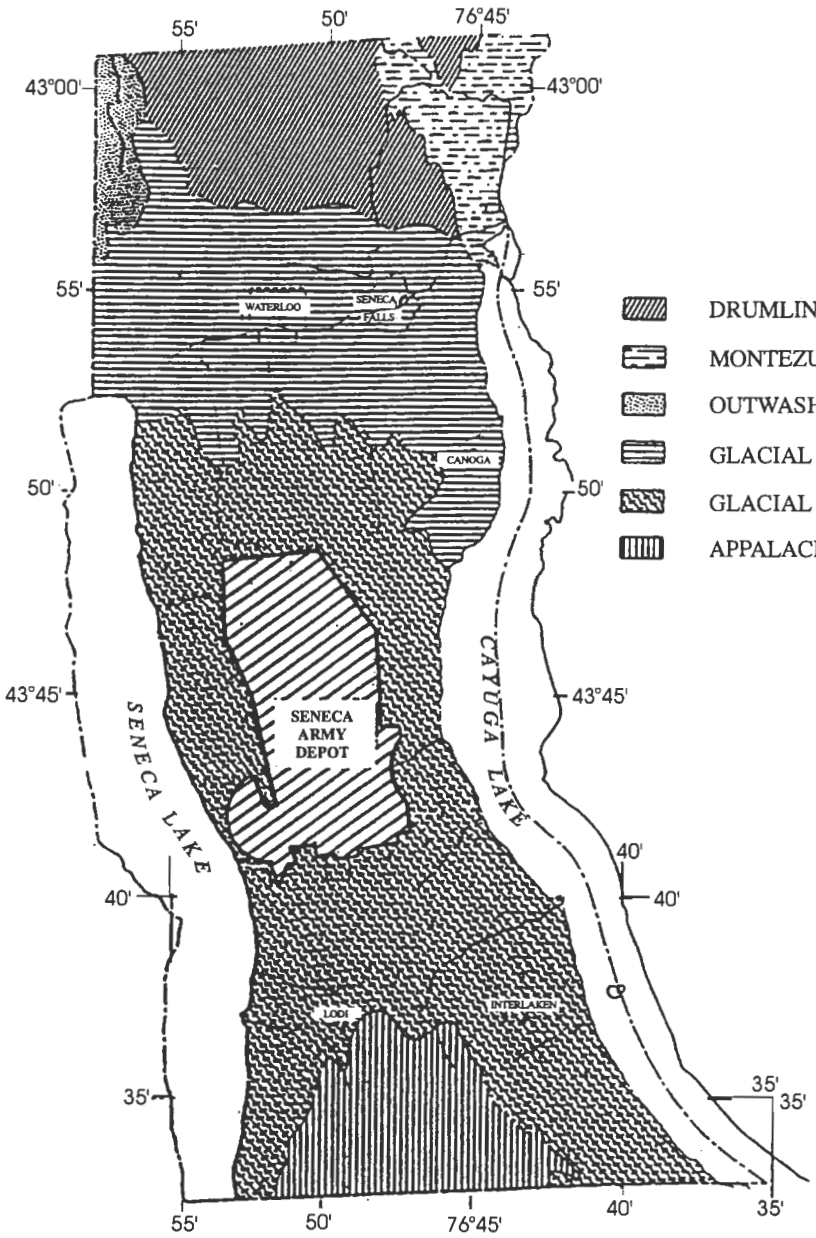
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 720518-01002

FIGURE 1.1-6
BEDROCK STRATIGRAPHIC COLUMN

SCALE | DATE APRIL 1996

R:\GRAPHICS\SENECA\BEDSTRAT.CDR(CVM)



SOURCE: MODIFIED FROM-THE GROUND WATER RESOURCES OF SENECA COUNTY, NEW YORK: MOZOLA, A.J., BULLETIN GW-26, ALBANY, NY, 1951

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOCs

DEPT.	DWG NO.
ENVIRONMENTAL ENGINEERING	726518-01002

FIGURE 1.1-7

PHYSIOGRAPHIC MAP OF SENECA COUNTY

SCALE	DATE
1" = 5 MILES	NOVEMBER 1994

R:\GRAPHICS\SENECA\PHYSIO.CDR(CVM)

Darien silt-loam soils, 0 to 18 inches thick, have developed over Wisconsonian age glacial tills. These soils are developed on glacial till where they overlie the shale. In general, the topographic relief associated with these soils is from 3 to 8 percent. Figure 1.1-8 presents the U.S. Department of Agriculture (USDA) General Soils map for Seneca County.

Regional background elemental concentrations for soils from the Finger Lakes area of New York State are not available. However, elemental concentrations for soils from the eastern United States and in particular, New York State are available. Table 1.1-2 cites data on the eastern United States from a United States Geological Survey (USGS) professional paper (Shacklette and Boerngen, 1984) and data on the New York State soils from a NYSDEC report.

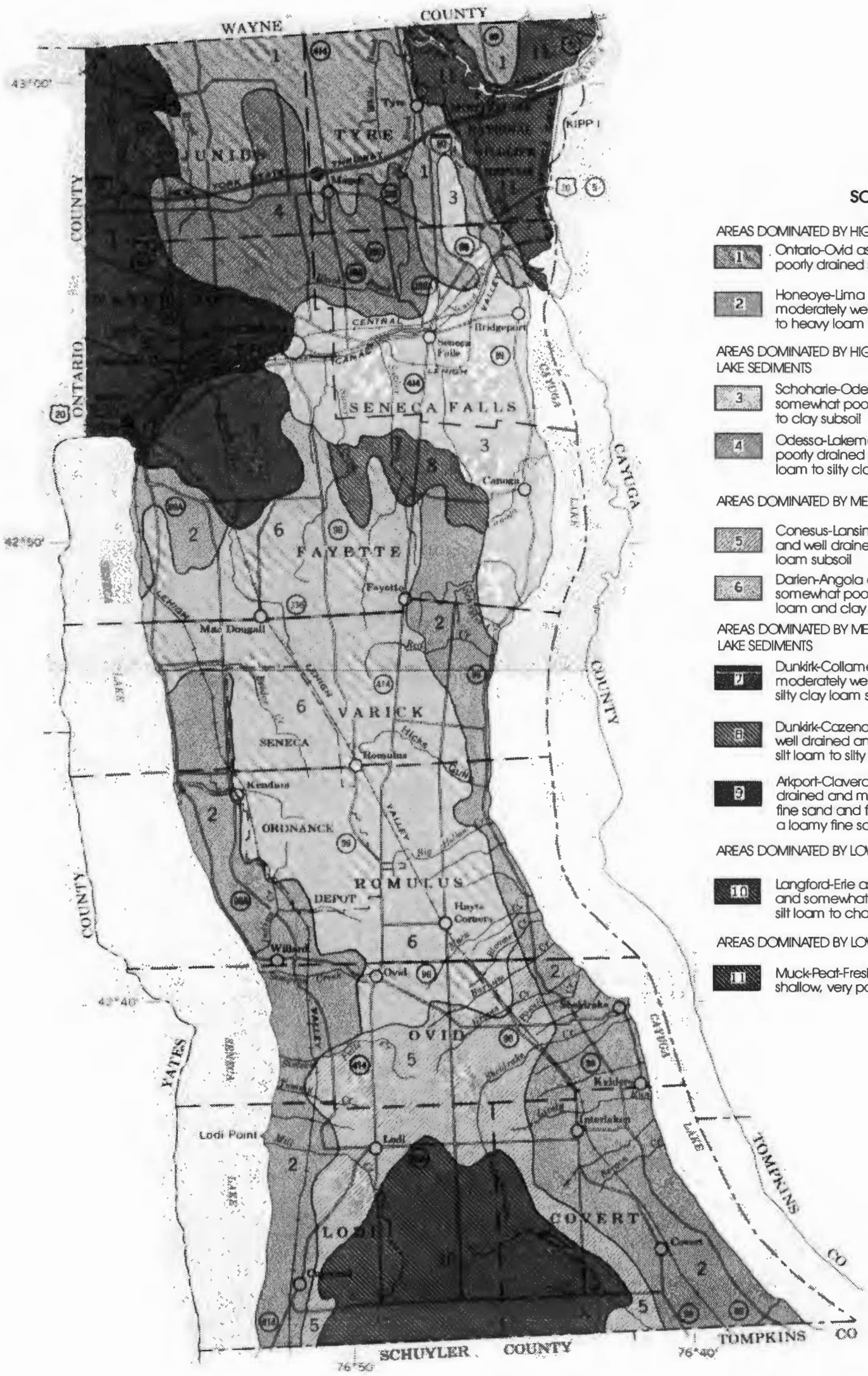
1.1.1.2 Regional Hydrogeologic Setting

Regionally, four distinct hydrologic units have been identified within Seneca County (Mozola A.J., 1951). These include two distinct shale formations, a series of limestone units, and unconsolidated beds of Pleistocene glacial drift. Overall, the groundwater in the county is very hard, and therefore, the quality is minimally acceptable for use as potable water.

Approximately 95 percent of the wells in the county are used for domestic or farm supply and the average daily withdrawal is approximately 500 gallons, an average rate of 0.35 gallons per minute (gpm). About five percent of the wells in the county are used for commercial, industrial, or municipal purposes. Seneca Falls and Waterloo, the two largest communities in the county, are in the hydrogeologic region which is most favorable for the development of a groundwater supply. However, because the hardness of the groundwater is objectionable to the industrial and commercial establishments operating within the villages, both villages utilize surface water (Cayuga Lake and Seneca River, respectively) as their municipal supplies. The villages of Ovid and Interlaken, both of which are without substantial industrial establishments, utilize groundwater as their public water supplies. Ovid obtains its supply from two shallow gravel-packed wells, located approximately 1,000 feet south of the village center. Ovid is located approximately 5 miles south of SEDA. Interlaken obtains its water from one developed seepage spring well located 1 1/2 miles northeast of the village. Two wells, which are used for backup water supply only, are located approximately 1 1/2 miles southwest of the village. Interlaken is located approximately 11 miles south of SEDA.

N

1 0 1 2 3 4
SCALE IN MILES
1:190,080



SOIL ASSOCIATIONS

AREAS DOMINATED BY HIGH-LIME SOILS DEVELOPED IN GLACIAL TILL

1 Ontario-Ovid association: Deep, well-drained to somewhat poorly drained soils that have a loam to silty clay loam subsoil

2 Honeoye-Lima association: Deep, well-drained and moderately well drained soils that have a heavy silt loam to heavy loam subsoil

AREAS DOMINATED BY HIGH-LIME SOILS DEVELOPED IN GLACIAL LAKE SEDIMENTS

3 Schoharie-Odessa association: Deep, well-drained to somewhat poorly drained soils that have a silty clay loam to clay subsoil

4 Odessa-Lakemont association: Deep, dominantly somewhat poorly drained and poorly drained soils that have a silty clay loam to silty clay subsoil

AREAS DOMINATED BY MEDIUM-LIME SOILS DEVELOPED IN GLACIAL TILL

5 Conesus-Lansing association: Deep, moderately well drained and well drained soils that have a heavy silt loam to heavy loam subsoil

6 Darien-Angola association: Deep and moderately deep, somewhat poorly drained soils that have a silty clay loam and clay loam subsoil

AREAS DOMINATED BY MEDIUM-LIME SOILS DEVELOPED IN GLACIAL LAKE SEDIMENTS

7 Dunkirk-Collamer association: Deep well drained and moderately well drained soils that have a silt loam to silty clay loam subsoil

8 Dunkirk-Cazenovia association: Moderately deep and deep, well drained and moderately well drained soils that have a silt loam to silty clay loam subsoil that overlies limestone

9 Arkport-Claverack association: Deep, dominantly well drained and moderately well drained soils that are loamy fine sand and fine sandy loam throughout or that have a loamy fine sand subsoil over silty clay or clay

AREAS DOMINATED BY LOW-LIME SOILS DEVELOPED IN GLACIAL TILL

10 Langford-Erie association: Deep, moderately well drained and somewhat poorly drained soils that have a channery silt loam to channery loam fragipan

AREAS DOMINATED BY LOW-LIME SOILS DEVELOPED IN ORGANIC MATERIAL

11 Muck-Peat-Fresh Water Marsh association: Deep to shallow, very poorly drained organic soils

FEBRUARY 1971

SOURCE: U.S. DEPARTMENT OF ARGRICULTURE
SOIL CONSERVATION SERVICE
CORNELL UNIVERSITY AGRICULTURAL EXPERIMENT STATION

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 726518-01002

FIGURE 1.1-8

GENERAL SOIL MAP
SENECA COUNTY, NEW YORK

SCALE 1" = 2000' | DATE NOVEMBER 1994

R:\GRAPHICS\SENECA\COLRSOIL.CDR(CVM)

TABLE 1.1 – 2

BACKGROUND CONCENTRATIONS OF ELEMENTS IN SOILS OF THE EASTERN UNITED STATES WITH SPECIFIC DATA FOR NEW YORK STATE

SENECA ARMY DEPOT

ELEMENT	CONCENTRATION RANGE (ppm)	GEOGRAPHIC LOCATION
Aluminum	7,000 – 100,000 1,000 – 25,000 5,560–21,200	Eastern U.S. (2) Albany Area (1) SEDA (5)
Arsenic	< 0.1 – 73 3 – 12 < 0.1 – 6.5 2.70–21.5	Eastern U.S. (2) New York State (1) Albany Area (1) SEDA (5)
Barium	10 – 1,500 15 – 600 250 –350 33.9–159	Eastern U.S. (2) New York State (1) Albany Area (1) SEDA (5)
Beryllium	1 – 7 0 – 1.75 0 – 0.9 0.32–1.40	Eastern U.S. (2) New York State (1) Albany Area (1) SEDA (5)
Cadmium	Not Available 0.0001 – 1.0 0.14–2.9	Eastern U.S. (2) No Region Specified (1) SEDA (5)
Calcium	100 – 280,000 130 – 35,000 150 – 5,000 2,900 – 6,500 1,370–293,000	Eastern U.S. (2) New York State (1) Albany Area (1) Albany Area (1) SEDA (5)
Chromium	1 – 1,000 1.5 – 40 1.5 – 25 10.3–35.8	Eastern U.S. (2) New York State (1) Albany Area (1) SEDA (5)
Cobalt	< 0.3 – 70 2.5 – 60 2.5 – 6 5.9–29.1	Eastern U.S. (2) New York State (1) Albany Area (1) SEDA (5)
Copper	< 1 – 700 < 1 – 15 9.7–62.8	Eastern U.S. (2) Albany Area (1) SEDA (5)
Iron	100 – 100,000 17,000 – 25,000 8,770–42,500	Eastern U.S. (2) Albany Area (1) SEDA (5)
Lead	> 10 – 300 1 – 12.5 5.4–269	Eastern U.S. (2) Albany Area (1) SEDA (5)
Magnesium	50 – 50,000 2,500 – 6,000 1,700 – 4,000 3,330–34,900	Eastern U.S. (2) New York State (1) Albany Area (1) SEDA (5)
Manganese	> 2 – 7,000 50 – 5,000 400 – 600 309–2,380	Eastern U.S. (2) New York State (1) Albany Area (1) SEDA (5)
Mercury	0.01 – 3.4 0.042 – 0.066 0.01–0.20	Eastern U.S. (2) Albany Area (1) SEDA (5)

TABLE 1.1 – 2

BACKGROUND CONCENTRATIONS OF ELEMENTS IN SOILS OF THE EASTERN UNITED STATES WITH SPECIFIC DATA FOR NEW YORK STATE

SENECA ARMY DEPOT

ELEMENT	CONCENTRATION RANGE (ppm)	GEOGRAPHIC LOCATION
Nickel	< 5 – 700 19.5 (mean) 16.3–62.3	Eastern U.S. (2) New York State (1) (no range available) SEDA (5)
Potassium	50 – 37,000 47.5 – 117.5 682–2,490	Eastern U.S. (2) New York State (1) SEDA (5)
Selenium	> 0.1 – 3.9 Not Available 0.05–0.97	Eastern U.S. (2) No New York State Data Given (1) SEDA (5)
Sodium	500 – 50,000 Not Available 21.9–269	Eastern U.S. (2) No New York State Data Given (1) SEDA (5)
Vanadium	> 7 – 300 Not Available 12.0–36.9	Eastern U.S. (2) No New York State Data Given (1) SEDA (5)
Zinc	> 5 – 2,900 37 – 60 40.6–219	Eastern U.S. (2) Albany Area (1) SEDA (5)

Notes:

1. (1) Source: McGovern, Carol E., Background Concentrations of 20 Elements in Soils with Special Regard for New York State, Wildlife Resources Center, New York Department of Environmental Conservation, Delmar, New York 12054, No Date.
2. (2) Source: Shacklette, H.T. and Boerngen, J.G., 1984, Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States, U.S.G.S. Prof Paper 1270, Washington.
3. The data are for areas where surficial materials are thought to be uncontaminated, undisturbed, or areas far from pollution sources.
4. ppm = parts per million.
5. Data represents the 95th Upper Confidence Limit (UCL) of the mean from soil data obtained during the Ash Landfill and Open Burning Grounds remedial investigation.

Regionally, the water table aquifer of the unconsolidated surficial glacial deposits of the region would be expected to flow in a direction consistent with the ground surface elevations. Geologic cross-sections from Seneca Lake and Cayuga Lake have been constructed by the State of New York, (Mozola, 1951, and Crain, 1974). This information suggests that a groundwater divide exists approximately half way between the two finger lakes. SEDA is located on the western slope of this divide and therefore regional groundwater flow is expected to be primarily westward toward Seneca Lake.

A substantial amount of information concerning the hydrogeology of the area has been compiled by the State of New York, (Mozola, 1951). No other recent state sponsored hydrogeological report is available for review. This report has been reviewed in order to better understand the hydrogeology of the area surrounding SEDA. The data indicates that within a four mile radius of the site a number of wells exist from which geologic and hydrogeologic information has been obtained. This information includes: 1) the depth; 2) the yield; and 3) the geological strata the wells were drilled through. Although the information was compiled in the 1950s, these data are useful in providing an understanding and characterization of the aquifers present within the area surrounding SEDA. A review of this information suggests that three geologic units have been used to produce water for both domestic and agricultural purposes. These units include: 1) a bedrock aquifer, which in this area is predominantly shale; 2) an overburden aquifer, which includes Pleistocene deposits (glacial till); and 3) a deep aquifer present within beds of limestone in the underlying shale. The occurrence of water derived from limestone is considered to be unusual for this area and is more commonplace to the north of SEDA. The limestone aquifer in this area is between 100 and 700 feet deep. As of 1957, twenty-five wells utilized water from the shale aquifer, six wells tapped the overburden aquifer, and one used the deep limestone as a source of water.

For the six wells that utilized groundwater extracted from the overburden, the average yield was approximately 7.5 gpm. The average depth of these wells was 36 feet. The geologic material which comprises this aquifer is generally Pleistocene till, with the exception of one well located northeast of the site. This well penetrates an outwash sand and gravel deposit. The yields from the five overburden wells ranged from 4 to 15 gpm. The well located in the outwash sand and gravel deposit, drilled to 60 feet, yielded only 5 gpm. A 20-foot hand dug well, located southeasterly of the outwash well, yielded 10 gpm.

The geologic information reviewed indicates that the upper portions of the shale formation would be expected to yield small, yet adequate, supplies of water, for domestic use. For mid-Devonian shales such as those of Hamilton group, the average yields, (which are less than 15 gpm), are consistent with what would be expected for shales (LaSala, 1968). The deeper portions of the bedrock, (at depths greater than 235 feet) have provided yields up to 150 gpm. At these depths, the high well yields may be attributed to the effect of solution on the Onondaga limestone which is at the base of the Hamilton Group. Based on well yield data, the degree of solution is affected by the type and thickness of overlying material (Mozola, 1951). Solution effects on limestones (and on shales which contain gypsum) in the Erie-Niagara have been reported by LaSala (1968). This source of water is considered to comprise a separate source of groundwater for the area. Very few wells in the region adjacent to SEDA utilize the limestone as a source of water, which may be due to the drilling depths required to intercept this water.

1.1.1.3 Local Geology

The site geology is characterized by gray Devonian shale with a thin weathered zone where it contacts the overlying mantle of Pleistocene glacial till. This stratigraphy is consistent over the entire site.

The predominant surficial geologic unit present at the site is dense glacial till. The till is distributed across the entire site and ranges in thickness from less than 2 feet to as much as 15 feet although it is generally only a few feet thick. The till is generally characterized by brown to gray-brown silt, clay and fine sand with few fine to coarse gravel-sized inclusions of weathered shale. Larger diameter weathered shale clasts (as large as 6-inches in diameter) are more prevalent in basal portions of the till and are probably ripped-up clasts removed by the active glacier. The general Unified Soil Classification System (USCS) description of the till on-site is as follows: Clay-silt, brown; slightly plastic, small percentage of fine to medium sand, small percentage of fine to coarse gravel-sized gray shale clasts, dense and mostly dry in place, till, (ML). Grain size analyses performed by Metcalf & Eddy (M&E 1989) on glacial till samples collected during the installation of monitoring wells at SEDA show a wide distribution of grain sizes. The glacial tills have a high percentage of silt and clay with trace amounts of fine gravel. Another study, conducted at the same site by the United States Army Environmental Hygiene Agency (USAEHA) determined the porosities of 5 gray-brown silty clay (i.e., till) samples. These ranged from 34.0 percent to 44.2 percent with an average of 37.3 percent (USAEHA Hazardous Waste Study No. 37-26-0479-85).

Darian silt-loam soils, 0 to 18 inches thick, have developed over the till, however, in some locations, the agricultural soils have been eroded away and the till is exposed at the surface. The surficial soils are poorly drained and have a silt clay loam and clay subsoil. In general, the topographic relief associated with these soils is from 3 to 8 percent.

A zone of gray weathered shale of variable thickness is present below the till in almost all locations drilled at SEDA. This zone is characterized by fissile shale with a large amount of brown interstitial silt and clay.

The bedrock underlying the site is composed of the Ludlowville Formation of the Devonian age Hamilton Group. Merin (1992) also cites three prominent vertical joint directions of northeast, north-northwest, and east-northeast in outcrops of the Genesse Formation 30 miles southeast of SEDA near Ithaca, New York. Three predominant joint directions, N60°E, N30°W, and N20°E are present within this unit (Mozola, 1952). These joints are primarily vertical. The Hamilton Group is a gray-black, calcareous shale that is fissile and exhibits parting (or separation) along bedding planes.

The minimum, maximum, average, standard deviation and the 95th Upper Confidence Level (UCL) of the mean for background concentrations of selected inorganic constituents in the soil located at the SEDA are shown in Table 1.1-3. In addition to the statistical summary information, the actual data points have also been included in this table. Non-detect values have been adjusted to one-half the detection limit. The soil sample locations and the sample depths are also presented in the table. The data presented have been compiled from soil samples collected at the Ash Landfill site, the Open Burning Grounds site, at 10 AOCs investigated prior to this effort, and the background soil samples collected as part of the 15 SWMU workplan scope of work.

1.1.1.4 Local Hydrology/Hydrogeology

Surface drainage from SEDA flows to four creeks as shown in Figure 1.1-9. In the southern portion of the depot, the surface drainage flows through ditches and streams into Indian and Silver Creeks. These creeks then flow into Seneca Lake just south of the SEDA airfield. The central part and administration area of SEDA drain into Kendaia Creek. Kendaia Creek discharges into Seneca Lake near the Lake Housing Area. The majority of the northwestern and north-central portion of SEDA drain into Reeder Creek. The northeastern portion of the depot, which includes a marshy area called the Duck Ponds, drains into Kendig Creek and then flows north into the Cayuga-Seneca Canal and to Cayuga Lake.

TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS
OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs EXPANDED SITE INSPECTION

METALS	MINIMUM SOILS	MAXIMUM SOILS	AVERAGE SOILS	STANDARD DEVIATION SOILS	95TH UCL SOILS	ASH B8-91 0-2 SOIL	ASH B8-91 2-4 SOIL	ASH B8-91 2-4 SOIL	ASH B8-91 6-8 SOIL
Aluminum	5560.00	21200	13610.00	4510.79	14592.84	19200	20500	17700	12700
Antimony	0.08	17.1	2.95	2.90	3.59	5.15	4.4	4.1	4.2
Arsenic	2.70	21.5	5.51	2.75	6.13	5.1	6.1	6	4.2
Barium	33.90	159	82.14	26.92	88.01	136	98.9	86.7	56.2
Beryllium	0.27	1.4	0.67	0.25	0.73	1.4	1.2	1	0.78
Cadmium	0.01	2.9	0.58	0.72	0.83	2.6	2.9	2.4	1.9
Calcium	1370.00	293000	46203.33	49677.73	101903.83	5390	4870	3560	85900
Chromium	10.30	35.8	20.73	6.42	22.13	27.4	30.1	26.9	19.8
Cobalt	5.20	29.1	11.28	4.31	12.22	13.8	18.4	14	14.2
Copper	9.70	62.8	22.23	8.76	24.14	22.3	27.6	26	16.2
Iron	8770.00	42500	24992.46	7500.25	26626.65	37200	36100	32500	27400
Lead	5.40	269	22.35	48.97	21.86	14.5	11.4	13.6	10.1
Magnesium	2830.00	34900	10734.39	6826.46	12221.77	5850	7300	6490	6720
Manganese	207.00	2380	593.64	335.21	669.38	1130	956	832	926
Mercury	0.01	0.5	0.05	0.07	0.07	0.09	0.06	0.06	0.05
Nickel	12.30	62.3	31.21	11.05	33.62	42.3	48.7	44.4	30.4
Potassium	628.00	3460	1630.86	599.51	1761.48	1910	2110	1760	1430
Selenium	0.05	2.1	0.40	0.44	0.53	0.085	0.105	0.1	0.305
Silver	0.04	0.87	0.35	0.26	0.40	0.8	0.65	0.6	0.65
Sodium	8.45	269	91.50	56.16	103.74	39.6	33.75	31.3	75.3
Thallium	0.08	0.8	0.24	0.17	0.28	0.235	0.29	0.285	0.17
Vanadium	11.50	36.9	22.43	6.83	23.92	32.2	25.4	26.4	15.7
Zinc	36.20	219	76.15	28.37	82.50	85.1	94.2	85	75
Cyanide	0.22	0.41	0.29	0.04	0.30	0.3	0.315	0.335	0.29

Notes:
1) All soil results are expressed in mg/kg.
2) All detects (no qualifier or J qualifier) were taken at full value.
   All non-detects (U or UJ qualifier) were taken at half value.
3) 15 background soil samples collected from Phase I and II RI/FS investigations at the
   Ash Landfill (9 samples) and the Open Burning Grounds (6 samples).
4) The "H" statistic was used to calculate the 95th UCL of lognormally distributed data.
5) "R" qualifier indicates datum rejected during data validation.

TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS
OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs EXPANDED SITE INSPECTION

METALS	ASH B9-91 0-2 SOIL	ASH B9-91 2-4 SOIL	ASH B9-91 6-8 SOIL	ASH BK-1 0-2 SOIL	ASH BK-2 0-2 SOIL	OB MW-34 0-2 SOIL	OB GB35-1 0-2 SOIL	OB GB35-2 2-4 SOIL	OB GB35-6 0-2 SOIL	OB GB36-1 0-2 SOIL	OB GB36-2 2-4 SOIL	SEAD-4 SB4-1.1 0-2 SOIL
Aluminum	14800	8880	7160	19400	14400	16100	18000	17600	16200	18100	16200	14800
Antimony	4.95	4.95	3.5	3.95	3.6	5.7	2.9	6.8	6.3	5.9	2.9	2.4
Arsenic	4.3	3.8	4.4	3	2.7	3.15	6.2	7.7	5.3	4.6	9.7	6.2
Barium	101	110	39.9	159	106	67.5	93.6	61.7	61.7	74.8	50.8	72
Beryllium	1.1	0.76	0.52	1.1	0.81	0.86	0.85	0.74	0.77	0.77	0.65	0.73
Cadmium	2.3	1.7	1.5	0.225	0.205	2.3	0.165	0.155	0.175	0.15	0.165	0.235
Calcium	45600	104000	101000	4590	22500	28600	1590	17700	1370	1660	22900	4280
Chromium	22.5	13.8	11.2	30	22.3	26.6	23.5	29.3	25.1	24.8	27.4	23.2
Cobalt	13.7	10.7	8.1	14.4	12.3	17	9.4	16.3	10.3	20.4	13.2	11.3
Copper	22.6	21.6	19.3	26.9	18.8	32.7	17.5	24.5	17.2	17.7	17.5	14.1
Iron	31000	19600	17300	38600	26600	35000	25200	34200	30800	26100	30700	27500
Lead	10.8	10.1	7.8	15.8	18.9	11.9	14.4	5.4	19.1	12.7	6.2	17.7
Magnesium	8860	17000	12600	5980	7910	6850	3850	7790	4490	4490	7150	4270
Manganese	903	532	514	2380	800	803	701	646	775	426	507	R
Mercury	0.08	0.04	0.05	0.13	0.11	R	0.06	0.015	0.07	0.02	0.02	0.05
Nickel	38.4	23.8	19	47.7	31	49.3	26.3	48.7	28.3	28.3	42.8	27.8
Potassium	1320	1080	1050	1720	1210	1290	1110	1110	975	1400	1100	1250
Selenium	0.105	0.325	0.105	0.73	0.94	0.09	0.115	0.115	0.105	0.1	0.09	0.4
Silver	0.75	0.75	0.55	0.235	0.215	0.87	0.17	0.16	0.18	0.155	0.17	0.465
Sodium	84.2	112	116	49.1	61.1	55.2	35.6	77.5	34.6	46.6	97.6	21.9
Thallium	0.295	0.18	0.3	0.21	0.19	0.255	0.275	0.27	0.25	0.23	0.215	0.115
Vanadium	19.7	19.5	12.9	28	22.4	22.3	27.1	22.3	26.1	27.8	19.7	28.6
Zinc	126	84.3	74.8	98.6	63.7	95.7	55	83.4	53.1	59.2	74.1	79.6
Cyanide	0.35	0.315	0.31	0.285	0.305	0.27	0.39	0.355	0.41	0.35	0.34	0.26

TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS
OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs EXPANDED SITE INSPECTION

METALS	SEAD-4 SB4-1.1 DUP SOIL	SEAD-4 SB4-1.3 4-6 SOIL	SEAD-4 SB4-1.6 8-10 SOIL	SEAD-11 SB11-3.1 0-2 SOIL	SEAD-11 SB11-3.2 4-6 SOIL	SEAD-11 SB11-3.6 10-12 SOIL	SEAD-13 SB13-1.1 0-2 SOIL	SEAD-13 SB13-1.3 6-8 SOIL	SEAD-13 SB13-1.4 8-10 SOIL	SEAD-13 SB13-4.1 0-2 SOIL	SEAD-13 SB13-4.2 2-4 SOIL
Aluminum	21000	15300	19200	17600	6330	10900	18300	8250	11700	21200	15500
Antimony	1.9	2.5	1.4	5.4	4	3.8	5.1	1.85	1.4	2	4.5
Arsenic	4.2	3.9	21.5	R	R	R	7	6.2	5.7	8.1	6.8
Barium	97.7	40.4	81.2	113	57.4	62.7	106	88.1	33.9	129	96.9
Beryllium	0.64	0.74	1	0.85	0.34	0.47	0.92	0.42	0.54	1.1	0.78
Cadmium	0.185	0.245	0.135	0.335	0.25	0	0.225	0.18	0.135	0.19	0.17
Calcium	2460	30900	14400	4950	91300	48600	3570	87700	50300	28800	68000
Chromium	27.9	27.6	32.7	24	11.1	18.6	29.4	13.3	19.6	30.2	25.8
Cobalt	5.9	16.5	29.1	11.3	6.5	10.1	12	7.2	11.1	10.6	12.4
Copper	15.1	62.8	21.6	20	12.2	21.7	11.6	18.4	17.6	21.6	21.1
Iron	19500	34300	37900	27200	13200	28300	32500	17400	24700	31600	30100
Lead	9.8	7.5	9.1	27.9	11.4	10.1	R	R	R	13.6	13.6
Magnesium	4460	7130	8040	4160	12900	10100	5890	20800	12600	8780	10600
Manganese	R	R	R	674	356	434	451	517	404	363	607
Mercury	0.04	0.04	0.04	0.05	0.02	0.02	0.03	0.07	0.01	0.05	0.01
Nickel	25.1	47.6	62.3	28.3	16.7	29.5	34.9	24	33.1	38.1	43.2
Potassium	2490	1300	2030	2110	1110	1230	2190	1390	1270	2130	1570
Selenium	0.23	0.045	0.07	0.24	0.065	0.105	0.26	0.56	0.51	0.53	0.2
Silver	0.37	0.495	0.64	0.7	0.5	0.485	0.45	0.305	0.27	0.385	0.345
Sodium	39.2	105	91.6	66.3	136	146	80.6	155	134	81.5	183
Thallium	0.12	0.08	0.12	0.095	0.75	0.115	0.43	0.43	0.64	0.11	0.1
Vanadium	31	22.2	29.3	31.8	13.3	17	32.7	13.3	16.3	35.8	23.1
Zinc	72.1	102	115	R	R	R	81.9	56.2	45.3	89.4	65.8
Cyanide	0.265	0.265	0.235	0.285	0.235	0.265	0.305	0.25	0.265	0.27	0.255

TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS
OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs EXPANDED SITE INSPECTION

METALS	SEAD-13 SB13-4.3 4-6 SOIL	SEAD-16 SS16-1 0-0.2 SOIL	SEAD-17 SB17-1.1 0-2 SOIL	SEAD-17 SB17-1.2 2-4 SOIL	SEAD-17 SB17-1.3 4-6 SOIL	SEAD-24 SB24-5.1 0-2 SOIL	SEAD-24 SB24-5.3 4-6 SOIL	SEAD-24 SB24-5.5 8-10 SOIL	SEAD-25 SB25-6.1 0-2 SOIL	SEAD-25 SB25-6.2 2-4 SOIL	SEAD-26 SB26-1.1 0-2 SOIL	SEAD-26 SB26-1.2 2-4 SOIL
Aluminum	20400	6550	13700	18100	8700	16200	10100	13700	10600	7070	5560	9040
Antimony	1.6	17.1	5.85	5.9	4.5	6.25	2.9	5.65	2.1	1.5	3.65	3.35
Arsenic	9.6	4.9	4.3	5.2	3.4	4.2	3.3	5	8.3	4.8	3.2	5.3
Barium	79.1	102	107	114	59.4	117	58.3	67.2	59.1	35	73.2	43.7
Beryllium	1	0.32	0.7	0.9	0.42	0.98	0.48	0.65	0.48	0.35	0.35	0.41
Cadmium	0.155	0.22	0.365	0.37	0.28	0.39	0.18	0.35	R	R	0.23	0.21
Calcium	10200	147000	2870	20900	72800	4540	74200	49000	82500	122000	293000	47300
Chromium	35.8	12.6	17.6	25.1	13.9	24.5	16.9	23.1	16.9	11.3	10.3	15.7
Cobalt	12.1	6.2	9.9	13.3	8.8	16	8.2	12	11.2	6.6	5.9	9.5
Copper	26.5	44	46.4	26.9	20	28.4	20.9	22.2	20.2	12	9.7	14.3
Iron	42500	12300	25100	29900	18800	33600	21300	26700	21400	15800	8770	19100
Lead	7.1	269	266	11.4	7.5	45.5	8.7	7.9	9.5	13.8	6.33	8.5
Magnesium	9660	34900	3330	8490	18100	5150	12100	11400	19600	22800	29100	9160
Manganese	398	355	547	487	391	1080	400	450	722	610	309	551
Mercury	0.02	0.2	0.05	0.06	0.015	R	R	R	0.03	0.02	0.01	0.01
Nickel	53	23	19.1	42	25.2	37.3	26.4	35.2	26.8	18	16.3	23.9
Potassium	1810	1290	628	1560	1090	1170	993	1660	1480	1060	1710	901
Selenium	0.28	0.075	0.125	0.12	0.07	0.075	0.115	0.11	0.97	0.63	0.065	0.26
Silver	0.315	0.45	0.75	0.75	0.55	0.8	0.365	0.7	0.41	0.295	0.46	0.425
Sodium	87.8	213	46.2	74.6	137	50.9	153	139	269	186	192	108
Thallium	0.09	0.8	0.14	0.13	0.075	0.08	0.125	0.12	0.12	0.105	0.365	0.085
Vanadium	30.7	36.9	23.1	27	13.9	29.9	14.4	19.5	18.5	12	12.7	14.4
Zinc	93	219	93.4	80.2	57.1	85.7	62.8	63.2	71.6	40.6	56	90.6
Cyanide	0.27	0.32	NA	NA	NA	0.3	0.255	0.285	0.29	0.32	0.24	0.285

TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS
OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs EXPANDED SITE INSPECTION

METALS	SEAD-12 MW12A-1-00 0-0.2 SOIL	SEAD-12 MW12A-1-03 4-6 SOIL	SEAD-12 MW12A-1-05 8-9.5 SOIL	SEAD-12 MW12B-1-00 0-0.2 SOIL	SEAD-12 MW12B-1-03 4-6 SOIL	SEAD-12 MW12B-1-07 12-13.5 SOIL	SEAD-64 MW64A-1.00 0-0.2 SOIL	SEAD-64 MW64A-1.02 2-4 SOIL	SEAD-64 MW64A-1.03 4-6 SOIL	SEAD-64 MW64B-1-00 0-0.2 SOIL
Aluminum	18700	11000	12400	10800	8060	5940	16100	19800	12600	13400
Antimony	0.11	0.12	0.1	0.115	0.1	0.13	0.23	0.1	0.1	0.3
Arsenic	5.2	3.5	3.6	6.6	4.6	2.9	7.1	8.2	5	5.5
Barium	125	82.8	78.3	102	89.1	43.8	83.7	91.2	62.3	75.5
Beryllium	0.8	0.46	0.58	0.53	0.4	0.27	0.68	0.74	0.53	0.56
Cadmium	0.86	0.52	0.85	0.63	0.52	0.32	0.11	0.01	0.12	0.63
Calcium	3370	71200	70300	45900	79400	51100	7210	4300	72400	5530
Chromium	23.1	15.3	19.7	16	12.7	12	23	25	19	17.5
Cobalt	10.9	10.1	10.8	9.2	8.6	5.2	11.8	11.3	9.1	7.2
Copper	19.1	20.6	29.6	30.4	22.5	17.3	25.5	21	23.7	18.9
Iron	23500	17400	22600	23400	17200	13500	28500	28000	22600	20900
Lead	21.6	7.6	10.8	17.1	10.3	7.3	21.6	13.6	15.4	21.4
Magnesium	3880	19200	12000	11400	16300	8320	5480	5010	14800	3720
Manganese	939	414	409	418	388	244	558	604	402	207
Mercury	0.06	0.02	0.03	0.04	0.5	0.03	0.05	0.03	0.02	0.05
Nickel	25.7	23.7	35.5	28	23.6	19	32.2	28.6	26.7	19.8
Potassium	2660	3460	2910	1870	1660	1040	2590	2260	2700	1700
Selenium	1.2	0.25	0.205	1.3	0.72	2.1	0.96	1.7	0.17	0.99
Silver	0.045	0.045	0.04	0.045	0.04	0.05	0.06	0.07	0.07	0.08
Sodium	8.45	79.9	136	76.2	135	77.3	13.75	15.9	92.1	17.95
Thallium	0.16	0.175	0.145	0.41	0.64	0.39	0.42	0.16	0.16	0.41
Vanadium	33.1	21.7	20.2	20.9	13.8	11.5	27.6	32.2	22.8	23.3
Zinc	77.8	41.4	82.1	62.7	50.5	36.2	104	87.1	64.9	72.2
Cyanide	0.3	0.265	0.215	0.25	0.235	0.235	0.33	0.28	0.275	0.3

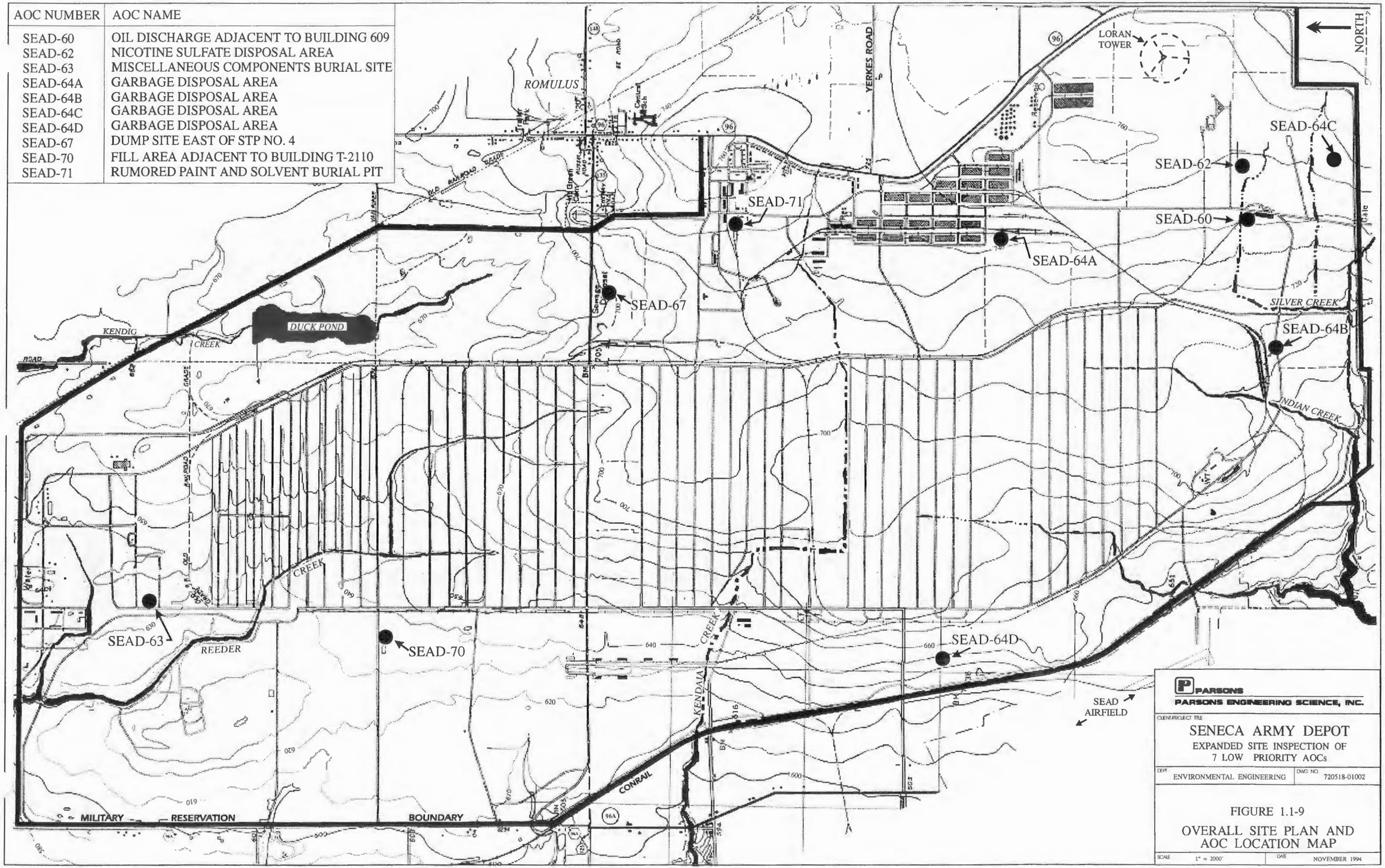
TABLE 1.1-3

AVERAGE AND INDIVIDUAL BACKGROUND CONCENTRATIONS
OF METALS IN SOILS AT SEDA

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs EXPANDED SITE INSPECTION

METALS	SEAD-64 MW64B-1-03 4-6 SOIL	SEAD-64 MW64B-1-04 6-8 SOIL	SEAD-67 MW67-2.00 0-0.2 SOIL	SEAD-67 MW67-2.02 2-4 SOIL	SEAD-67 MW67-2.03 4-5 SOIL	SEAD-70 MW70-1.00 0-0.2 SOIL	SEAD-70 MW70-1.02 2-4 SOIL	SEAD-70 MW70-1.03 4-6 SOIL
Aluminum	8870	7620	16700	14900	9460	12200	9480	11000
Antimony	0.075	0.075	0.27	0.22	0.1	0.115	0.105	0.095
Arsenic	4.3	5.5	4.4	4.5	4.2	5.4	4.1	5.7
Barium	70.8	76.7	114	105	80.8	67.5	56.6	79.9
Beryllium	0.43	0.37	0.67	0.61	0.4	0.44	0.41	0.54
Cadmium	0.64	0.54	0.2	0.11	0.12	0.57	0.43	0.8
Calcium	70000	75900	3580	79000	77800	3600	51600	48600
Chromium	14.1	13.5	19.5	22.5	14.8	13.7	14.7	17.8
Cobalt	10	7.4	7.5	10.4	9.7	5.5	7.1	21
Copper	20.2	17.6	16.5	20.3	20.5	12.4	19.7	33.5
Iron	18400	17100	20500	24400	18700	17700	16000	26400
Lead	8.8	8.3	17.5	9.3	8.5	20.7	9.1	13.6
Magnesium	18900	21500	3590	15600	20900	2830	13600	7980
Manganese	434	389	438	528	411	233	470	1040
Mercury	0.02	0.005	0.04	0.01	0.02	0.1	0.03	0.02
Nickel	28.2	22.6	18.7	32.3	25.9	12.3	17.6	52.4
Potassium	1630	1650	1780	3160	1970	982	1590	1350
Selenium	0.13	0.57	0.81	0.18	0.17	1	0.64	0.16
Silver	0.065	0.065	0.065	0.075	0.07	0.08	0.07	0.07
Sodium	96.8	79.6	12.55	112	107	18.2	126	165
Thallium	0.12	0.12	0.48	0.17	0.16	0.185	0.165	0.155
Vanadium	14.8	14.2	28.2	24.8	16.5	23.3	17.2	17.6
Zinc	59	45.6	64.8	62	60.1	55.4	42.4	116
Cyanide	0.25	0.24	0.32	0.25	0.27	0.32	0.295	0.24

AOC NUMBER	AOC NAME
SEAD-60	OIL DISCHARGE ADJACENT TO BUILDING 609
SEAD-62	NICOTINE SULFATE DISPOSAL AREA
SEAD-63	MISCELLANEOUS COMPONENTS BURIAL SITE
SEAD-64A	GARBAGE DISPOSAL AREA
SEAD-64B	GARBAGE DISPOSAL AREA
SEAD-64C	GARBAGE DISPOSAL AREA
SEAD-64D	GARBAGE DISPOSAL AREA
SEAD-67	DUMP SITE EAST OF STP NO. 4
SEAD-70	FILL AREA ADJACENT TO BUILDING T-2110
SEAD-71	RUMORED PAINT AND SOLVENT BURIAL PIT



PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOCs

DEPT: ENVIRONMENTAL ENGINEERING | DWG NO: 720518-01002

FIGURE 1.1-9

OVERALL SITE PLAN AND
AOC LOCATION MAP

SCALE: 1" = 2000' | DATE: NOVEMBER 1994

Characterization of the local hydrogeology is based upon hydrogeological information obtained from previous site investigations. USATHAMA (1989) conducted single-well aquifer tests (slug tests) in the Ash Landfill area to estimate the hydraulic conductivity of the water-bearing materials underlying the site. The slug tests were performed on five shallow groundwater monitor wells (PT-11, PT-12, PT-15, PT-21 and PT-23) screened in the overburden and upper (weathered) portion of the bedrock. Slug test data were analyzed according to the method developed by Bouwer and Rice (1976). The hydraulic conductivity values generated from the slug test analysis were used in conjunction with an estimate of soil porosity and the calculated groundwater flow gradient to develop an estimate for the average groundwater flow rate at the Ash Landfill site. Excluding PT-21, which had an unusually low hydraulic conductivity value of 5.87×10^{-11} centimeters per second (cm/sec) (1.66×10^{-7} ft/day), the average hydraulic conductivity, as determined by the slug test analysis, was 2.06×10^{-4} cm/sec (0.587 ft/day). Typical tight clay soils have hydraulic conductivity values that range from 3.53×10^{-5} to 3.53×10^{-8} cm/sec (Davis, 1969).

The effective porosity of the aquifer at the Ash Landfill site was estimated by ICF, Inc. (ICF) to be 11 percent. The average linear velocity of groundwater flow, calculated by ICF using Darcy's law, between PT-17 and PT-18 is 2.2×10^{-7} ft/sec, 1.9×10^{-2} ft/day or, 6.9 feet per year (ft/yr) based on a hydraulic conductivity of 3.3×10^{-5} cm/sec (9.33×10^{-2} ft/day).

Data from the Ash Landfill site quarterly groundwater monitoring program and previous field investigations indicate that the saturated thickness of the till/weathered shale overburden aquifer is variable, generally ranging between 1 and 8.5 feet. However, the aquifer thickness appears to be influenced by the hydrologic cycle and some monitoring wells dry up completely during portions of the year. Based upon a review of two years of data, the variations of the water table elevations are likely a seasonal phenomenon. The overburden aquifer is thickest during the spring recharge months and thinnest during the summer and early fall. During late fall and early winter, the saturated thickness increases. This cycle of variations in the aquifer thickness appears to be consistent with what would be expected based upon an understanding of the hydrologic cycle. Although precipitation is fairly consistent at SEDA, averaging approximately 3 inches per month, evapotranspiration is a likely reason for the large fluctuations observed in the saturated thickness of the over-burden aquifer.

On-site hydraulic conductivity determinations were performed by M&E (1989) on monitoring wells MW-8 through MW-17 at the Open Burning Grounds. These wells are all screened within the glacial till unit. The data were analyzed according to a procedure described by Hvorslev (1951). The average hydraulic conductivity measured for the ten monitoring wells

was $5.0x10^{-1}$ ft/day ($1.8x10^{-4}$ cm/sec). The hydraulic conductivities ranged from 2.02×10^{-2} ft/day ($7.06x10^{-6}$ cm/sec) to 1.47 ft/day ($5.19x10^{-4}$ cm/sec). These hydraulic conductivity measurements were within an order of magnitude agreement with previous results reported by O'Brien and Gere (1984). O'Brien and Gere determined the average hydraulic conductivity of the till material to be approximately $2.8x10^{-1}$ ft/day ($9.9x10^{-5}$cm/sec). A comparison of the measured values with the typical range of hydraulic conductivities for glacial tills indicates that the glacial till at the site is at the more permeable end of typical glacial till values.

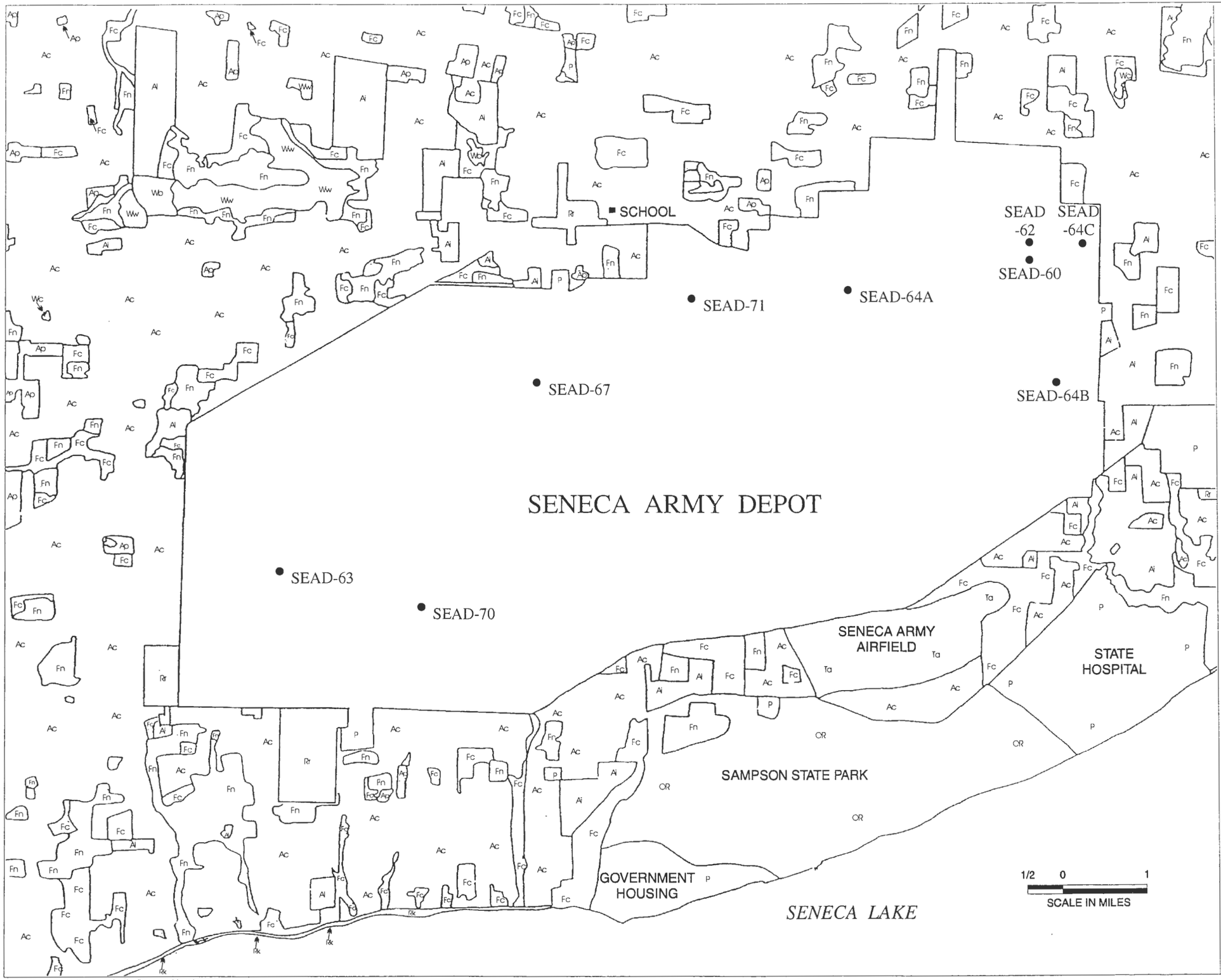
Soils samples were collected during the 1984 USAEHA Phase IV investigation of the Open Burning Grounds to characterize the permeability of the burning pad soils. Soil permeabilities were measured by recompacting the soil in a mold to 95 percent standard proctor density. The average permeability for 5 measurements was $1.01x10^{-3}$ ft/day ($3.56x10^{-7}$ cm/sec). The typical range for glacial tills, described by Freeze and Cherry (1979), is between $3x10^{-1}$ ft/day ($1x10^{-4}$ cm/sec) and $3x10^{-7}$ ft/day ($1x10^{-10}$ cm/sec).

1.1.1.5 Land Use

The SEDA is situated between Seneca Lake and Cayuga Lake and encompasses portions of Romulus and Varick Townships. Land use in this region of New York is largely agricultural, with some forestry and public land (school, recreational and state parks). Figure 1.1-10 summarizes the regional and local land use. The most recent land use report is that issued by Cornell University (Cornell 1967). This report classifies in further detail land uses and environments of this region. Agricultural land use is categorized as inactive and active use.

Inactive agricultural land consists of land committed to eventual forest regeneration, landwaiting to be developed, or land presently under construction. Active agricultural land surrounding SEDA consists largely of cropland and cropland pasture.

SEDA is a government-owned installation under the jurisdiction of the U.S. Army Material Command (AMC). SEDA lies immediately west of the village of Romulus, NY, 12 miles south of the villages of Waterloo and Seneca Falls, and 2.5 miles north of the village of Ovid, NY (Figure 1.1-9). The nearest major cities are Rochester, NY and Syracuse, NY located 60 miles northwest and northeast, respectively. The total area of SEDA is 10,587 acres, of which 8,382 are designated storage areas for ammunition, storage and warehouse, and open



N

LEGEND

Active
- Ac Cropland/cropland pasture
- Ap Permanent pasture

Inactive
- Ai Agriculture inactive

Forestland
- Fc Brush cover up to fully stocked poles less than 30 feet
- Fn Forest over 30 feet

Water
- Wh Natural, any size
- Wc Artificial, one acre

Wetlands
- Wb Bogs, shrub wetlands
- Ww Wooded wetlands

Public
- P All Categories

Residential
- Rr Rural hamlet

Shoreline
- Rk Shoreline developed

Outdoor Recreation
- OR All categories

Transportation
- Ta Airport

Source: New York Land Use and Natural Resource Inventory

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOCs

DEPT: ENVIRONMENTAL ENGINEERING | DWG NO.: 726518-01002

FIGURE 1.1-10

REGIONAL/LOCAL LAND USE MAP

SCALE: 1" = 2000' | DATE: NOVEMBER 1994

r:\graphics\seneca\basemap\zoning\landuse.cdr(cvm)

storage and warehouse. On-post family housing is in two parcels, a 54-acre development adjacent to Route 96 and another 69 acres situated along Seneca Lake. Additionally, troop housing is available for 270 enlisted men (Buildings 703, 704, and 708). Bachelor officer quarters are located in Building 702, which is designated for 18 men. Other land uses include Administration, Community Services and an airfield. SEDA has a swimming pool at the north end of the facility, along with tennis courts, a gymnasium, and a sports field complex. Picnic and playground areas are found on the installation at Hancock Park, the Lake Area and the Family Housing Area. There is also a skeet and trap shooting range at the air field.

EPA guidance for determining future land uses recommends that, if available, master plans, which include future land uses, Bureau of Census projections and established land use trends in the general area should be utilized to establish future land use trends. The Romulus and Varick Town Clerks were contacted to determine if any master plans exist for this area or if any land use restrictions could apply to the future use of the depot. No zoning maps or master plans were found to exist for the depot or the surrounding areas in the towns of Romulus and Varick. Consequently, the use of this area for light industrial or residential uses is not restricted by local zoning laws and either use could be permitted. The existing land use is generally agricultural with sparse housing. Large tracts of undeveloped land are widely available for future development. The area is not experiencing a high degree of growth nor is it expected to. There is no pressure to develop land in this area, nor will there likely be the need to develop the depot for residential purposes. Section 6.2.2 of the EPA Risk Assessment Guidance for Superfund (RAGS) discusses future land uses and states: "If the site is industrial and is located in a very rural area with a low population density and projected low growth, future residential use would probably be unlikely. In this case, a more likely alternate future land use may be recreational. At some sites, it may be most reasonable to assume that the land use will not change in the future."

The intended future use of the seven sites under consideration is being determined by BRAC committee and will be described in a Community Reuse Plan which is currently under development. If the transfer of property occurs, CERCLA, Sections 120 (h)(1),(2), and (3) require that the prospective owner must be notified that hazardous substances were possibly stored on the parcel. This notification will include the quantity and type of the substances that were stored. The content of the deed must also include a covenant warranting that all remedial actions necessary to protect human health and the environment with respect to any such hazardous substances remaining on the property have been taken before the date of the transfer. If a property transfer is contemplated by the Army, this information, under penalty

of the law, must be supplied to the prospective owner. Should the actual future use of the parcel be residential, then the Army will perform any remedial activities required to ensure that human health and the environment, under the future use scenario, are protected.

Forest land adjacent to SEDA is primarily under regeneration with sporadic occurrence of mature forestry. Public and semi-public land use surrounding and within the vicinity of SEDA is Sampson State Park, Willard Psychiatric Center, and Central School (at the Town of Romulus). Sampson State Park entails approximately 1,853 acres of land and includes a boat ramp on Seneca Lake. Historically, Varick and Romulus Townships within Seneca County developed as an agricultural center supporting a rural population. However, increased population occurred in 1941 due to the opening of SEDA. Population has progressed since then largely due to the increased emphasis on promoting tourism and recreation in this area.

Figure 1.1-9 provides the location of the seven low priority AOCs investigated for this report. The oil discharge adjacent to Building 609 (SEAD-60), the nicotine sulfate disposal area (SEAD-62), and two of the garbage disposal areas (SEAD-64B and SEAD-64C) are situated in the southwestern corner of SEDA near Indian Creek. Land use adjacent to, yet off-site of, the southwestern corner of SEDA is sparse residential areas with some farmland. The dump site east of Sewage Treatment Plant No.4 (SEAD-67) and the rumored paint and solvent pit (SEAD-71) are located on the eastern side of SEDA within 2,000 feet of each other and within 1,500 feet of the administration buildings, a playground, and on-post housing. The fill area adjacent to Building T-2110 (SEAD-70) is situated on the western boundary of SEDA near Kendaia Creek. Land use adjacent to, yet off-site of, SEDA within 4,000 feet include farmland and some residential areas. One garbage disposal area (SEAD- 64A) is located on the eastern boundary of SEDA near storage buildings. Land use adjacent to, yet off-site, includes farmland and sparse residential areas. One garbage disposal area (SEAD-64D) is located on the western boundary of SEDA near the air field. Land use adjacent to, yet offsite of, SEDA within 2,000 feet include farmland and some residential areas. SEAD-63, the miscellaneous components burial site, is situated in the northwest corner of SEDA. The SEDA property boundary is approximately 3,000 feet from the miscellaneous components burial site. Land use adjacent to, yet off-site of, the northwestern corner of SEDA is sparse residential areas with some farmland. Records provided by the Town of Varick show approximately 15 residences adjacent to the northwestern border of SEDA which are within 4,000 feet of the SEAD-63. These residences all obtain drinking water from private water wells.

1.1.1.6 Climate

Table 1.1-4 summarizes climatological data for the SEDA area. The nearest source of climatological data is the Aurora Research Farm in Aurora, New York which is approximately ten miles east of SEDA on the east side of Cayuga Lake. This research farm is administered by the Northeast Regional Climate Center located at Cornell University in Ithaca, New York. Only precipitation and temperature measurements are available from this location. The other data reported in Table 1.1-4 were taken either from isopleth drawings from a climatic atlas, or from data collected at Syracuse, New York, which is 40 miles northeast of SEDA. Meteorological data collected from 1965 to 1974 at Hancock International Airport in Syracuse, New York, were used to prepare the wind rose presented in Figure 1.1-11.

A cool climate exists at SEDA with temperatures ranging from an average of 23°F in January to 69°F in July. Marked temperature differences are found between daytime highs and night time lows during the summer and portions of spring and autumn. Precipitation is unusually well-distributed, averaging approximately 3 inches per month. This precipitation is derived principally from cyclonic storms which pass from the interior of the country through the St. Lawrence Valley. Lakes Seneca, Cayuga, and Ontario provide a significant amount of the winter precipitation and moderate the local climate. The average annual snowfall is approximately 100 inches. Wind velocities are moderate, but during the winter months, there are numerous days with sufficient winds to cause blowing and drifting snow. The most frequently occurring wind directions are westerly and west-southwesterly.

Daily precipitation data, measured at the Aurora Research Farm in Aurora, New York, have been summarized and tabulated for the period of 1957 to 1991. The average monthly precipitation during this 35-year period of record is summarized in Figure 1.1-12. The maximum 24-hour precipitation measured at this station during this period was 3.9 inches on September 26, 1975. Values of 35 inches mean annual pan evaporation and 28 inches for annual lake evaporation were already reported in Table 1.1-4. An independent value of 27 inches for mean annual evaporation from open water surfaces was estimated from an isoplethed figure in "Water Atlas of the United States" (Water Information Center, 1973).

Precipitation and relative humidity tend to be rather high throughout the year. The months with the most amount of sunshine are June through September. Mixing heights tend to be lowest in the summer and during the morning hours. Wind speeds also tend to be lower during the morning, which suggests that dispersion will often be reduced at those times, particularly during the summer. However, no episode-days are expected to occur with low mixing heights (less than 500 meters (m)) and light wind speeds (less than or equal to 2

TABLE 1.1-4

CLIMATOLOGICAL DATA FOR SENECA ARMY DEPOT

SENECA ARMY DEPOT

MONTH	TEMPERATURE[1] (°F)			PRECIP[1] (in)	RH[3] (%)	SUN-	MEAN NUMBER OF DAYS[4]		
	MAX	MIN	MEAN	MEAN	MEAN	SHINE[3] (%)	CLEAR	PTLY. CLDY.	CLOUDY
JAN	30.9	14.0	22.5	1.88	70	35	3	7	21
FEB	32.4	14.1	23.3	2.16	70	50	3	6	19
MAR	40.6	23.4	32.0	2.45	70	50	4	7	20
APR	54.9	34.7	44.8	2.86	70	50	6	7	17
MAY	66.1	42.9	54.5	3.17	70	50	6	10	15
JUN	76.1	53.1	64.6	3.70	70	60	8	10	12
JUL	80.7	57.2	69.0	3.46	70	60	8	13	10
AUG	78.8	55.2	67.0	3.18	70	60	8	11	12
SEP	72.1	49.1	60.7	2.95	70	60	7	11	12
OCT	61.2	39.5	50.3	2.80	70	50	7	8	16
NOV	47.1	31.4	39.3	3.15	70	30	2	6	22
DEC	35.1	20.4	27.8	2.57	70	30	2	5	24
ANNUAL	56.3	36.3	46.3	34.33	70	50	64	101	200

PERIOD	MIXING HEIGHT[2] (m)	WIND SPEED[2] (m/s)
Morning (Annual)	650	6
Morning (Winter)	900	8
Morning (Spring)	700	6
Morning (Summer)	500	5
Morning (Autumn)	600	5
Afternoon (Annual)	1400	7
Afternoon (Winter)	900	8
Afternoon (Spring)	1600	8
Afternoon (Summer)	1800	7
Afternoon (Autumn)	1300	7

Mean Annual Pan Evaporation[3] (in) : 35
Mean Annual Lake Evaporation[3] (in) : 28
Number of episodes lasting more than 2 days (No. of episode-days)[2] :
Mixing Height < 500 m, wind speed < 2 m/s : 0 (0)
Mixing Height < 1000 m, wind speed < 2 m/s : 0 (0)
Number of episodes lasting more than 5 days (No. of episode-days)[2] :
Mixing Height < 500 m, wind speed < 4 m/s : 0 (0)

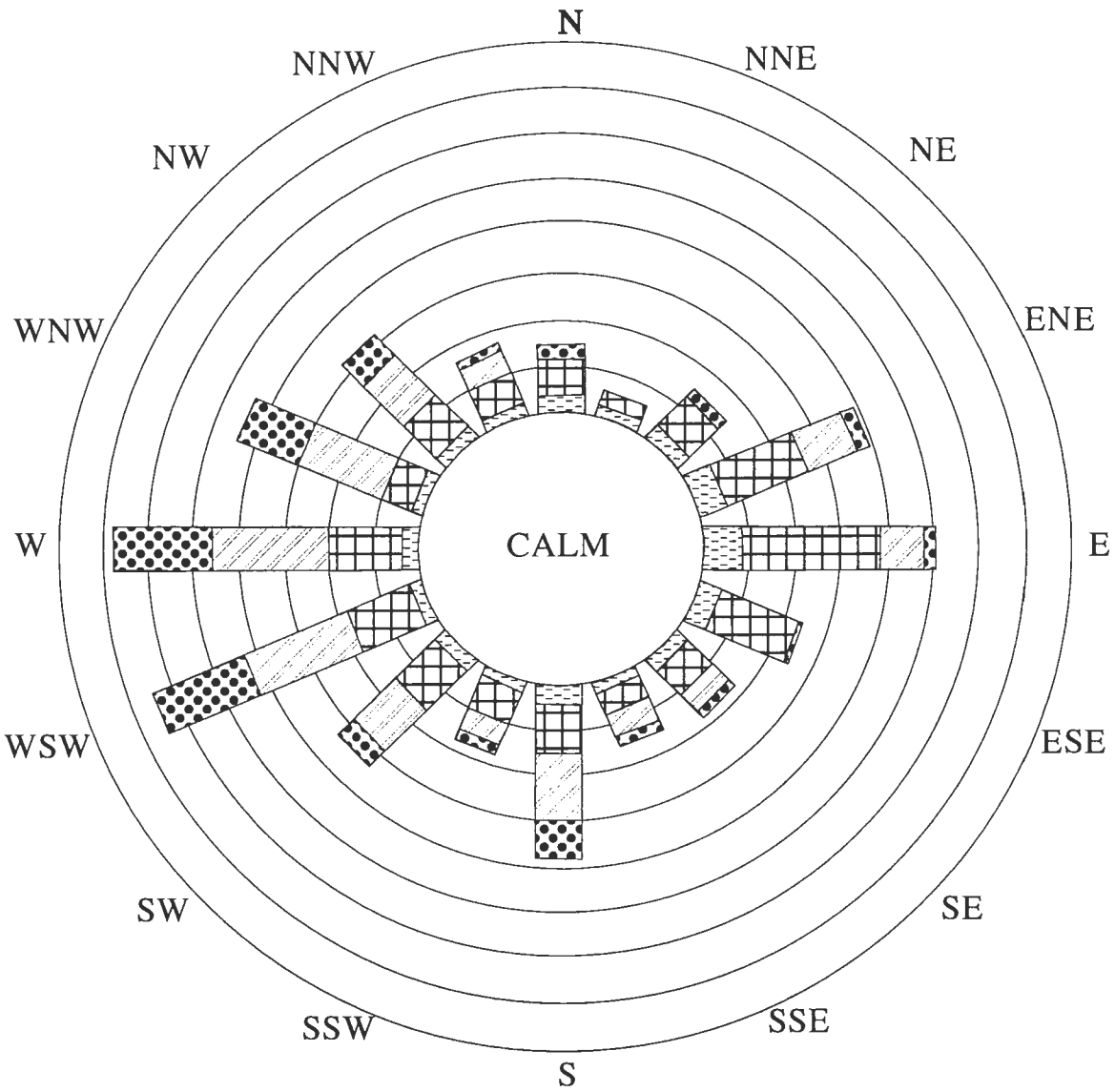
Notes:

[1] Climate of New York Climatography of the United States No. 60. National Oceanic and Atmospheric Administration, June 1982. Data for Ithaca Cornell University, NY.

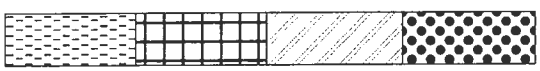
[2] Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution throughout the Contiguous United States. George C. Holzworth, Jan. 1972.

[3] Climate Atlas of the United States. U.S. Department of Commerce, 1983.

[4] Climate of New York Climatography of the United States No. 60. National Oceanic and Atmospheric Administration, June 1982. Data for Syracuse, NY.



LEGEND



0-3 4-7 8-12 >12 KNOTS

NOTE: EACH DIVISION IS 2% OF TOTAL TIME

INSTALLATION: SENECA army DEPOT
LOCATION OF DATA: SYRACUSE, NEW YORK
SOURCE: MODIFIED FROM:
US ARMY ENVIRONMENTAL
HYGIENE AGENCY

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOCs

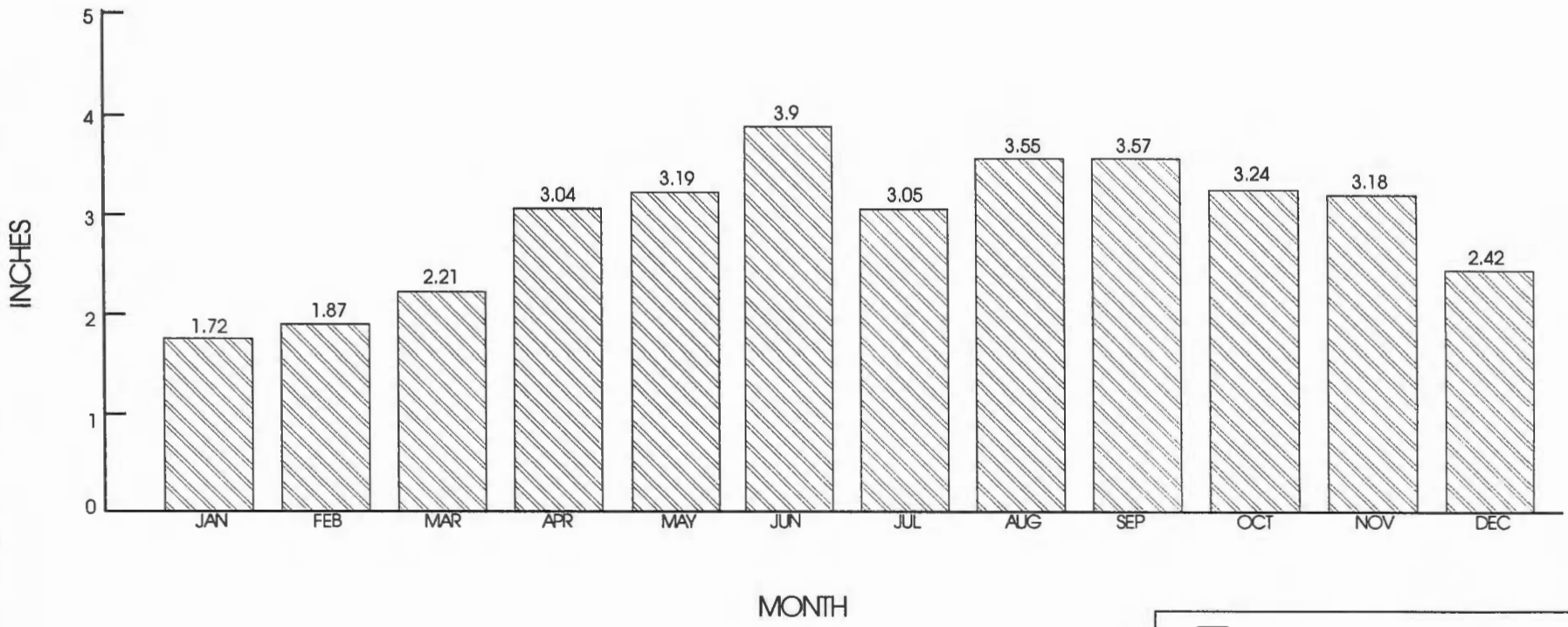
DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 726518-01002

FIGURE 1.1-11

WIND ROSE,
SYRACUSE, NEW YORK

SCALE 1" = 2000' | DATE NOVEMBER 1994

R:\GRAPHICS\SENECA\WINDROSE.CDR(CVM)



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOCs

DEPT.	DWG NO.
ENVIRONMENTAL ENGINEERING	726518-01002

FIGURE 1.1-12

AVERAGE MONTHLY PRECIPITATION IN PROXIMITY OF SENECA ARMY DEPOT
(1958-1991)

SCALE	DATE
	NOVEMBER 1994

R:\GRAPHICS\SENECA\HISTO.CDR(CVM)

meters per second (m/s)). Information on the frequency of inversion episodes for a number of National Weather Service stations is summarized in "Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States" (George C. Holzworth, US EPA, 1972). The closest stations at which inversion information is available are Albany, New York and Buffalo, New York. The Buffalo station is nearer to SEDA but almost certainly exhibits influences from Lake Erie. These influences would not be expected to be as noticeable at SEDA.

SEDA is located in the Genesee-Finger Lakes Air Quality Control Region (AQCR). The AQCR is designated as "non-attainment" for ozone and "attainment" or "unclassified" for all other criteria pollutants. Data for existing air quality in the immediate area surrounding the SEDA, however, can not be obtained since the nearest state air quality stations are 40 to 50 miles away from the depot (Rochester of Monroe County or Syracuse of Onondaga County). A review of the data for Rochester, which is in the same AQCR as SEDA, indicates that all monitored pollutants (sulfur dioxide, particulates, carbon monoxide, lead, ozone) are below state and federal limits, with the exception of ozone. In 1987, the maximum ozone concentration observed in Rochester was 0.127 parts per million (ppm). However, this value may not be representative of the SEDA area which is in a more rural area.

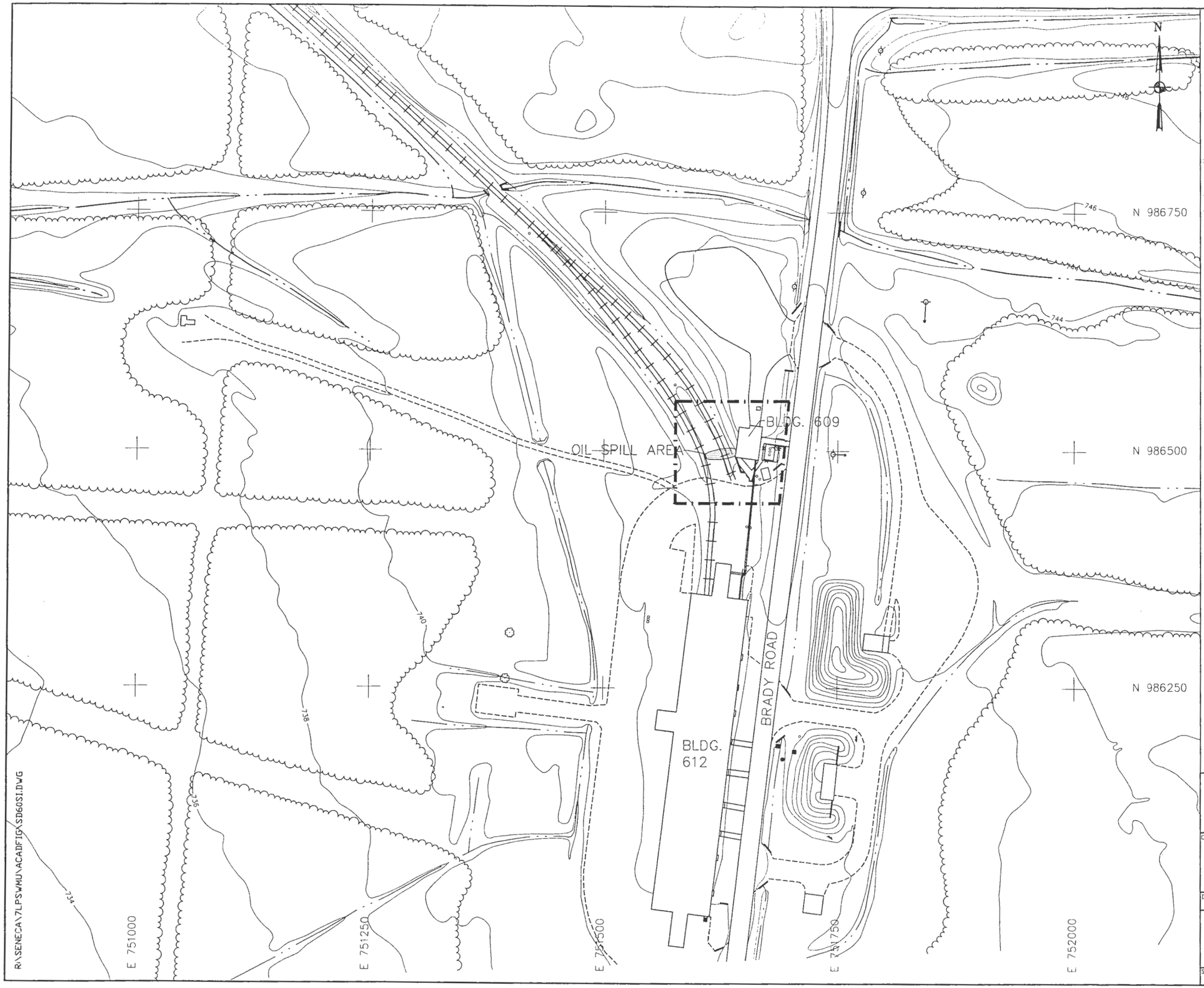
1.1.2 Physical Site Setting and History

SEDA was constructed in 1941 and is owned by the United States Government. The site was operated by the Department of the Army and the AEC until the early 1960's at which time the Department of the Army assumed control of all Depot activities. Prior to construction of the Depot, the site was used for farming. The following sections describe the physical site setting for the seven low priority AOCs.

1.1.2.1 SEAD-60 Oil Discharge Adjacent to Building 609

1.1.2.1.1 Physical Site Setting

SEAD-60 represents an area of oil-stained soil adjacent to Building 609, which is located in the southeastern portion of SEDA (Figure 1.1-9). The surrounding areas are characterized by developed and undeveloped land. The developed areas consist of Building 609, which is immediately west of Brady Road, and two SEDA railroad spurs leading to Building 612 (Figure 1.1-13). Building 612, which is not part of SEAD-60, is located approximately 200



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-13

SEAD-60 OIL DISCHARGE ADJACENT TO BUILDING 609
SITE PLAN

SCALE	DATE	REV
1" = 100'	MARCH 1998	A

feet south on Brady Road. Building 609 is a boiler house for Building 612. Elevated pipes (some of them for steam), running parallel to Brady Road, connect Buildings 609 and 612. A tall emissions stack protrudes from the southeastern corner of the building. The SEDA railroad track enters the site from the northwest, then it divides and provides access to both the eastern and western sides of Building 612; the eastern most railroad spur passes within a few feet of Building 609. A paved driveway is located immediately south of Building 609 and provides vehicular access to the western portion of the site from Brady Road. There are also paved access routes on the eastern and northern sides of the building. The site is located within the ammunition storage area and access to the site is restricted.

North and west of the site are grassy fields with some sparse brush. These same types of vegetation are present east of the site across Brady Road. South the site are developed areas around Building 612.

The topography in the immediate vicinity of the Building 609 is variable but the most notable feature is a low-lying area defined by the western wall of Building 609 and the easement railroad spur. The local topography within an approximately 50-foot radius slopes toward this area while the regional topography slopes to the west. In the northern portion of the site, the topography slopes toward a small unnamed intermittent stream that flows to the west. In the northern portion of the site, drainage swales along the flanks of the railroad track lead to the same unnamed intermittent stream.

1.1.2.1.2 Site History

Building 609 has historically been a boiler house for Building 612. Most of the historical information is related to a release of oil on the site. At some time in the past, oil is believed to have been discharged from a pipe in the wall of Building 609 and resulted in a spill adjacent to the building. The spill area, which is evidenced by visibly stained soils, extends past the easternmost railroad spur. No information is available on the date of the spill, the volume of materials released or the composition of the spilled materials. No vegetation is present in the spill area.

1.1.2.1.3 Existing Analytical Data

There are no existing analytical data for this site.

1.1.2.2 SEAD-62 Nicotine Sulfate Disposal Area

1.1.2.2.1 Physical Site Setting

The nicotine sulfate disposal area is located in the southeastern portion of SEDA (Figure 1.1.-9). It is characterized by mostly undeveloped land with the exception of bunkers and buildings along the western perimeter (Figure 1.1-14). The undeveloped areas are predominantly low grassland in the western portion and they become more vegetated with low brush and sparse trees in the eastern portion. The developed area in the western perimeter of the site includes Buildings 609 and 612 and two grass covered bunkers with paved access. The buildings and bunkers are separated by Brady Road. The site is bound on all sides by mostly undeveloped land. The northern boundary of the site is defined by an unnamed paved road that runs between Brady Road and Building 606 near the eastern boundary of the site. The fence separating the ammunition storage area from the unrestricted portion of the site generally forms the eastern boundary of the site. Access to most of the site is restricted by the ammunition storage area fence.

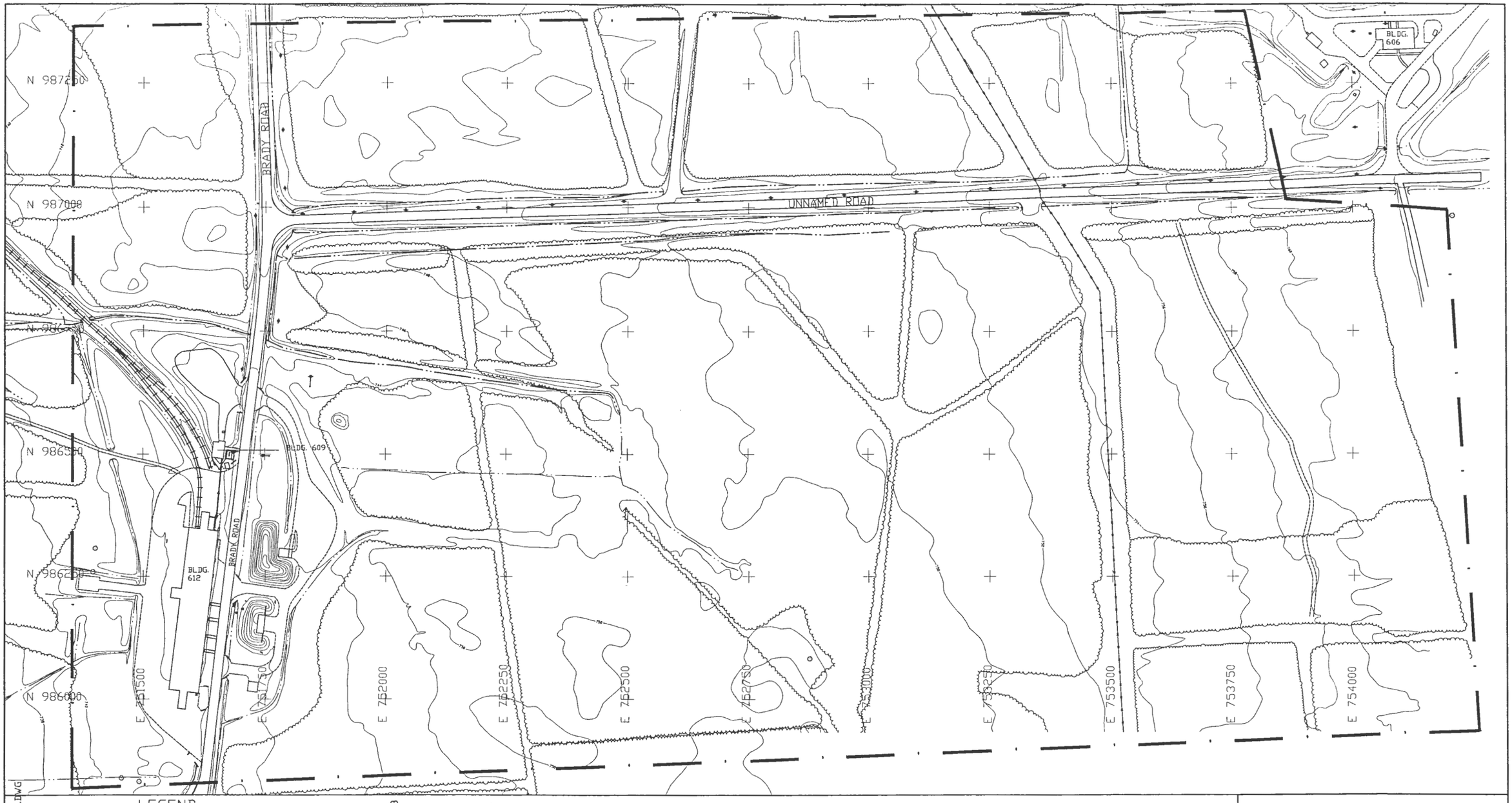
The regional topography on the site slopes gently to the west toward Brady Road. A well developed ditch drains several wet areas in the central and south-central portions of the site; the ditch drains west through a culvert under Brady Road.

1.1.2.2.2 Site History

SEDA personnel reported finding a signed work-order for the disposal of two drums containing nicotine sulfate. The work-order was found during a transfer of office supplies from Building 606 some 10 to 20 years ago. No indication of the size of the drums or as to the means of disposal was recalled to have been reported on the work-order. Based upon historical disposal practices used at SEDA, base personnel believed these drums could have been disposed in the areas between or surrounding Buildings 606 and 612. Building 606 is currently used as the pesticide/herbicide storage facility. Building 612 is a munitions disassembly facility. Both buildings have been used for these operations for many years.

1.1.2.2.3 Existing Analytical Data

There are no existing analytical data for the site.



LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- APPROXIMATE LANDFILL EXTENT
- RAILROAD
- 760 GROUND SURFACE ELEVATION CONTOUR
- ELECTRIC UTILITY LINE
- UNDERGROUND WATER UTILITY LINE

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

N

100 0 100 200

(feet)

ACAD\SENECA\7LPSW\MU\ACADFIG\SD62S1.DWG

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE:

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEEERING

Dwg. No. 720518-01002

FIGURE 1.1-14

SEAD-62 NICOTINE SULFATE DISPOSAL AREA
SITE PLAN

SCALE 1" = 200'

DATE APRIL 1996

REV A

1.1.2.3 SEAD-63 Miscellaneous Components Burial Site

1.1.2.3.1 Physical Site Setting

The miscellaneous components burial site is located on the east side of North-South Baseline Road in the northwestern portion of SEDA (Figure 1.1-9).

The approximately 480 by 300 foot site is bound by paved roads on the north, south, and west and by open grassland to the east (Figure 1.1-15). The site is mostly undeveloped except for a grass-covered bunker in the southeast corner and an elevated former machine-gun turret made of soil in the northwest corner. A noticeable feature of the site is a crushed shale road that enters the site via Patrol Road and leads to a crushed shale pad measuring about 100 by 100 feet. In general, the western half of the site is less vegetated and appears to have been physically worn by vehicular traffic.

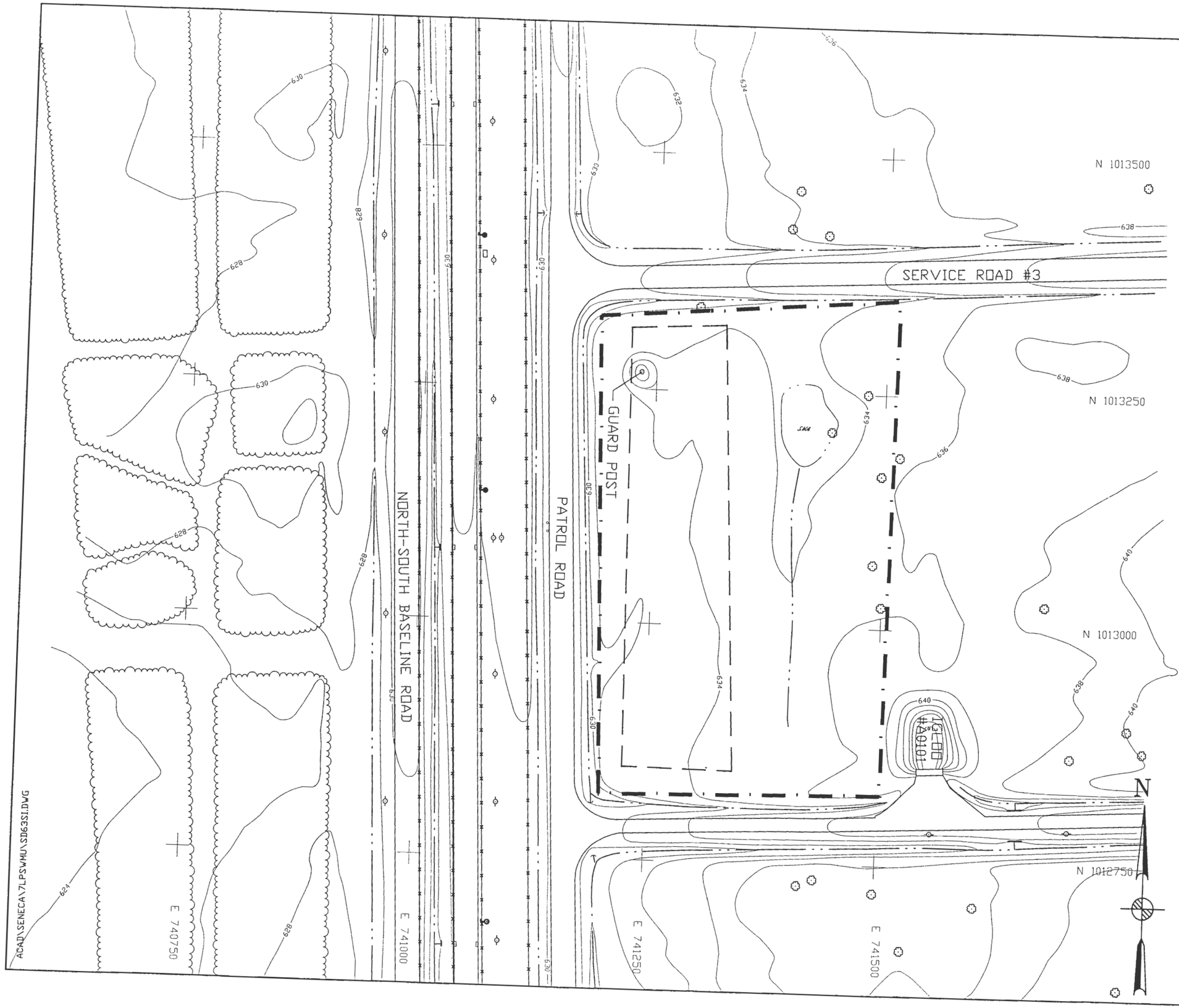
Topography on-site is generally flat with only a small westward slope. Drainage ditches are adjacent to Patrol Road and the east-west trending roads that bound the site to the north and south. A slight ground depression, sloping south to north, is located in the northeastern quadrant of the site. Reeder Creek is located approximately 1500 feet southwest of the site where it flows west into Seneca Lake.

1.1.2.3.2 Site History

The site was used during the 1950s and 1960s as a disposal area for classified parts. Multiple disposal pits were excavated along a north-south line approximately 200 feet long. The individual pits were between 10 and 30 feet long and were likely to have been excavated down to the surface of the weathered shale. The number of actual disposal pits is unknown. The types of materials disposed of at this site have been identified as metal parts by SEDA personnel. The documents related to the disposal of the metal parts at this site are classified and are not available for review, therefore, the exact nature of the buried material is unknown. The SWMU Classification Report states that "inert materials" were buried within the disposal pits.

1.1.2.3.3 Existing Analytical Data

There are no existing analytical data for the site.



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

APPROXIMATE EXTENT OF OPERATIONS PAD (FROM SEDA SITE MAPS)

50 0 50 100
(Feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-15

SEAD-63 MISCELLANEOUS COMPONENTS BURIAL SITE
SITE PLAN

SCALE	DATE	REV
1" = 100'	MARCH 1998	A

1.1.2.4 SEAD-64A, 64B, 64C, 64D Garbage Disposal Areas

There are four garbage disposal areas associated with this SWMU, three of which were active in the past (64A, 64B, and 64D), and one which is the site of a proposed landfill (64C). None of the four units are contiguous.

1.1.2.4.1 SEAD 64-A Garbage Disposal Area

1.1.2.4.1.1 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 1.1-9). 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 1.1-16).

Topography on-site is relatively flat and covered with low grassland vegetation, however, the regional slope of the land surface is to the west. A well developed drainage ditch is located near the southern boundary of the site. The site is not located within the ammunition storage area and, therefore, access is restricted only by clearance through Post #1, the main gate. The disposal area, which is characterized by undeveloped land, is approximately 350 feet by 200 feet. The area appears to have been disturbed, and some debris was visible on the ground surface during the SWMU classification site visit. A "no dumping" sign is located in the area of the site.

1.1.2.4.1.2 Site History

SEAD-64A was used 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 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.

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-16
SEAD 64A GARBAGE DISPOSAL AREA
SITE PLAN

SCALE	DATE	REV
1" = 100'	MARCH 1996	A

ACAD\SENECA\7LPSWMU\ACADFIG\SD64ASI.DWG

1.1.2.4.1.3 Existing Analytical Data

There are no existing analytical data for the site.

1.1.2.4.2 SEAD-64B Garbage Disposal Area

1.1.2.4.2.1 Physical Site Setting

The disposal area at SEAD-64B is located immediately north of Ovid Road near Building 2086 in the southern end of SEDA (Figure 1.1-9). The site is characterized by undeveloped land that is bounded by Ovid Road on the south, an unnamed paved road on the west, an intermittent stream and several sets of SEDA railroad tracks to the north, and undeveloped land with dense vegetation and deciduous trees to the east. Additionally, there are two large piles located along the site's northern boundary. Generally, the southern half of the site was more heavily vegetated than the northern half. The site is located within the ammunition storage area and access to it is restricted (Figure 1.1-17).

The local topography on-site is somewhat uneven, but generally slopes to the south-southwest. The intermittent stream flows west in response to the west-sloping regional topography.

1.1.2.4.2.2 Site History

SEAD-64B was used during the time period from 1974 to 1979 when the solid waste incinerator was not in operation. The types of waste disposed of at the site are suspected to be primarily household items, although according to the SWMU Classification Report metal drums and other industrial items were reported to have been disposed of at the site. Very little surface debris, consisting mainly of household items, was observed in the northwestern portion of the site.

1.1.2.4.2.3 Existing Analytical Data

No existing analytical data are available for the site.

E 748000
E 748250
E 748500
E 748750
E 749000
N 986250
N 986000
N 985750
N 985500
UNNAMED ROAD
OVID ROAD
N

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

50 0 50 100
(feet)

ACAD\SENECA\7LPS\MU\ACADFIG\SD64B01.DWG

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-17
SEAD 64B GARBAGE DISPOSAL AREAS
SITE PLAN

SCALE	DATE	REV
1" = 100'	APRIL 1998	A

1.1.2.4.3 SEAD-64C Garbage Disposal Area

1.1.2.4.3.1 Physical Site Setting

The proposed disposal area at SEAD-64C is comprised of undeveloped land and is located near the intersection of East Patrol Road and South Patrol Road in the southeastern corner of SEDA (Figure 1.1-9). The area is vegetated with grass and low brush which is more dense in the southern and western portions of the site.

Two small concrete pads are located in the southeastern portion of the site and can be accessed via a 75-foot long crushed shale road. One pad (25 feet long by 15 feet wide) is slightly elevated above the ground and shows little evidence of deterioration. The second pad (15 feet square), which is slightly covered with gravel and cracked in several places, is located near the southern edge of the first and is oriented approximately 25 degrees counterclockwise to it. A north-south trending chain-link fence divides the site into eastern and western portions. A small west-flowing intermittent stream bounds the site on the north. The eastern and southern boundaries of the site are defined by paved roadways. Topography on-site is generally flat but slopes gently to the southwest (Figure 1.1-18).

1.1.2.4.3.2 Site History

SEAD-64C is the location of a proposed SEDA landfill. A June 6, 1980 USAEHA report titled "Army Pollution Abatement Program Study No. D-1031-W, Landfill Permit Assistance, Seneca Army Depot Romulus, NY", describes the investigation of a portion of SEAD-64C for the purpose of locating suitable land for a sanitary landfill. The report depicts the proposed site as a rectangular area approximately 950 feet by 450 feet that is oriented with an east-west trending long dimension.

The eastern edge of the rectangular area is approximately 800 feet west of the concrete pad (and corresponds to the location of the north-south trending ammunition storage area chain-link fence) and the southern edge is approximately 300 feet north of South Patrol Road. The proposed area is, in effect, entirely within the ammunition storage area. Five soil borings were performed during the USAEHA investigation within the proposed landfill area in order to characterize physical properties of the soils on-site. In addition, four monitoring wells were installed on the site, one in the eastern portion of the site near the concrete pad (MW64C-9, the upgradient well) and three more on the north (MW64C-6), south (MW64C-8) and west

E.752250 E.752500 E.752750 E.753000 E.753250 E.753500 E.753750 E.754000 E.754250 E.754500

UNNAMED ROAD

N 985250 N 985000 N 984750 N 984500 N 984250 N 984000

EAST PATROL ROAD

MW64C-6

MW64C-7

MW64C-8

MW64C-9

CONCRETE PAD

SOUTH PATROL ROAD

GATE

N

ACAD\SENECA\7LPSWMU\ACADFIG\SD64CSITE.DWG

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN
- MONITORING WELL

100 0 100 200
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-18

SEAD-64C GARBAGE DISPOSAL AREAS
SITE PLAN

SCALE	DATE	REV
1" = 200	APRIL 1996	A

(MW64C-7) sides of the proposed landfill area (the downgradient wells). The wells were to be used as piezometers to observe and measure fluctuation of the water table and to be used as groundwater sampling points. A high water table was noted in the area of the proposed landfill.

The report concluded that the site could be used for a sanitary landfill provided engineering plans and operations utilized an area method to allow for the high water table. No available information indicates that a formal landfill was established on-site. Information presented in the SWMU Classification Report, however, suggests that limited dumping may have occurred at the site.

1.1.2.4.3.3 Existing Analytical Data

There are limited analytical data from the monitoring wells on-site. The wells were sampled on January 15, 1981 for the following parameters: temperature, pH, chlorides, Chemical Oxygen Demand (COD), conductivity, and iron. The range of values measured for these parameters are as follows: temperature (6-8°C), pH (7.2-7.4 pH units), chlorides (0.2-3.5 mg/l), COD from chromate (0-2 mg/l), conductivity (577-937 μmhos at 25°C), and iron (0.2-0.4 mg/l). The results of the analyses are presented in (Table 1.1-5).

1.1.2.4.4 SEAD-64D Garbage Disposal Area

1.1.2.4.4.1 Physical Site Setting

SEAD-64D covers a large area located between West Patrol Road and the SEDA railroad tracks along North-South Baseline Road (Figure 1.1-9). The site stretches for approximately 2,700 feet along the straight portion of West Patrol Road and is approximately 1,200 feet wide extending east from West Patrol Road. Firebreaks are cut into the vegetation in the area and trend east-west and north-south. Portions of this area were used for garbage disposal from 1974 to 1979 when the SEDA solid waste incinerator was not operational (Figure 1.1-19).

The site is heavily vegetated with grass, low brush, and small deciduous trees. Areas in the southern portion of the site are heavily vegetated with large deciduous trees. Stressed vegetation was observed adjacent to West Patrol Road.

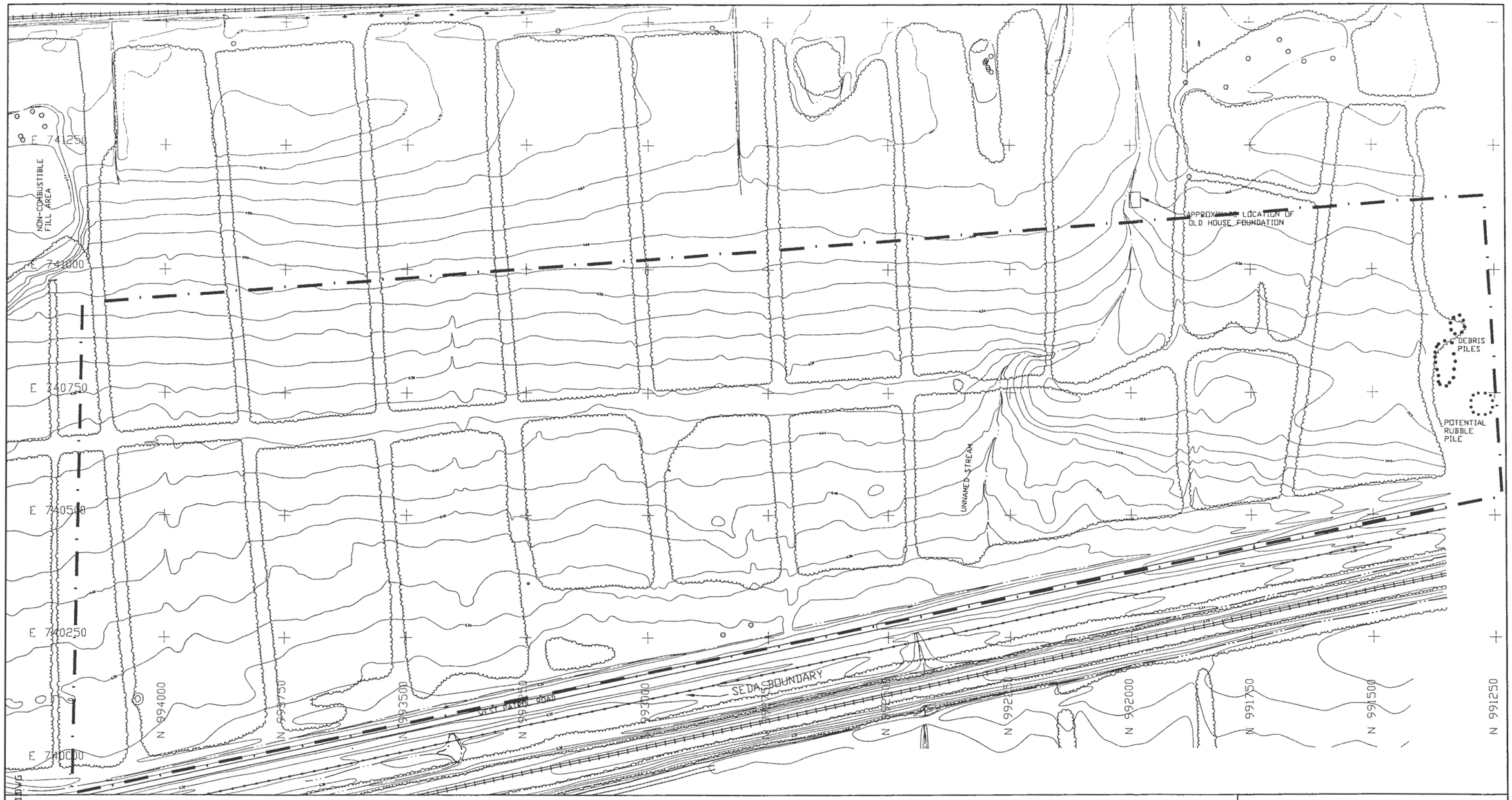
Table 1.1-5

SEAD-64C Proposed Garbage Disposal Area
Typical Well Data

Parameters	Well No. 6	Well No. 7	Well No. 8	Well No.9
Temperature	8	7	7	6
pH	7.2	7.4	7.2	7.2
Chlorides	0.2	1.3	3.5	1.5
C.O.D (from dichromate)	0	2	0	0
Conductivity (umhos at 25°C)	612	577	702	937
Iron	0.2	0.4	0.2	0.4
Water Level (below grade)	13.75"	23.75"	112.5"	22.5"

Notes:

1) Analysis date 1/15-26/81
2) Water was sampled monthly 1980-1981. These are typical parameters and results.
3) Results in mg/l unless indicated otherwise.



ACAD\SENECA\7LPSWMU\ACADFIG\SD64DSIDVG

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

N

100 0 100 200
(feet)

APPROXIMATE AOC EXTENT

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-19
SEAD-64D GARBAGE DISPOSAL AREAS
SITE PLAN

SCALE	DATE	REV
1" = 200'	APRIL 1996	A

The topography of this site slopes to the west. The regular west-sloping topography is interrupted in the south-central portion of the site by an eroded steam bed which traverses the south-central portion of the site. The intermittent stream flows west toward low areas east of West Patrol Road. These low areas parallel to West Patrol Road are believed to collect much of the surface water run-off from the site.

Several disposal areas are present on the site and can be identified by the surface expression of metal or debris. Several of these areas are in the southern, south-central and east-central portions of the site. In the southern portion of the site an elongate east-west trending mound (approximately 75 feet long) is reported to contain trash and assorted debris. Immediately to the north and east of this elongated mound are three 25 foot to 30 foot diameter depressions that are 2 to 4 feet deep.

Small north-south trending furrows beneath the vegetation on most of the site are likely the product of grape farming activities, which are known to have existed in the area prior to the establishment of SEDA.

1.1.2.4.4.2 Site History

SEAD-64D was used during the time period from 1974 to 1979 when the on-site incinerator was inoperable. The types of wastes that were disposed of at the site are suspected to be primarily household items, although according to the SWMU Classification Report metal drums and other industrial wastes are also reported to have been disposed of at this site.

1.1.2.4.4.3 Existing Analytical Data

There are no existing analytical data for the site.

1.1.2.5 SEAD-67 Dump Site East of Sewage Treatment Plant No. 4

1.1.2.5.1 Physical Site Setting

SEAD-67 is comprised of several waste piles located east of sewage treatment plant No. 4 and south of West Romulus Road in the east-central portion of SEDA (Figure 1.1-9). The site is entirely undeveloped and was heavily vegetated with low brush and deciduous trees. One grass-covered 10-foot diameter waste pile is located 10 feet south of West Romulus Road.

Four brush-covered piles are located approximately 100 feet south of the road. Three berms and 2 piles, surficially of the same material as the four brush-covered piles, are situated approximately 50 feet south of these four piles. The piles and berms are approximately 5 feet high. A rectangular depression, measuring approximately 2.5 feet wide by 5 feet long and 10 inches deep, is located 25 feet north of the brush-covered piles (Figure 1.1-20).

The topography on the site slopes gently to the west toward a small stream. The stream flows north under West Romulus Road and into a large wetland area located to the north of SEAD-67. The site is not located within the ammunition storage area and access to the site is restricted only by the requirements to enter Post #1.

1.1.2.5.2 Site History

Very little is known about the history of this site. The contents of the waste piles are unknown as well as the time period during which the waste piles were formed.

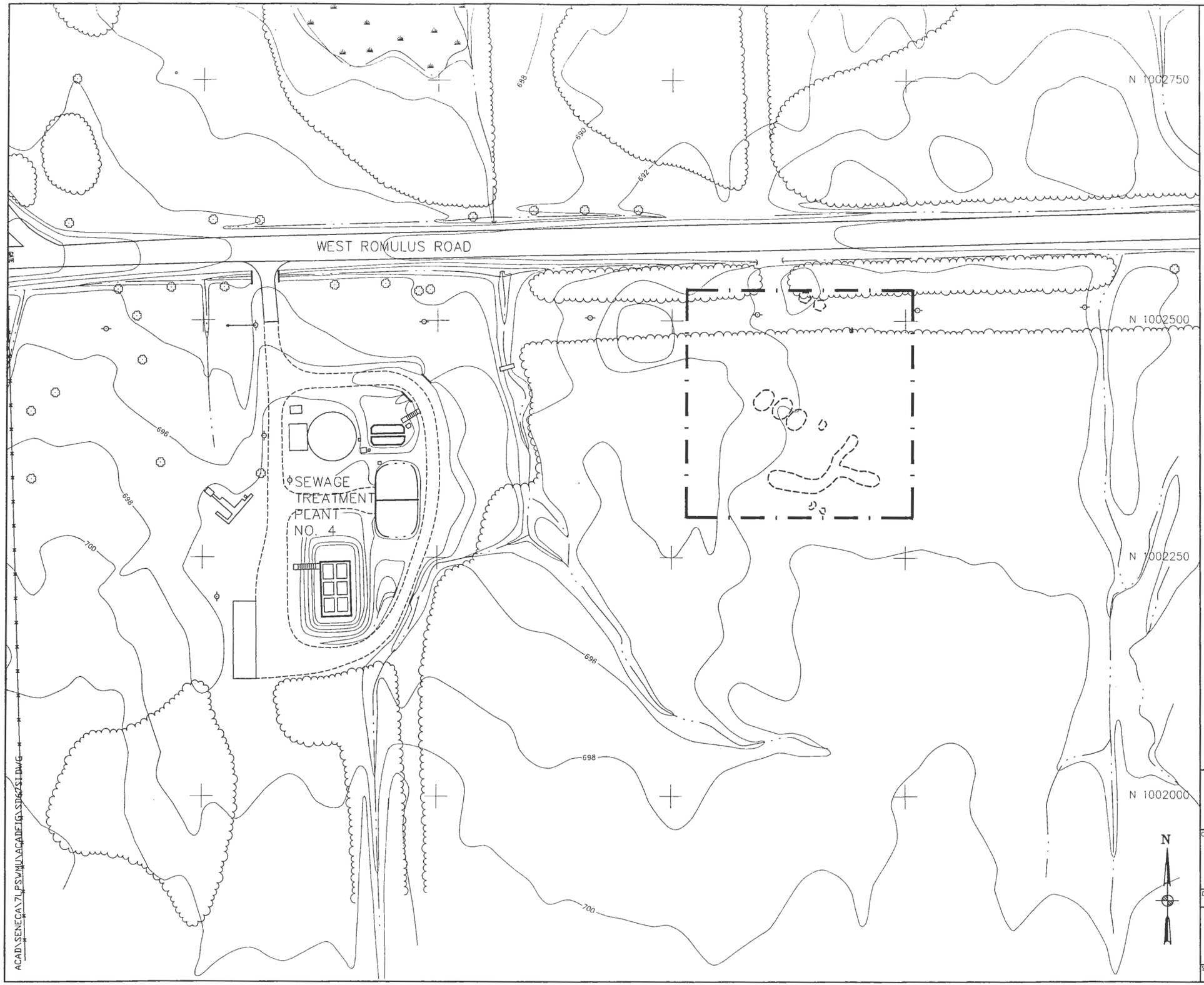
1.1.2.5.3 Existing Analytical Data

There are no existing analytical data for this site.

1.1.2.6 SEAD-70 Fill Area Adjacent to Building T-2110

1.1.2.6.1 Physical Site Setting

The fill area that comprises SEAD-70 is located on the southern side of East-West Baseline Road approximately 1,000 feet west of the intersection with North-South Patrol Road (Figure 1.1-9). It is located in the northwest portion of SEDA. The site and surrounding area contains developed and undeveloped land. The developed area is characterized by an old dilapidated wooden barn (Building T-2110) that contains piles of hay and sawdust, which are visible through its broken walls. The remainder of the site is undeveloped. The most noticeable feature in the undeveloped portion of the site is a kidney-shaped landfill southeast of the barn that forms a low, flat topographic high and appears to originate near the barn. The landfill's scarp is clearly visible on its eastern side. A large mound is located near the southeastern corner of the barn and an elongated vegetated mound is present along the southern perimeter of the landfill. Immediately east of the landfill is a wetland area beyond which is a large stand of deciduous trees (Figure 1.1-21).



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- APPROXIMATE LOCATION OF DEBRIS PILE

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-20

SEAD-67 DUMP SITE EAST OF SEWAGE TREATMENT PLANT NO. 4 SITE PLAN

SCALE	DATE	REV
1" = 100'	APRIL 1998	A

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW–PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1–21

SEAD 70 FILL AREA ADJACENT TO BUILDING T–2110

SITE PLAN

SCALE	DATE	REV
1" = 100'	APRIL 1996	A

The topography in the area of the barn and over the extent of the landfill is relatively flat. The local and regional topography surrounding the landfill slopes to the west.

1.1.2.6.2 Site History

The building on-site (Building T-2110) is reported to have been used as a stable for horses by SEDA personnel. The area east of the building was used as a disposal area for construction debris. It is not known if other material was also disposed of at the site. Up to two years ago soldiers at SEDA used this location as a staging area.

1.1.2.6.3 Existing Analytical Data

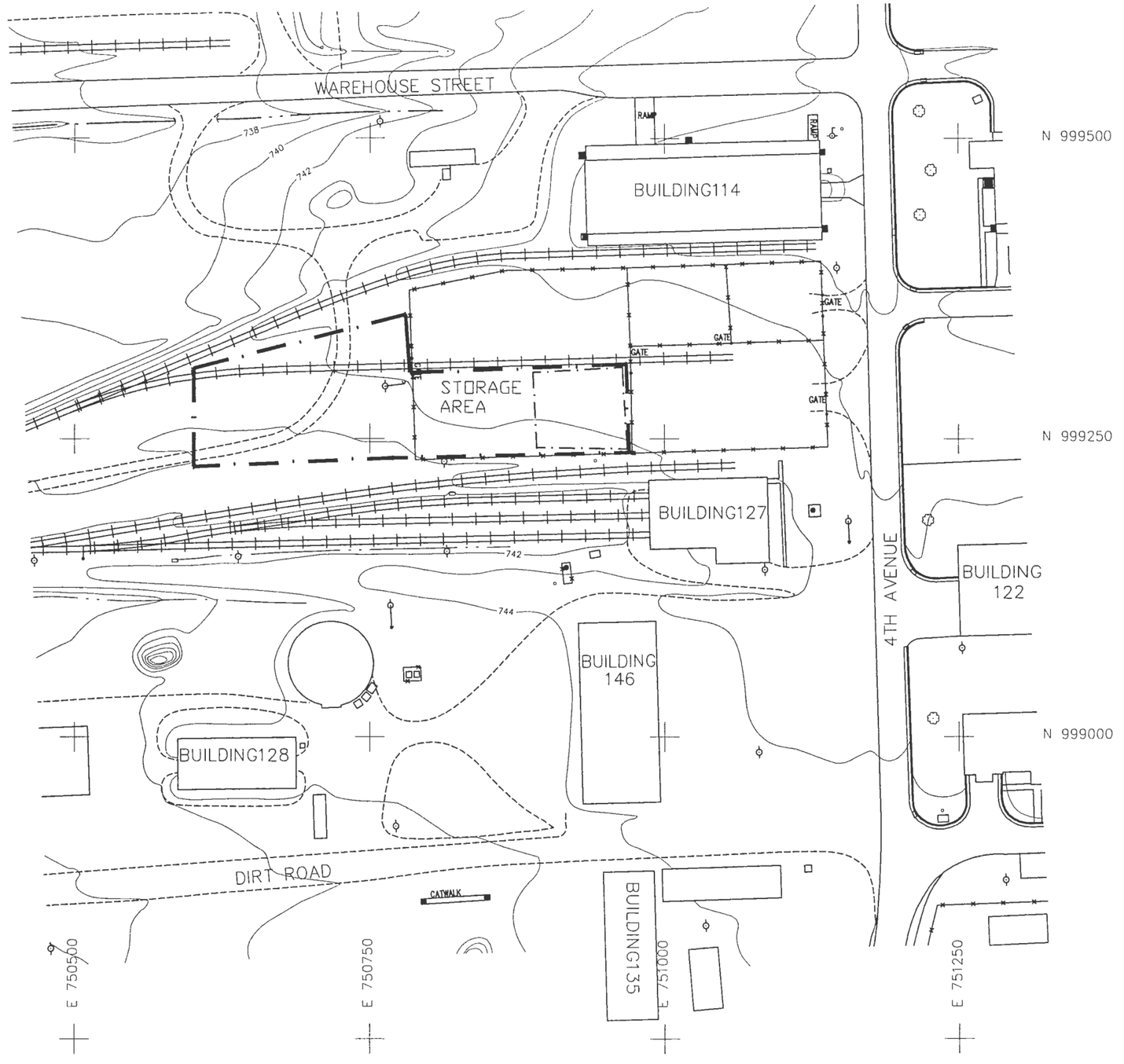
There are no existing analytical data for the site.

1.1.2.7 SEAD-71 Rumored Paint and Solvent Burial Pit

1.1.2.7.1 Physical Site Setting

SEAD-71 is a rumored paint and/or solvent disposal area located in a highly developed portion of SEDA. Specifically, It is located immediately west of buildings 122 and 144 approximately 200 feet west of 4th Avenue in the east-central portion of SEDA (Figure 1.1-9). The site is one of several areas defined by chain-link fences that serve as storage for equipment and miscellaneous supplies. Originally, the site was thought to be a small, square area adjacent to the northwest corner of Building 122, however, prior to the investigation, an area west of, and adjacent to the site was also reported to have been the location of the suspected burial pits. Therefore, the site investigated for this study was extended west approximately 150 feet to include this area as well (Figure 1.1-22).

The storage areas north and east of the site contain numerous white transformers, large spools of cable, and other assorted equipment. South of the site are SEDA railroad tracks that service Building 127. West of the site is a grassy area that is interrupted by a gravel roadway, and an east-west trending SEDA railroad track that cuts through the middle of the storage areas and forms the northern boundary of the site.



N

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN

50 0 50 100
(feet)

ACAD\SENECA\7LPSWMUACADFIG\SD71S1.DWG

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 1.1-22

SEAD-71 RUMORED PAINT AND SOLVENT BURIAL PIT
SITE PLAN

SCALE	DATE	REV
1" = 100'	MARCH 1998	A

1.1.2.7.2 Site History

It is rumored that paints and/or solvents were disposed of in burial pits at this location. It is not known what other activities occurred here. No dates of disposal are available nor is there any information on the number of suspected disposal pits.

1.1.2.7.3 Existing Analytical Data

There are no existing analytical data for this site.

2.0 STUDY AREA INVESTIGATION

2.1 INTRODUCTION

The focus of this investigation was to determine whether hazardous constituents or wastes have been released to the environment at each of the seven AOCs and to evaluate potential threats to human health, welfare, and the environment. The potential threats are based on the effects of current use to humans and biota and possible future use by on-site residents. If an AOC is determined to pose a threat to human health, welfare or the environment, a removal action may be performed or a CERCLA RI may be undertaken. Otherwise, if an AOC is determined to pose no threat, it will be classified as requiring no further action. A completion report is then prepared documenting the end of remedial actions.

Information for each site was acquired through the implementation of numerous focused tasks described in the Fifteen SWMU Workplan (ES, 1993), which was approved by EPA, Region II and NYSDEC, prior to initiation of fieldwork in February 1994. The workplan describes the following tasks:

1. Geophysical Investigations
2. Soil Gas Survey
3. Surface and Subsurface Soil Sampling
4. Monitoring Well Installation, Development and Sampling
5. Surface Water/Sediment Sampling

The following sections of this report describe, in detail, work completed by Parsons ES to characterize the environmental setting of each site.

The chemical constituents of concern for this investigation are summarized in Table 2.1-1. Analytical methods utilized at each AOC and the rationale for the selection of analytes for each AOC are presented in Table 2.1-2. Table 2.1-3 presents a summary of samples collected and analyses performed as part of this investigation.

The site survey program consisted of a field reconnaissance of the site and aerial photography. The reconnaissance was performed to locate general site features and confirm the presence of significant features (i.e., buildings, filled areas, waste piles, stressed vegetation,

TABLE 2.1-1

SUMMARY OF CHEMICAL CONSTITUENTS OF CONCERN

Material Managed at SEAD	Chemical Group	Analytical Method
1. Solvents	Volatile organic compounds (VOCs) Semi-volatile organic compounds (SVOs)	NYSDEC CLP TCL VOCs, 524.2 NYSDEC CLP TCL SVOs
2. Oils	Petroleum hydrocarbons (TPH)	TPH 418.1
3. Transformer Oil	Polychlorinated biphenyls (PCBs)	NYSDEC CLP TCL Pest./PCB
4. Herbicides	Herbicides	8150
5. Pesticides	Pesticides	NYSDEC CLP TCL Pest./PCB
6. Sludge	Cyanide Heavy metals Semi-volatile organic compounds (SVOs) Nitrates Volatile Organic Compounds	NYSDEC CLP Cyanide NYSDEC CLP TAL Metals NYSDEC CLP TCL SVOs 353.2 NYSDEC CLP TCL VOCs, 524.2
7. Radioactive	Radionuclides	9310, Gross Alpha, Gross Beta 901.1 Gamma Spec.

1. All analytical deliverables were level IV with exception of Method 353.2 (NO_3), Method 418.1 (TPH), Method 9310 (gross Alpha, gross Beta), and Method 901.1 (Gamma spec.).

TABLE 2.1-2
AOC - SPECIFIC EPA ANALYTICAL METHODS AND SELECTION RATIONALE

AOC	8150 Herbicides	NYSDEC CLP TCL SVOs	NYSDEC CLP TCL VOCs; 542.2	NYSDEC CLP TAL Metals and Cyanide	8080 PCB; NYSDEC CLP TCL Pestcides/PCB	418.1 TPH	9310 Gross α Gross β Radio-activity	901.1 Gamma Spec.	Selection Rationale
SEAD 60	-	X	X	X	X	X	-	-	Oil spill from boiler house.
SEAD 62	X	X	X	X	X	-	-	-	Nicotine sulfate disposal.
SEAD 63	-	X	X	X	X	-	X	X	Miscellaneous components disposed of here.
SEAD 64 A,B,C,D	-	X	X	X	X	-	-	-	Garbage, drums disposed of here (SVOs, VOCs, heavy metals).
SEAD 67	-	X	X	X	X	-	-	-	Dump site.
SEAD 70	-	X	X	X	X	-	-	-	Fill area.
SEAD 71	-	X	X	X	X	-	-	-	Paints/solvents disposed of here (SVOs, VOCs, heavy metals).

TABLE 2.1-3
SUMMARY OF LABORATORY ANALYSES

	ANALYSES				
	No. of Samples	Suite[2]	TPH 418.1	Herbicides 8150	Radioactivity[3] 9310 901.1
SEAD 60					
B[1] Soils	9	9	9	NS	NS
Groundwater	3	3	3	NS	NS
Sediment	3	3	3	NS	NS
Surface Water	3	3	3	NS	NS
SEAD 62					
TP Soils	3	3	NS	3	NS
Groundwater	3	3	NS	3	NS
SEAD 63					
TP[1] Soils	12	12	NS	NS	12
Groundwater	3	3	NS	NS	3
Surface water	4	4	NS	NS	4
Sediment	4	4	NS	NS	4
SEAD 64A					
B[1] Soils	12	12	NS	NS	NS
Groundwater	3	3	NS	NS	NS

TABLE 2.1-3 (Con't)
SUMMARY OF LABORATORY ANALYSES

	ANALYSES				
	No. of Samples	Suite[2]	TPH 418.1	Herbicides 8150	Radioactivity[3] 9310 901.1
SEAD 64B					
B[1] Soils	12	12	NS	NS	NS
Groundwater	3	3	NS	NS	NS
Surface water	3	3	NS	NS	NS
Sediment	3	3	NS	NS	NS
SEAD 64C					
TP[1] Soils	6	6	NS	NS	NS
Groundwater	5	5	NS	NS	NS
Surface Soil	3	3	NS	NS	NS
SEAD 64D					
B[1] Soils	30	30	NS	NS	NS
Groundwater	5	5	NS	NS	NS
Surface soil	5	5	NS	NS	NS
SEAD 67					
B[1]/TP Soils	8	8	NS	NS	NS
Groundwater	3	3	NS	NS	NS
Surface water	2	2	NS	NS	NS
Sediment	2	2	NS	NS	NS

TABLE 2.1-3 (Con't)
SUMMARY OF LABORATORY ANALYSES

	ANALYSES				
	No. of Samples	Suite[2]	TPH 418.1	Herbicides 8150	Radioactivity[3] 9310 901.1
SEAD 70					
B[1] Soils	9	9	NS	NS	NS
Groundwater	4	4	NS	NS	NS
Surface water	2	2	NS	NS	NS
Sediment	2	2	NS	NS	NS
SEAD 71					
TP[1] Soils	8	8	NS	NS	NS
Groundwater	2	2	NS	NS	NS
Sample Total	179	179	18	6	23

NOTES TABLE 4-3:

1. B = Borings
   TP = Test Pits (test pits include pile samples)
   NS = Not Sampled
2. Suite consists of analyzing each sample for TCL VOCs, SVOs, and Pesticide/PCBs and TAL Metals and Cyanide according to the NYSDEC CLP SOW.
3. Analysis for radioactivity consisted of gross alpha and gross beta analysis by Method 9310 and gamma spectral analysis by Method 901.1.
4. A matrix spike analysis, performed every 20 samples, actually consisted of 3 analyses: matrix spike blank, matrix spike, and matrix spike duplicate.

debris pits, monitoring wells, access roads) identified in the workplan. Also, sampling locations were identified and marked during this initial survey. The site and surrounding area were photographed from the air on December 14, 1993 for the purpose of constructing a photogrammetric site plan with 2 foot contour intervals for each of the seven low priority AOCs.

The groundwater flow directions were estimated in the workplan based primarily on topography and to some extent on proximity to surface water. The actual locations of some borings and monitoring wells were adjusted based on the results of geophysical surveys and a more complete field reconnaissance.

2.2 METHODOLOGY

2.2.1 Geophysical Investigations

Seismic Refraction

Seismic refraction surveys were performed at all AOCs, except SEAD-60 and SEAD-64C, to determine the direction of groundwater flow by measuring either the depth to the water table or the depth to bedrock. These data, along with topographic information, were used to more accurately locate the upgradient and downgradient monitoring wells.

Four 115-foot seismic refraction transects were laid out at each site. They were located approximately equidistant from the center of the AOC with each transect located near the perimeter of the AOC. The shot points were located along each profile and were used to define each individual seismic spread. The seismic data were collected using an EG&G Geometrics 24 channel seismograph. Geophone stations were placed at equal intervals along each survey line and the individual geophones were coupled to the ground by a metal spike firmly attached to their bases. When the geophones were placed on asphalt or concrete, small metal base plates replaced the metal spike on each geophone. Those geophones placed on asphalt or concrete were weighted down using small 2 to 3 pound sand bags to improve overall coupling with the ground and to help minimize background noise levels. Geophone spacings were held at 5 foot intervals for the majority of the surveys. Geophone spacings of 2.5 feet were used to obtain additional data from the overburden layer in areas of shallow bedrock.

Once the seismograph set up was complete and data collection was ready to commence, the background noise level at each geophone location was monitored. The background noise was displayed on the seismograph CRT as a series of moving bars, the amplitude of which is proportional to the background noise level. This review provided information on ambient noise levels, while also highlighting malfunctioning geophones. Geophones that displayed a high level of noise were moved or had their placement adjusted.

An impact hammer was used as the seismic energy source. Due to a shallow water table (i.e., generally less than 10 feet in depth) a low energy source was sufficient to accurately image the water table surface. Five impact points were used for each geophysical spread: one located at the spread center, one at each end of the spread and one approximately 40 feet beyond each end of the spread. A paper copy of each seismic record was made in the field. Each record was reviewed for quality to insure that adequate signal to noise levels were present for the shot. Upon initial acceptance, a preliminary velocity analysis was performed in the field to define the subsurface structure along each spread. This preliminary review focused on determining if the water table surface had been properly resolved. Upon final acceptance of each shot, the seismic record was annotated to identify the transect number, the spread number, the shot point number, and the shot point location. After each record was reviewed, accepted, and annotated, the data collection procedure was repeated for the remainder of the shot points for each spread.

Subsequent to the seismic data collection, a survey was performed to provide X,Y,Z station information for the seismic shot point locations to $\pm$ 1.0 feet horizontally and $\pm$ 0.1 feet vertically. These data were used during seismic data reduction and seismic modeling.

The seismic refraction method relies upon the analysis of the arrival times of the first seismic energy at each geophone location to provide details about the subsurface geology. The time when the seismic energy arrives at each geophone location is referred to as the first break. Each seismic record was reviewed, both using the seismograph CRT and the paper records, to determine the first breaks at each geophone. This analysis was preliminarily performed in the field with the data checked after the completion of the field program. These first break data values were tabulated and used to create time-distance plots as described below.

For each seismic spread, a graph was made of the first break determinations for all of the spread shot points. These graphs display, in an X-Y plot, the first breaks (time) versus the geophone locations (distance). These time-distance plots form the basis of the geophysical

interpretation. The time-distance plots were individually analyzed to assign each first break arrival to an assumed layer within the subsurface. It is estimated that up to four distinct seismic layers exist at the site. These include the unsaturated and saturated surficial deposits, the weathered bedrock, and the competent bedrock. In general, these various layers can be grouped into broad ranges of seismic velocities. As an example, unsaturated deposits will generally have a seismic velocity of less than 2,500 feet per second. By comparison, the saturated deposits should have seismic velocities in the range of 4,500 to 5,500 feet per second. The time-distance plots were interpreted to yield the velocity distribution within the subsurface. Each first break arrival was assigned to one of the above mentioned layers. This velocity analysis and layer assignment formed the basis for the data files to be used during the seismic modeling.

Once the first break analysis and layer assignments were complete, input seismic data files were created for use in the seismic modeling software. The input files included all of the information pertaining to the spread geometry, shot point locations and depths, first break arrivals, and layer assignments. The elevation data was also input into the computer files. The computer program, SIPT (Scott, 1977) was used to model the seismic data. SIPT is an interactive computer program developed by the United States Geological Survey for the inverse modeling of seismic refraction data. This program uses input seismic refraction data to create two-dimensional cross-sectional models of velocity layering within the subsurface. The program uses the delay time method to produce a first approximation of the subsurface velocity layering. This approximation is then refined through the use of iterative ray tracing and model adjustment to minimize the differences between field measured first arrival times and the forward modeled raypath times. The program also provides various levels of velocity analyses that will be reviewed to provide diagnostic information on the model solutions.

The results of the computer modeling were reviewed in conjunction with the known geology of the site. The subsurface velocity layering was attributed to known or expected geologic units. A detailed analysis was made of the velocity distribution of the upper unsaturated materials to ensure that near surface low velocity materials were not adversely affecting the data quality and interpretation. The velocity distribution within the bedrock was also reviewed to provide information on the presence and degree of weathering and to identify any lithologic or fracture related changes within the bedrock.

EM-31 Survey

Electromagnetic (EM-31) surveys were performed at all of the SEADs, except SEAD 60. The objectives of the EM-31 surveys were to delineate waste boundaries, identify the location of buried metallic objects, and identify the locations of old disposal pits. The EM-31 method was employed in conjunction with Ground Penetrating Radar (GPR) surveys so as to provide a maximum delineation of the subsurface from the geophysical investigations.

The electromagnetic data at each AOC was collected using both grid and profile based surveys. In general, the grid based surveys used either a 50 foot by 10 foot or a 20 foot by 10 foot grid spacing. Refer to the individual AOC descriptions in the following sections for the grid spacing details. The corners of the geophysical survey grids were established using a registered New York State land surveyor. The individual EM-31 survey lines and station locations were established using tape measures and a surveying level.

At all of the AOCs where EM-31 data were collected, a data logger was used to record the individual electromagnetic readings. Both the in-phase and quadrature components of the electromagnetic field were measured and recorded. These data were in turn stored on a computer and printed out at the end of each field day. For each AOC where EM-31 data were collected, a calibration area, free of cultural interference, was established. The EM-31 response was measured at this area at the start of each day. This check was made to insure that no significant meter drift was occurring during each survey.

Upon completion of each electromagnetic survey, the data were presented in both profile and contour form. Both the in-phase and quadrature components were plotted. All of these data were interpreted to identify the locations of buried metallic objects, disposal pits, waste boundaries, and areas of elevated subsurface soil apparent conductivities. These data were compared to the results of the GPR surveys to provide as complete and accurate interpretation of the subsurface conditions at each AOC as possible.

The EM-31 instrument was initially calibrated by the manufacturer. This calibration can be rechecked in the field but requires access to highly resistive rock outcrops. A secondary field calibration was performed on a daily basis to insure repeatability of measurements and to check against daily meter drift. This field calibration was the only performance evaluation that was performed on these instruments. The EM-31 data were collected at each AOC to evaluate only relative variations in subsurface conductivities. An accurate terrain conductivity

was not required since the individual objectives of these surveys were to identify relative variations in subsurface conditions associated with waste boundaries, buried metallic objects, etc. During the individual AOC surveys, up to five station repeats were performed on a daily basis so as to quantitatively evaluate the overall data repeatability.

GPR Survey

A GPR survey was conducted at each AOC, except SEAD 60. The objectives of the GPR surveys were to locate buried structures (i.e., buried or filled-in pits, trenches, disposal areas) and to provide better subsurface definition of anomalies detected during the EM-31 surveys.

The GPR instrument used was a hand operated GSSI SIR-3 Ground Penetrating Radar. As the equipment was pulled across the site, the reflected radar pulses were transmitted to the receiver unit where they were converted to analog signals. The analog signal was transmitted to the control unit where the signal was electronically processed and sent to the graphic recorder. The graphic recorder produced a continuous chart display on electro-sensitive paper. This real-time display enabled the operator to interpret the data on site.

An operational verification of the GPR unit was performed over a location where underground utilities were known to exist. Data acquired over this area also allowed for an approximate calculation of the two-way travel time for RADAR waves through the soils at SEDA. A two-way travel time of 7 nanoseconds per foot was established by analyzing GPR records acquired over a forced water main known to be buried 4 to 4.5 feet below grade.

2.2.2 Soil Gas Survey Investigation

A soil gas sampling and analysis program was performed from June 7 through June 14, 1994 at SEAD-64D as part of the fieldwork. The objectives of the soil gas survey were to determine if concentrations of volatile organic compounds were present in soil gas and to identify source areas of VOCs. Areas which were identified as having the highest concentrations of volatile organics were then subjected to test pitting or soil borings in order to investigate the source of the volatile organics.

The presence of contaminants in the soil gas provides a strong indication that there is a source of volatile organics either in the soil near the probe or in the groundwater below the probe. The soil gas analysis is performed in the field with a portable gas chromatograph so

that sample loss does not occur due to shipment off-site. The analytical results are available immediately and can be used to help direct the investigation regarding the location and density of soil gas samples. The analysis of site soil gas is used as a screening tool for rapidly identifying contaminant source soils and, in some cases, can delineate groundwater contamination plumes. In soils above groundwater contamination plumes, the expected soil gas concentrations are much less than those concentrations for source soils. This soil gas program was designed to identify volatile organic concentrations that indicate the presence of source materials (i.e., soils containing solvents or fuels).

Soil Gas Sampling Methods and Materials

Soil gas samples were collected through a hollow steel drilling rod that was driven approximately 48 inches into the vadose zone using a drilling rig. The extracted gas was then analyzed for the presence of volatile organic contaminants. A total of 162 soil gas samples were analyzed as part of this investigation at 171 locations. No soil gas samples were able to be obtained a nine locations due to either groundwater in the probe or refusal was encountered within 2.5 feet of the ground surface. Soil gas sampling was conducted in a grid pattern on the site. The grid was established along the 53 lines used for the geophysical survey. The approximate size of the grid was 3000 feet by 1000 feet. One hundred and fifty-two (152) soil gas sample locations were established at 200-foot spacings along every other odd geophysical line such that on every other soil gas line the soil gas points were off-set by 100 feet. In this way better coverage of the site could be obtained. No soil gas samples were collected at Line 1 (along the western boundary of the site) due to the high water table in this topographically low portion of the site. Nineteen additional sample locations were chosen based on the analytical results from soil gas sampling along the grid and on the results of the geophysical survey. All locations of soil gas samples were marked with a yellow flag. These locations were subsequently plotted on the SEAD-64D site map.

A hollow, 1.75 inch outside diameter (OD), steam-cleaned, hardened carbon steel drilling rod fitted with a penetrometer point on the tip was driven below the ground surface using a drilling rig equipped with an assembly consisting of a 140-pound weight, a driving head, and a guide permitting a free fall of 30 inches. Blow counts for each 6-inch penetration were recorded for each location. The blow counts provide an indication of the relative density of the material. Rod refusal was defined when more than 100 blows were applied for six inches of penetration.

Once the desired depth of penetration was reached, the drilling rod was withdrawn approximately 6 inches, allowing the penetrometer point to dislodge from the rod, creating a void space through which soil gas was extracted. A metal rod was inserted into the hollow drilling rod to ensure that the penetrometer point had been dislodged. If not, the point was knocked out with the metal rod. If after the rod was installed at a particular location, groundwater entered the rod due to hydrostatic pressure, no soil gas sample was collected. Bentonite was packed at the ground surface around the probe to prevent influx of atmospheric air into the sample probe. The hollow drilling rod exposed above the land surface was fitted with a coupling containing evacuation and sampling ports. Teflon tape was used on the threads connecting the coupling to the hollow drilling rod to prevent infiltration of surface gases into the sampling ports. Tubing connected the evacuation port to the intake of a SKC Aircheck Sampler pump (Model 224-PCXR7). The sampling port was fitted with a septum. A new septum was used at each sampling location.

The probe was purged by creating a slight negative pressure with an SKC air sampling pump through the evacuation line for at least 4 minutes to ensure that the gases flowing through the hollow drilling rod were representative of soil gases. The gases were purged at a rate of approximately 3 liters per minute. The effluent gas was monitored continuously with an Organic Vapor Meter (OVM) Model 580B. The soil gas sample was collected from the probe immediately if the effluent monitoring indicated an increase in the concentration of volatiles. Gas samples were collected to coincide, as much as possible, with the highest concentration of gas measured by the OVM. Approximately 3 ml of soil gas was extracted through the sampling port using a Hamilton gas tight sampling syringe. The syringe was immediately transported to the temporary soil gas laboratory.

Following the collection of the soil gas sample, the drilling rod was removed from the ground using the drilling rig or by hand. The probe hole was backfilled with bentonite. Penetrometer points were decontaminated prior to use and drilling rods were steam cleaned after each use. Other sampling equipment (e.g., drill couplings, sampling syringes, tubing, etc) was decontaminated after each use according to the decontamination procedures outlined in the Chemical Data Acquisition Plan (CDAP). All syringes were decontaminated and blanked prior to field use.

Analytical Support

Soil gas samples were analyzed in the field using a Photovac 10S50 portable gas

chromatograph to facilitate real time data acquisition. Various volumes of soil gas samples, ranging between 0.25 and 5.0 mls, were injected into the portable gas chromatograph. The amount injected was based on the results of the continuous monitoring with the OVM. High OVM readings, meant that less sample was required to be injected so that the detector response was within the calibration range of the instrument. The temporary soil gas laboratory was established in a temperature controlled on-site field trailer. A simplified explanation of the analytical procedure is provided in the following paragraphs.

The 10S50 gas chromatograph instrument separates compounds in a chromatographic column (selected on a site-specific basis) and detects and quantifies the compounds using a photoionization detector (PID). After a sample is introduced to the chromatograph, it is carried by a carrier gas (zero air) through the column. Different compounds pass through the column at different rates, resulting in a characteristic "retention time" for each compound. By comparison with standards, this retention time can be used to identify compounds. The PID responds to the presence of compounds by producing a difference in current from a reference current. The magnitude of this current difference can be used, when compared to standards, to determine concentrations of compounds present in the sample. The PID is ideal for detecting volatile organic compounds that contain aromatic rings and unsaturated double bonds.

Quantitative analysis of soil gas requires quantitative gas standards. Two gas standards, with the balance of each standard composed of nitrogen, were used for this project. The first, a 100 ppm chlorinated solvent standard, was prepared by Scott Specialty Gases, Inc., and contained vinyl chloride, 1,1-dichloroethene, and trichloroethane. The second, a 100 ppm standard containing benzene, toluene, ethylbenzene, and M-, O- and P-xylenes (BTEX), was prepared by Canaan Scientific. The standards were certified to be traceable to the National Institute of Standards and Technology (NIST). The field calibration standards were prepared from these certified gas standards. Dilutions were made from the standards by injecting a known volume of calibration gas into a clean glass sampling bulb of known volume. The analytical instrument was calibrated each day prior to the analysis of a sample.

Data Interpretation

Data interpretation is an important element of the soil gas analysis. The acquired vapor phase concentrations were evaluated to determine the relationship between soil gas and source soils. The interpretation of the soil gas data involved identification of each organic

compound by retention time comparison with gas standards. Quantitation of gas concentrations was obtained as the product of the Response Factor (RF) and the obtained detector response for each compound. RFs were obtained from the calibration curves by taking the average of the integrated area under the curve, expressed in Volt-sec (Vs), for two injections representing different concentrations of 1 mL injections. If the relative percentage difference of the two RFs was greater than 50 percent, a third standard injection was made and the average of the three RFs was used to quantify the samples. All injections were normalized to 1 mL. If necessary, based upon the OVM readings obtained during sample collection, the volume injected was adjusted to assure that the detector response would not exceed the upper calibration range. The final concentration of the collected sample was determined by applying either a dilution factor or a concentration factor, depending upon the volume injected. For example, if 0.5 mL was injected the obtained concentration was multiplied by 2.

2.2.3 Soil Sampling Programs

The objectives of the soil sampling program were to provide data on the background soil chemistry, and to define the horizontal and vertical extent of contaminated soils at each of the seven low priority AOCs.

The soils investigation program was completed at SEADs-60, 62, 64A, 64B, 64C, 64D, 67, 70 and 71 in accordance with the pre-approved workplan. The sampling plan at SEAD-63 was modified from that described in the workplan for better identification of suspected buried objects. Sample locations were located in source areas and in hydrologic upgradient locations, the latter to establish background conditions. The groundwater flow directions were estimated for the workplan based on topography and to some extent the proximity of surface water. The locations of borings, monitoring wells and test pits were adjusted from those defined in the workplan based on the results of the geophysical investigations, which better defined the groundwater flow directions and detected anomalies. The individual boring logs and test pit logs are included in Appendix B. Empire Soils Investigation, Inc. of Groton, New York performed the drilling and test pit excavations under the direction of Parsons ES personnel.

Soil Borings

Soil borings were performed at SEADs 60, 64A, 64B, 64C, 64D, and 70 using a CME-55 drilling rig and a CME 850 drilling rig, each equipped with 4.25-inch I.D. hollow stem augers. The soil borings were advanced until spoon or auger refusal on shale was encountered. The total depth of the boring was determined by the degree of weathering of the shale. During drilling, soil samples were collected continuously at 2-foot intervals using a decontaminated 2-inch or 3-inch diameter by 2-foot long split spoon sampler according to the method described in ASTM D-1586-84. This technique involved driving a decontaminated split spoon sampler 2 feet into undisturbed soil with a rig-mounted 140 lb hammer. Once the sample was collected, the augers were advanced to the top of the next sample interval. Samples were collected until spoon refusal on weathered or competent shale was encountered. Soil samples were classified according to the United Soil Classification System (USCS).

Soil samples were screened for volatile organic compounds using an Organic Vapor Meter (OVM) 580B and for radioactivity with a Dosimeter Mini Con Rad Detector. Three soil samples from each soil boring were selected for chemical analysis including: 1) a surface soil sample collected from 0.2 feet below grade; this sample was collected with a stainless steel trowel after the overlying vegetation has been removed; 2) a soil sample collected immediately above the water table; and 3) the third sample based on one of the following site specific criteria: (1) visibly affected soil (e.g., oil stains), (2) elevated photoionization detection (PID) readings, or (3) a stratigraphic change such as the base of the fill or the fill/bedrock interface. If none of these occurred, then the third sample was collected at the halfway point between the samples collected at the surface and at the water table. If similar looking split spoon samples exhibit elevated PID readings, the one with the highest concentration was submitted for chemical analysis. Samples to be analyzed for volatile organic compounds were collected first in two 40 ml vials with septum seals. The remaining soil from the spoon was mixed in a decontaminated stainless steel bowl with a decontaminated stainless steel utensil and placed in the appropriate sample containers.

After the boring was completed, it was filled to ground surface with lean grout containing at least 3 percent bentonite powder by volume. If groundwater was present in the borehole, the grout was pumped through a tremie pipe to the bottom of the boring. Grout was pumped in until undiluted grout discharges from the boring at ground surface.

The soil brought to the surface by the augers was containerized in DOT-approved, 55-gallon drums, which were labelled with the date, location, and description of wastes.

Split spoon barrels were decontaminated as described in the workplan. Drilling augers were steam cleaned along with other drilling equipment between subsequent soil borings.

Test Pits (Geophysical Anomaly Excavations)

The objectives of test pitting were to provide a means for visual evaluation of subsurface soils and collection of soil samples, as well as to investigate anomalies discovered during the geophysical surveys. Test pits were excavated at all the SEADs, except SEAD-60.

Test pit locations were marked in the field prior to performing the excavation. The excavations were performed with a backhoe using a smooth edged bucket when possible. The top 0.5 to 1 foot of soil was segregated so that it could be used to cover the other backfilled soils when the test pit was closed. The length and width of the excavation was kept as small as practical to minimize the potential of exposing field personnel to hazardous conditions.

The excavations were continuously monitored by Parsons ES personnel with a PID and a radiation meter. At no time was any personnel permitted to enter the excavation. The test pits were closed by backfilling the pit with the soil that was removed from it. If the pit was not to be closed immediately after the required samples had been obtained, the excavation was barricaded to prevent accidental entry by personnel working on the site. Each excavation was marked after closure as needed for identification of the sample location.

A log for each test pit was prepared to record the subsurface soil conditions, monitoring data, location of samples obtained, and other information. These are included in Appendix B. Where appropriate, photographs of the test pits were taken.

Soil samples were taken from test pits performed at SEADs 62, 63, 64C, 67, and 71. The samples were taken from fill material based on field screening (stained soils or elevated PID readings). Test pit samples were collected using the bucket of the backhoe. The bucket was scraped along the side of the test pit at the desired depth to allow material to fall into the bucket or scooped from the bottom of the test pit. The sample was collected from the

backhoe bucket with a stainless steel trowel or scoop, mixed in a stainless steel bowl, then transferred to the appropriate sample containers. Samples for volatile analysis were collected as soon as possible from the middle of the backhoe bucket prior to mixing.

Surface Soils

Grab samples of surface soils were obtained at SEADs 64C and D by removing representative sections of soil from 0 to 2 inches below ground surface. Vegetation was removed prior to sample collection. Surface soil samples were collected using a stainless steel trowel or scoop and a stainless steel bowl. VOC samples were placed in the VOA vials before mixing the soil. The soil was then mixed in the bowl and placed in the appropriate sample containers.

2.2.4 Monitoring Wells

The groundwater investigation program was designed to obtain background water quality data, to determine groundwater flow direction, and to determine if hazardous constituents are migrating from the site in the groundwater of the overburden aquifer. When required, the locations of monitoring wells were changed from the locations shown in the workplan based on the depth to groundwater and bedrock data obtained from the geophysical surveys. Monitoring wells were installed at all the SEADs.

The program regarding design, installation, development and collection of groundwater samples was consistent with the USEPA Region II CERCLA QA Manual and the NYSDEC Technical and Administrative Guidance Manuals (TAGMS). Further, the program is in compliance with all requirements described in the NYSDEC, 6 NYCRR Part 360, Solid Waste Management Facilities Regulations, Section 360-2.11, which details groundwater monitoring well requirements.

Installation

The installation of each monitoring well began after the soil boring was completed. The soil borings were advanced to split spoon or auger refusal, which for the purposes of this investigation defined the contact between the overburden and the competent shale. During drilling, split spoon samples were collected continuously until spoon refusal using the method outlined in ASTM D-1580-84 to observe and characterize the soil conditions and geology at the well location.

Only one well was installed in each boring. Once installation was begun, no breaks in the installation process were made until the well was grouted and the augers were removed. The monitoring well installation diagrams are presented in Appendix C. Table 2.2-1 presents the monitoring well construction details.

These wells were screened from 3 feet above the water table (if space allowed) to the top of weathered or competent bedrock. Soil samples were collected as described in the soil boring program. The monitoring wells were constructed of new 2-inch schedule 40 PVC with a screen slot size of 0.010" and threaded, flush joints.

Development

Subsequent to the well installations, each monitoring well was developed to insure that a proper hydraulic connection existed between the well and the surrounding aquifer. The well development reports are in Appendix D. The well development details are summarized in Table 2.2-2.

A coarse sand pack (#3 Q-Rock) was placed by a tremie pipe in the annular space between the well screen and the hollow stem auger. This sand pack did not extend more than 2 feet above the top, or 6 inches below the bottom of the screen. A finer grained 6 inch sand pack (#1 Q-Rock), was placed between the coarse sand pack and the bentonite seal to prevent infiltration of the bentonite into the coarse sand pack. A layer of bentonite pellets, ranging from 1.0 foot to 1.5 feet in thickness, was poured within the annular space to seal the well. The bentonite pellets were hydrated by pouring potable water into the annular space. After a one hour hydration period, the remaining annular space was completely filled with a lean cement grout containing at least 3 percent bentonite. The grout mixture was placed in the annular space using a tremie pipe. Augers were removed as the grouting progressed to prevent caving.

In untrafficed areas, wells were protected with a steel casing, 4 inches in diameter. This protective steel casing extended at least 1.5 feet below the ground surface to attempt to minimize heaving by frost. The protective casing was held in place by a 2-foot square cement pad. Weep holes were drilled at the base of the protective casing above the cement collar to allow for the drainage of water. The protective casing was installed with a locking cap and a weather resistant padlock. In trafficked areas where the steel casing may be hit, a roadway box was installed. The protective casings were marked with the well number using metal stamps. The well number was also stamped on the roadway box cover.

TABLE 2.2 - 1

MONITORING WELL CONSTRUCTION DETAILS

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs

	Well Number	Depth of Well Relative to Ground Surface (ft)	Depth of Well Relative to Top of PVC (ft)	Well Screen Length (ft)	Screened Interval Relative to Ground Surface (ft)	Thickness of Bentonite Seal (ft)	Height of PVC Well Stickup (ft)	Elevation of Top of PVC Well (MSL) (ft)
1	MW60-1	18.3	19.77	11	5.4-17.2	1.5	1.5	747.86
2	MW60-2	19.6	21.27	13	4.4-18.4	1.5	1.5	745.53
3	MW60-3	24	24.5	18	4.0-22.95	1	1.2	744.42
4	MW62-1	8.1	9.46	2.8	3.85-7.25	1.2	1.7	753.01
5	MW62-2	9.8	11.37	4	4.7-8.7	1	1.9	749.46
6	MW62-3	17.95	23.46	11	5.4-17.1	1	2.6	750.41
7	MW63-1	8.65	10.06	4	3.5-7.5	1	1.4	639.69
8	MW63-2	8.1	9.56	4	3.0-7.0	1	1.5	632.32
9	MW63-3	8.1	9.5	4	3.0-7.0	1	1.4	633.19
10	MW64A-1	10.7	11.96	4.8	4.0-9.6	1.2	1.5	747.30
11	MW64A-1A	12.0	unknown	6.0	4.1-10.9	10.5	1.3	745.77
12	MW64A-2	8	9.56	2.8	3.7-7.1	1.2	1.8	740.98
13	MW64A-3	8.7	10.42	4	3.6-7.6	1.2	2.0	739.85
14	MW64B-1	15.7	17.02	9.8	4.1-14.8	1.5	1.5	707.45
15	MW64B-2	13.95	15.24	9	3.9-12.9	1	1.5	703.77
16	MW64B-3	26.2	27.14	15	8.6-25.4	2.5	1.5	710.64
17	MW64C-1	16.1	17.4	11	3.5-15.3	1	1.7	765.85
18	MW64C-6	21.72	23.51	unknown	unknown	unknown	1.8	754.57
19	MW64C-7	13.33	14.54	unknown	unknown	unknown	1.2	751.00
20	MW64C-8	16.27	17.45	unknown	unknown	unknown	1.2	760.24
21	MW64C-9	14.96	16.2	unknown	unknown	unknown	1.2	767.28
22	MW64D-1	5.25	6.24	0.8	3.6-4.4	1	1.2	667.79
23	MW64D-2	9	10.36	4	4.0-8.0	1.3	1.5	635.20
24	MW64D-3	7.6	9.22	2	4.9-6.9	2.4	1.6	648.88
25	MW64D-4	9.6	11.22	4	4.5-8.5	1.75	1.6	661.33
26	MW64D-5	7.15	8.46	2	4.3-6.3	1.75	1.5	652.49
27	MW67-1	11.3	13.05	6	3.7-10.5	1.3	1.8	698.53
28	MW67-2	11.75	12.75	6	4.2-10.9	1	1.0	698.64
29	MW67-3	11.3	12.8	6	3.4-10.2	1.3	1.7	696.72
30	MW70-1	10.45	11.72	4.9	3.7-9.6	1	1.6	638.07
31	MW70-2	11.55	13.18	6	4.0-10.7	1.2	2.0	637.39
32	MW70-3	9.4	10.62	4	4.3-8.3	1.3	1.3	637.61
33	MW70-4	10.1	11.53	4.9	3.4-9.3	1	1.6	637.86
34	MW71-1	9.4	8.98	4	4.3-8.3	1.5	*	747.06
35	MW71-2	6.6	6.14	2	3.8-5.8	1	*	747.29
36	MW71-3	6.35	7.82	2	3.5-5.5	0.5	1.4	745.94

Notes:
1. All wells except MW64C-6,7,8, and 9 were installed by Empire Soils Investigations, Inc. under the supervision of Engineering-Science, Inc.
2. Data obtained from Well Installation forms, Well Development forms and survey summary.
3. All wells were installed in Till/Weathered Shale.
4. All wells were constructed of 2-inch PVC well casing with 0.010 inch PVC well screen.
5. Part of screened interval may be connection section (.8 ft).
6. * = MW71.1 and MW71-2 were installed with roadway box protective casings.

TABLE 2.2 - 2

MONITORING WELL DEVELOPMENT INFORMATION

SENECA ARMY DEPOT
7 AOCs

MONITORING WELL	INSTALLATION DATE	INDICATORS				GALLONS REMOVED	BORING WELL VOLUMES REMOVED
		TEMPERATURE (°C)	pH (standard units)	CONDUCTIVITY (µmhos/cm)	TURBIDITY (NTUs)		
MW60-1	3/23/94	8/8/8.5	6.85/6.97/7.01	875/875/900	37.2/1.38/0.88	56.5	3.65
MW60-2	3/22/94	8.5/7.5/8	7.5/7.33/7.32	625/625/625	9.85/2.25/3.40	61	3.65
MW60-3	3/2/94	2/9.5/9.5	7.24/7.25/7.26	700/650/650	2.37/11.7/4.19	52	2.40
MW62-1	4/1/94	13.5/16.4	7.6/7.65	800/800	1000+/30	9.9	1.7
MW62-2	6/27/94	14.8/16.3/14.7/15.7/15.4/13.4/14.5	7.33/7.11/7.6/7.56/7.55/7.57/.41	6/6/6/6/6/6	1000+/100+/NA/1000+/100+/1000+/27	30.6	4.6
MW62-3	6/28/94	10.9/10.8/11.2/11.0/10.4/10.6	7.15/7.3/7.21/7.25/7.20/7.16	500/510/51/51/51/51	45/1000+/1000+/15/1000+/20	104	7.3
MW63-1	6/14/94	13.3/12.6	7.28/7.19	410/390	11/16	18.85	4.6
MW63-2	6/14/94	15.7/15.2/15.3/15.5/15.6/15.4/15.3/15.4	6.97/6.89/6.93/6.95/6.93/6.89/6.98/7.02	660/630/620/630/600/600/600	1000+/100+/100+/100+/100+/1000+/67/10	49.6	8.6
MW63-3	6/14/94	16.2/15.9/16.3/16.5/16.4/16.2/16.1	6.92/6.84/6.87/6.95/6.83/6.82/6.89	2100/2050/2000/2000/2100/2000/2000	1000+/17/67/24/27/7/20	49	9
MW64A-1	4/12/94	14.9/10/13.9/16.4/13.8	7.47/7.64/7.11/7.08/7.07	500/470/500/530/460	458/89.9/100+/18/3.6	2.55	2.2
MW64A-2	4/1/94	16.1/15/17.6/10.1/16.8/16.5/20/21.9/18.9	6.98/7.03/7.01/6.93/6.86/6.84/6.67/6.84/6.7	680/650/660/690/700/750/420/950/1000	1000/1000/100/1000/100/100/200+/152/33	4.7	2.3
MW64A-3	4/1/94	10.5/10.6/10.8/11.3/10.8/10.9	7.10/7.08/7.16/7.17/7.09/7.09	450/460/480/460/460/460	1000+/1000+/1000+/29/4.94/3.24	20	5.1
MW64B-1	5/14/94	9.2/8.8/9.5/9.7/9.6/9.7	7.1/7.15/7.01/6.99/7.01/7.00	680/680/680/680/680/680	1000+/1000+/998/322/97.3/49.3	78	6
MW64B-2	5/15/94	9.7/9.4/9.3/9.7/9.6	7.17/7.18/7.17/7.12/7.09	600/590/580/590/590	1000+/1000+/1000+/220/38.7	57.5	5
MW64B-3	5/13/94	8.7/8.8/8.9/9/9	6.93/6.99/6.75/6.74/6.80	880/870/880/920/870	1000+/1000+/4.13/1.33/1.69	75	5.1
MW64C-1	5/16/94	10/9.7/9.8/9.8	7.82/7.64/7.63/7.58	500/600/590/590	1000+/100+/45/30	54	4
MW64C-6	8/27/79	11.2/11.3/11.3	7.89/7.89/8.06	465/475/475	2.84/5.05/3.11	57	3
MW64C-7	8/28/79	14.3/13.9/14.7	7.94/7.11/7.31	450/420/440	>200/1000+/100+/35	19.6	3.3
MW64C-8	8/28/79	12.0/12.5/12.2/11.0/17.3	6.87/7.36/7.14/7.58/7.7	700/730/650/670/650	1000+/1000+/37/59/100+/15	40	5.8
MW64C-9	8/29/79	13.7/12.6/12.5/12.6/13	7.13/7.61/7.31/7.27/6.84	680/690/680/695/700	200+/200+/36.2/7.63/3.23/4.43	404	4
MW64D-1	3/28/94	16/15.8/15.9	7.43/7.42/7.45	700/675/700	1000+/23/14/2.5	7	4.7
MW64D-2	6/22/94	15/14.5/15/14/14	7.23/7.24/7.24/7.23/7.2	475/475/475/450/450	1000+/9.1/212/6.85/2.54	37	6.2
MW64D-3	6/20/94	14.1/14.5/13.9/13.6/13.5	7.2/7.37/7.49/7.38/7.3	500/500/500/490/500	100+/6/1000+/100+/23/12	35	8.2
MW64D-4	6/20/94	13/13/13/12	7.14/7.14/7.09/7.09	500/500/500/500	1000+/3.02/3.46/1000+/4.44/1.41	21.8	6.8
MW64D-5	6/22/94	NA/14.8/14.0/14.2/13.6/13.3	7.8/7.4/7.42/7.42/6.84/7.22	825/490/500/500/475/470	100+/1000+/NA/13.0/NA/15.0	15.35	6.1
MW67-1	3/30/94	11.5/11	7.10/7.51	480/440	1000+/1.19	45.1	4.9
MW67-2	3/30/94	11/9	7.11/7.15	470/450	1000+/28	46	5.2
MW67-3	3/29/94	12.5/13/8.5	7.5/7.69/7.14	400/370/370	604/551/4.92	57.25	6
MW70-1	2/22/94	7.5/8/7.6/7.6/7.8	6.7/6.88/6.90/6.85/6.86	500/500/480/470/470	1000+/1000+/19.7/20.5/15.3	48.5	5.9
MW70-2	2/21/94	8.7/8.8/9/9.2/9.4	6.6/6.7/6.7/6.73/6.63	800/750/780/790/800	1000+/1000+/191/24.3/3.14	50	5.6
MW70-3	2/21/94	8.2/9/8.5/8.3/8.6	6.8/6.85/6.89/6.95/6.83	820/840/680/670/670	1000+/1000+/9.45/85.3/15.6	35	5.5
MW70-4	5/11/94	9.8/10.1/9.8/9.7/10.1	7.1/6.9/6.9/6.92/6.93	680/670/690/690/690	1000+/2.10/6.21/43.7/3.59	40	5.1
MW71-1	3/14/94	5/5.5/5.5/5.5/5.5	7.01/6.92/6.93/6.86/6.85	550/550/550/500/500	730/142/96.6/25/22.4	30	6.6
MW71-2	3/22/94	6.5/6.8/6.8	7.07/7.09/7.09	445/455/435	1000+/116/57.6	5.5	4.3
MW71-3	3/22/94	5.9/6.2/6.4/6.5	7.15/7.14/7.10/7.13	450/470/458/475	1000+/100+/6.3/33.6/3.1/438	7.45	5.3

Note: All wells were developed by the surge and pump method.

The collection of representative groundwater samples is partially dependent upon the turbidity of the sample. Guidance provided by NYSDEC indicates that a valid sample is considered to be one that has a turbidity of less than 50 Nephelometric Turbidity Units (NTUs).

The development of monitoring wells was performed at least 2 days after well installation and at least 7 days prior to the well sampling and monitoring activities. If the wells were slow to recharge due to the low permeability of the formation, surging and overpumping were required to be performed numerous times on each well, with complete recharge between each episode. Every attempt was made to remove excessive turbidity from the wells because high turbidity can result in elevated metal concentrations detected in the groundwater.

The criteria for determining if the well was properly developed was based upon the guidance provided by the NYSDEC TAGM #HWR-88-4015. This guidance document specifies an upper level of allowable levels of turbidity in groundwater from monitoring wells which is considered acceptable for determining the water quality of metals in the aquifer.

Development operations were performed until the following conditions were met:

1. Water samples had the lowest possible NTUs
2. The temperature, specific conductivity and pH of the well water varied by no more than 10 percent.

Temperature and specific conductivity were measured in the field using a YSI model 33 SCT meter; pH was measured in the field using an Orion model 230A pH meter. A nephelometer was used to measure turbidity. The instruction manuals for these instruments were kept with the instrument in the field.

The development procedure which was used for these wells reduced the turbidity of the water in the wells. For development of these wells, surging with a bailer for 5 to 60 minutes was performed and the water in the well was removed using a peristaltic pump at a rate of between 0.05 and 2.1 liters per minute. The surging was performed to remove any silt and clay "skin" that may have formed on the borehole wall during drilling. The relatively low flow rate water removal was performed to develop the well and surrounding formation by removing

some silt and clay, while not creating an influx of large amounts of silt and clay, which are major components of the till. The final turbidity values, measured after well development was completed, are shown in Table 2.2-2.

2.2.5 Groundwater Sampling

Monitoring wells were sampled to evaluate the presence and extent of organic and inorganic chemical constituents present within the groundwater. The monitoring well field sampling information is presented in Table 2.2-3. The groundwater sampling procedure is described below.

The wells were purged prior to sampling using a peristaltic pump with the dedicated Teflon tube that extended to the bottom of the well. A low flow purging method was implemented to obtain groundwater samples with the lowest possible turbidity values. Water levels in all monitoring wells were measured prior to the groundwater sample collection.

Groundwater sampling was performed in three steps: (1) remove the silt, (2) purge the water standing in the well, and (3) sample the water. Each of these steps is described in the following sections.

Silt Removal

One day prior to sampling, the depth to groundwater was measured and recorded. A previously unused piece of 3/8 inch OD Teflon tubing was installed in the well. The thickness of silt in the bottom of the well was determined by measuring the depth to the top of the silt. If the thickness of silt was greater than 1 inch, silt removal as described below was performed. If the thickness was less than 1 inch, then no silt removal was necessary prior to the purging process.

The Teflon tubing was connected to 1/4 inch. Tygon tubing installed in the head of a peristaltic pump. Purging began with the bottom opening of the Teflon tube immediately above the silt layer. The silt was slowly agitated with the tube so that the silt was disturbed, became suspended, and was collected by the tube (the purge water would become silt-laden and have a dark brown-gray color indicating that the silt was being removed). An appropriate flow rate was used for the silt removal. If more force was required to adequately disturb the silt at the bottom of the well, a decontaminated 1-inch stainless steel or Teflon bailer was

TABLE 2.2 - 3

MONITORING WELL FIELD SAMPLING INFORMATION

SENECA ARMY DEPOT
7 AOCs

MONITORING WELL	DATE SAMPLED	INDICATORS				GALLONS REMOVED (gal)	STANDING WATER VOLUME (gal)	WELL VOLUMES REMOVED
		TEMPERATURE (°C)	pH (standard units)	CONDUCTIVITY (µmhos/cm)	TURBIDITY (NTUs)			
MW60-1	7/7	11/11.3/11.7	6.91/7.24/7.35	1010/1010/1010	104	7.86	2.62	3
MW60-2	7/7	11/12.2/11.5	7.2/7.33/7.29	700/700/700	8.64	8.25	2.73	3
MW60-3	3/29	9/8.6/8.2	7.17/7.22/7.25	675/660/615	5.76	11.1	3.71	3
MW62-1	7/21	18.5/19.5/20.8	7.00/7.01/7.95	750/750/750	86	1.5	1.0	1.5
MW62-2	7/21	21.4/18.4/19.1	7.3/7.3/7.3	670/650/655	28	1.5	1.4	1
MW62-3	7/20	14.3/15.0/14.0	7.4/7.4/7.20	600/550/525	31	11.25	3.75	3
MW63-1	7/11	15.7/15.4/15.2	7.02/7.37/7.30	420/460/445	109	2.5	.75	3.3
MW63-2	7/11	17.8/18.6/17.6	7.26/7.25/7.30	650/650/650	44.8	3.0	1.0	3
MW63-3	7/11	18.7/19.0/18.4	6.71/6.75/6.75	1990/2075/2100	67.6	2.6	.86	3
MW64A-1	7/19	15.0	7.40	500	15	.14	.14	1
MW64A-2	7/21	19.1/22.0/216	7.19/7.50/7.40	875/975/950	80	.5	.4	1.25
MW64A-3	7/7	13.9/13.6/13.6	6.9/6.95/6.98	700/630/620	120	2.16	.72	3
MW64B-1	7/10	13.4/12.2/12.9	7.42/8.44/8.38	790/720/710	14.0	6.3	2.1	3
MW64B-2	7/10	13.9/16.5/14.5	7.28/8.20/8.24	720/725/710	3.30	5.4	1.8	3
MW64B-3	7/10	11.7/11.4/11.6	6.07/7.14/7.40	1075/1025/1010	331	7.26	2.42	3
MW64C-1	7/11	11.8/11.1/11.2	7.09/7.14/7.14	410/520/520	88	6.1	2	3
MW64C-6	7/21	13.4/15.7/15.4	6.06/6.61/7.61	500/510/500	0.94/9.04	9.6	3.2	3
MW64C-7	7/21	16.3/16.6/15.3	6.45/7.74/6.44	480/460/450	10.6	5.30	1.76	3
MW64C-8	7/21	14.5/16.1/17.3/17.3	6.0/6.04/6.73/6.85	700/700/725/725	12.1/16.8	3.5	1.0	3.5
MW64C-9	7/10	13.9/12.4/12.4	7.75/8.45/8.61	710/690/690	2.41/17.5	6.6	2.2	3
MW64D-1	7/8	19.9/21.3/22	7.27/7.20/7.22	775/730/725	1.48	1.25	.38	3.2
MW64D-2	7/9	15.5/15.8/15.6	7.54/7.60/7.88	500/490/4900	181	3	.88	3.4
MW64D-3	7/8	17.6/18.2/16.9	7.53/7.51/7.51	550/550/550	127	2.80	.95	3
MW64D-4	7/8	15.9/16.1/15.2	7.19/7.12/7.29	590/590/595	141	3	.82	3.7
MW64D-5	7/18	18.0/16.5/15.3	7.62/7.61/7.75	550/525/550	>>200	.19	.19	3.2
MW67-1	7/7	16/14.9/14.9	7.3/7.17/7.20	570/550/520	1000+	3.8	1.2	3.2
MW67-2	7/10	12.5/13/12	6.53/6.63/7.03	480/490/490	90	5	1.45	3.4
MW67-3	7/8	12/11.3/11.9	6.91/6.94/6.96	450/430/440	Clear	4	1.3	3.1
MW70-1	7/7	14.8/14.7/13.8	7.26/8.17/8.17	600/595/590	26.7	4.5	1.42	3.2
MW70-2	7/7	15.8/16.3/15.8	6.82/6.89/7.11	1010/1010/1010	329	4.75	1.58	3
MW70-3	7/8	14.6/14.7/15.3	7.13/8.05/8.23	890/880/850	54.6	4.5	1.15	3.9
MW70-4	7/8	15.7/16.2/16	7.83/8.14/8.06	875/875/875	2.83	4.2	1.4	3
MW71-1	3/29	6.3/5.9/6.1	6.75/6.83/6.80	575/580/620	1860	1.8	0.6	3
MW71-2	*	NA	NA	NA	NA	NA	NA	
MW71-3	7/7	17.5/17.5/17.5	7.02/7.09/7.09	675/660/660	64	.8	.3	2.7

Notes:

1) NA = Not Available
2) All wells were sampled in 1994
3) Turbidity was measured during metals sampling
4) * = MW71-2 was not sampled, well did not recharge after purging

slowly lowered to the bottom of the well to slowly agitate the silt while pumping. Silt removal was complete when the water was no longer silt-laden and dark brown-gray in color.

Monitoring Well Purging

The monitoring wells were purged prior to sampling using a peristaltic pump with a dedicated Teflon tube. Before purging, the depth to water was measured with a decontaminated electronic water level meter. The water level probe was left in the well so that the water level could be monitored continuously during purging. The purging process began with the open-end of the tube at least 6 inches from the bottom of the well. The purging flow rate was between 100 ml/min and 1,600 ml/min. The purge rate was set so that pumping the well to near dryness during purging was avoided and also so that the turbidity of the groundwater sample was less than 50 NTUs. If the water level fell below one half the static water column height, the purge rate was lowered to minimize the drawdown while still maintaining a practical purging rate. If the turbidity was greater than 50 NTUs, the purge rate was reduced to minimize the turbidity while maintaining a practical purging rate. The exact flow rate was determined using a plastic graduated beaker and was recorded on the sampling data sheet. The water was purged into a graduated 5-gallon bucket. After approximately one well volume was removed, the time, flow rate, depth to the bottom of the opening of the Teflon tube and the total volume of water removed was recorded on the sampling data sheet. A 1-gallon plastic container was filled from the outlet side of the peristaltic pump and the temperature, turbidity, specific conductance, and pH were measured. For wells which were not purged to near dryness after one well volume had been removed, the Teflon tube was slowly raised to a point between the top of the well screen and the water surface. When two well volumes were removed, the required data (noted above) were again recorded on the data sheet. Purging of the well continued until three well volumes had been removed. After purging the third well volume, the required data (noted above) were again recorded. If necessary additional temperature, specific conductance, turbidity, and pH measurements were made on additional well volumes until their measurements stabilized (two successive measurements varying by less than 10 percent). Moving the location of the tube from the screened interval to a point near the top of the water surface during purging ensured the removal of any stagnant water from the well prior to sampling. After removal of the necessary well volumes, the water level was measured in the well. If the well had recovered to 95 percent of the original static level, then sampling of the well was performed. If the 95 percent recovery had not been achieved after three hours, then the recovery requirement for the well was reduced to 85 percent water level recovery prior to sampling.

For wells which were very slow to recharge, purging of groundwater, at the 100 ml/min flow rate, was continued until the well had been purged to near dryness (i.e., when the water level was at one foot above the bottom of the well). Again the purging process began with the open end of the Teflon tube at the bottom of the well screen or at least six inches from the bottom of the well. The time, flow rate, depth to the bottom of the open tube, and total volume of water removed were recorded after purging the well to near dryness. The temperature, specific conductance and pH were also recorded immediately after purging the well to near dryness. The water level was monitored with an electronic water level meter during purging. After these procedures, the well was considered to have been purged enough to ensure that the subsequent water samples collected from the well would be representative of water from the aquifer. Once purged to near dryness, the well was allowed to recover to 95 percent of the original static level prior to sampling. If, however, the well had not recharged to 95 percent after three hours then the recovery requirement for the well was reduced to 85 percent water level recovery prior to sampling. If the well had not recharged to 85% of the original static level after six hours then sampling of the well was begun as water was available for each parameter.

Monitoring Well Sampling

Prior to collecting the groundwater sample, the Teflon purging tube was removed from the well and placed into a clean plastic bag during sampling. To sample, a decontaminated bailer was lowered into the well at a rate of 1/2-inch/sec to minimize the disturbance of water and silt in the well. When the bailer had filled with water, it was removed at a rate of 1/2-inch/sec and the appropriate sample containers were filled. If during the sampling process the well was bailed to near dryness (i.e., the bailer reaches the bottom of the well) sampling was stopped until the water level recharged to 85 percent of the original static level. If the water level had not recharged to 85 percent after six hours, sampling was continued the next day as water was available for each parameter. When sampling was complete, the dedicated Teflon tubing was returned to the well.

Groundwater samples collected for volatile analyses were collected first, before any of the other parameters, in a manner that would minimize the loss of volatile compounds. Sampling for the remaining parameters was carried out in the following sequence: semivolatiles, metals, cyanide, explosives, pesticides/PCB, herbicides, total petroleum, hydrocarbons, nitrates, and radionuclides. Groundwater samples were collected with the required quality

assurance/quality control (QA/QC) samples, then transmitted to the laboratory for chemical analysis in accordance with the Chemical Data Acquisition Plan (CDAP).

Depending upon the activities performed at the AOC and the constituents of concern, monitoring wells were sampled for most or all of the following parameters:

1. Target Compound List (TCL) for Volatile Organic Compounds (VOC) by NYSDEC CLP

2. TCL for Semivolatiles, Pesticides and Polychlorinated Biphenyls (SVOs, Pesticides and PCBs);
3. Target Analyte List (TAL) (Metals and Cyanide)
4. Method 8150 (Herbicides)
5. Method 8330 (Explosives)
6. Method 418.1 (Total Petroleum Hydrocarbons)
7. Method 353.2 (Nitrates)
8. Radionuclides: Method 9310 Gross Alpha, Gross Beta
   Method 901.1 Gamma Spectrum Analysis

Two rounds of water level measurements were completed for the monitoring wells. The water level data were used to determine the direction of groundwater flow within the glacial till/weathered shale aquifer. These data are presented and discussed in detail in Section 3.

2.2.6 Surface Water and Sediment Sampling Procedures

Surface water samples were collected by immersing a clean glass sample bottle without preservatives into the surface water body. The sample was then transferred to a pre-preserved sample bottle, if required. Temperature, conductivity, pH, and turbidity of surface water, were measured directly in the field with calibrated meters. The sample pH was measured with an Orion pH meter, Model SA230 or SA230A, conductivity and temperature were measured with a YSI Model 33 conductivity meter, and turbidity was measured with a Hach Portable Turbidimeter, Model 2100p or Model 16800.

Sediment samples were collected by scooping sediment into a decontaminated stainless steel bowl with a decontaminated trowel. Volatile organic compound samples were taken first,

prior to any mixing of the sediments. Then, the bowl was refilled with additional sediment, if required, thoroughly mixed and the appropriate sample containers filled with sediment.

2.3 SEAD-60 - OIL DISCHARGE ADJACENT TO BUILDING 609

The oil stained soil adjacent to Building 609 is believed to have been caused by a discharge of boiler fuel oil through a pipe at the southern end of the buildings western wall. The stained area is approximately 30 feet long and 6 feet wide. Because the oil could leach into the soil and the groundwater, these two media were considered as the primary migration pathways at SEAD-60. No drinking water wells exist within the area influenced by the site.

Therefore, the groundwater at this site has been classified as GA, which means the water quality must be suitable for drinking.

2.3.1 Chemicals of Interest

Chemicals of interest include VOCs, SVOs, pesticides/PCBs, TPHs, and heavy metals.

2.3.2 Media Investigated

Soils

A total of three soil borings were advanced at SEAD-60. The soil boring locations are shown on Figure 2.3-1. The three soil borings were drilled in the area of and adjacent to the oil spill outside of Building 609. Three soil samples were collected from each boring (Table 2.3-1) and were submitted for the chemical analysis identified in section 2.3-3.

Groundwater

A total of three monitoring wells were installed at this AOC. The monitoring well locations are shown in Figure 2.3-1. One monitoring well (MW60-1) was installed upgradient of Building 609 to obtain background water quality data. The remaining two wells were installed downgradient of the oil stained soil area to determine if hazardous constituents have migrated from the AOC and to determine the direction of groundwater flow. The presumed direction of groundwater flow at this AOC was to the west.

TABLE 2.3-1

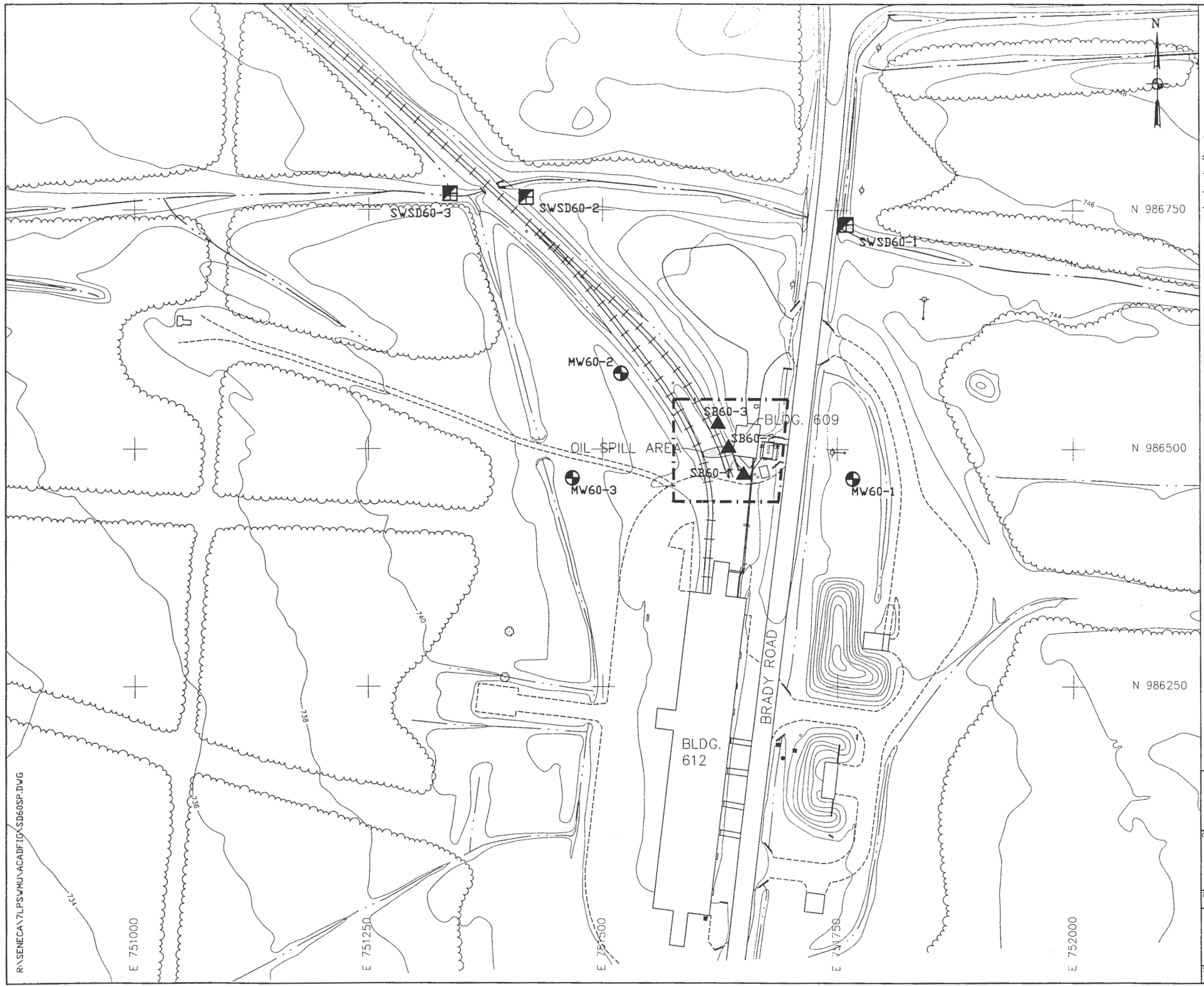
SEAD-60 SOIL BORING SAMPLING SUMMARY

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs

BORING NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
SB60-1	SB60-1.00	0-2"
	SB60-1.01	0-2'
	SB60-1.02	2-4'
SB60-2	SB60-2.00	0-2"
	SB60-2.02	2-4'
	SB60-2.04	6-8'
SB60-3	SB60-3.00	0-2"
	SB60-3.03	4-6'
	SB60-3.04	6-8'

Notes:

1) The sample number contains the sample location with a soil boring (SB) identifier.
2) All SEAD-60 samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, cyanide, and TPH.



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- MONITORING WELL
- SOIL BORING
- SURFACE WATER/ SEDIMENT SAMPLE

50 0 50 100
(feet)

R:\SENECA\7LPSWMU\ACADFIG\SD60SP.DWG

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.3-1
SEAD-60
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 100'	APRIL 1996	B

2.4.2 Media Investigated

Geophysics

Four 115 foot long seismic refraction profiles were surveyed along 4 lines positioned throughout the AOC. The seismic profile locations are shown in Figure 2.4-1. Data from the surveys were used in conjunction with those from the combined SEADs-43, 56, and 69 seismic refraction profiles to allow for a more comprehensive interpretation of groundwater flow direction for this area.

An EM-31 survey was performed to determine the exact location of the suspected nicotine sulfate drums. The geophysical survey grid is shown in Figure 2.4-1. A grid of electromagnetic data was collected across the site. Survey profiles were spaced at 50 foot intervals and electromagnetic measurements were taken at 10 foot intervals along each profile.

EM-31 was the primary geophysical method of investigation at SEAD-62, however, a GPR survey was also performed to provide additional data in areas of elevated ground conductivity and to characterize the source of several electromagnetic anomalies. The GPR data were collected along the same lines as the EM-31. A total of 73,600 feet of EM-31 data and 34,650 feet of GPR data were collected.

Soils

Three test pits were excavated at SEAD-62. The test pit locations are shown in Figure 2.4-2. Two test pits were located over electromagnetic anomalies, each located within an area of elevated ground conductivity. The third excavation was located over an EM-31 anomaly situated along the western boundary the AOC. One soil sample was collected from each test pit (Table 2.4-1) and submitted for chemical analysis identified in section 2.4-3.

Groundwater

Three groundwater monitoring wells were installed at SEAD 62 as shown in Figure 2.4-2. One monitoring well (MW62-1) was installed upgradient of the two areas of high conductivity previously mentioned to obtain background water quality data. The remaining two wells, were installed adjacent to and downgradient of these areas of high conductivity to determine if hazardous constituents were present and to determine the direction of groundwater flow.

LINE 1
LINE 5
LINE 10
LINE 15
LINE 20
LINE 25
LINE 29
N 987000
N 986500
N 986000
ST 1000
ST 1200
ST 1400
ST 1600
ST 1800
ST 2000
ST 2200
ST 2400
ST 2600
ST 2800
ST 3000
ST 3200
ST 3400
ST 3600
ST 3800
E 752500
E 753000
E 753250
E 753500
BRADY ROAD
UNNAMED ROAD
BLDG. 606
BLDG. 609
BLDG. 612

LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- APPROXIMATE LANDFILL EXTENT
- RAILROAD
- 760 — GROUND SURFACE ELEVATION CONTOUR
- ELECTRIC UTILITY LINE
- UNDERGROUND WATER UTILITY LINE

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

LINE 15 — ST3200 — EM TRANSECT AND STATION NUMBERS

N

100 0 100 200
(feet)

ACAD\SENECA\7LPSWMU\ACADFIG\SD62GS1.DWG

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEEERING	720518-01002

FIGURE 2.4-1
SEAD-62
LOCATION OF GEOPHYSICAL SURVEYS
PAGE 1 OF 2

SCALE	DATE	REV
1" = 200'	APRIL 1996	A

LINE 2
LINE 4
LINE 6
LINE 8
LINE 10
LINE 12
LINE 14
LINE 16
LINE 18
LINE 20
LINE 22
LINE 24
LINE 26
LINE 28
G1 P3 G24
G1 P4 G24
G1 P2 G24
G1 P1 G24
BRADY ROAD
UNNAMED ROAD
BLDG. 606
BLDG. 609
BLDG. 612
N 987250
N 986900
N 986600
E 751500
E 752000
E 752250
E 752750
E 753000
E 753750
E 754000

LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- APPROXIMATE LANDFILL EXTENT
- RAILROAD
- 760 GROUND SURFACE ELEVATION CONTOUR
- ELECTRIC UTILITY LINE
- UNDERGROUND WATER UTILITY LINE

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

LINE 15 L1300E

G1 P2 G24 SEISMIC PROFILE WITH GEOPHONE NUMBERS

GPR TRANSECT

N

100 0 100 200
(feet)

ACAD\SENECA\7LPSVMU\ACADFIG\SD62GSA.DWG

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEEERING
D*G. No. 720518-01002

FIGURE 2.4-1
SEAD-62
LOCATION OF GEOPHYSICAL SURVEYS
PAGE 2 OF 2

SCALE 1" = 200'
DATE APRIL 1996
REV A

LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- APPROXIMATE LANDFILL EXTENT
- RAILROAD
- 760 GROUND SURFACE ELEVATION CONTOUR
- ELECTRIC UTILITY LINE
- UNDERGROUND WATER UTILITY LINE

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT

- MONITORING WELL
- TEST PIT

N

100 0 100 200
(feet)

ACAD\SENECA\7LPSVMU\ACADFIG\SD62SP.DWG

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEEERING
Dwg. No. 720518-01002

FIGURE 2.4-2
SEAD-62
LOCATION OF SAMPLING POINTS

SCALE 1" = 200'
DATE APRIL 1998
REV A

TABLE 2.4-1

SEAD-62 TEST PIT SAMPLING SUMMARY

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs

TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
TP62-1	TP62-1	0-6"
TP62-2	TP62-2	3'
TP62-3	TP62-3	2'

Notes:

1) The sample number contains the sample location with a test pit (TP) identifier.
2) All SEAD-62 samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, cyanide, and herbicides.

The presumed direction of groundwater flow at this AOC was to the southwest, however, the geophysical survey showed the direction to be more to the west. The relocation of these monitoring wells was based upon the results of the seismic survey, to assure the wells were placed in the proper upgradient and downgradient locations.

One monitoring well was constructed at each designated location and was screened over the entire thickness of the aquifer above competent bedrock. Following installation and development, one groundwater sample was collected from each well and tested for the parameters identified in Section 2.4-3.

2.4.3 Analytical Program

A total of 3 soil samples and 3 groundwater samples were collected from SEAD 62 for chemical analysis. All the samples were analyzed for the following: TCL VOCs, SVOs, and Pesticides/PCBs and TAL Metals and Cyanide according to the NYSDEC CLP SOW, and herbicides by Method 8150. A summary of the laboratory analysis for SEAD 62 is presented in Table 2.1-3.

2.5 SEAD 63 - MISCELLANEOUS COMPONENTS BURIAL SITE

The materials disposed of at the miscellaneous components burial site are unknown. It is believed that this area was used for the burial of classified military parts. Because information pertaining to the operating practices and the materials disposed of at this site is limited, transport in groundwater, leaching into the soil, and transport in surface water and sediments were considered as potential migration pathways. No drinking water wells exist within the area influenced by the site, and the groundwater at this site has been classified as GA.

2.5.1 Chemicals of Interest

It is unknown what may have been disposed of within these burial pits. Consequently, VOCs, SVOs, Pesticides/PCBs, heavy metals and radioactive materials may be present.

2.5.2 Media Investigated

Geophysics

Four 115 foot long seismic refraction profiles were surveyed on 4 lines positioned along each

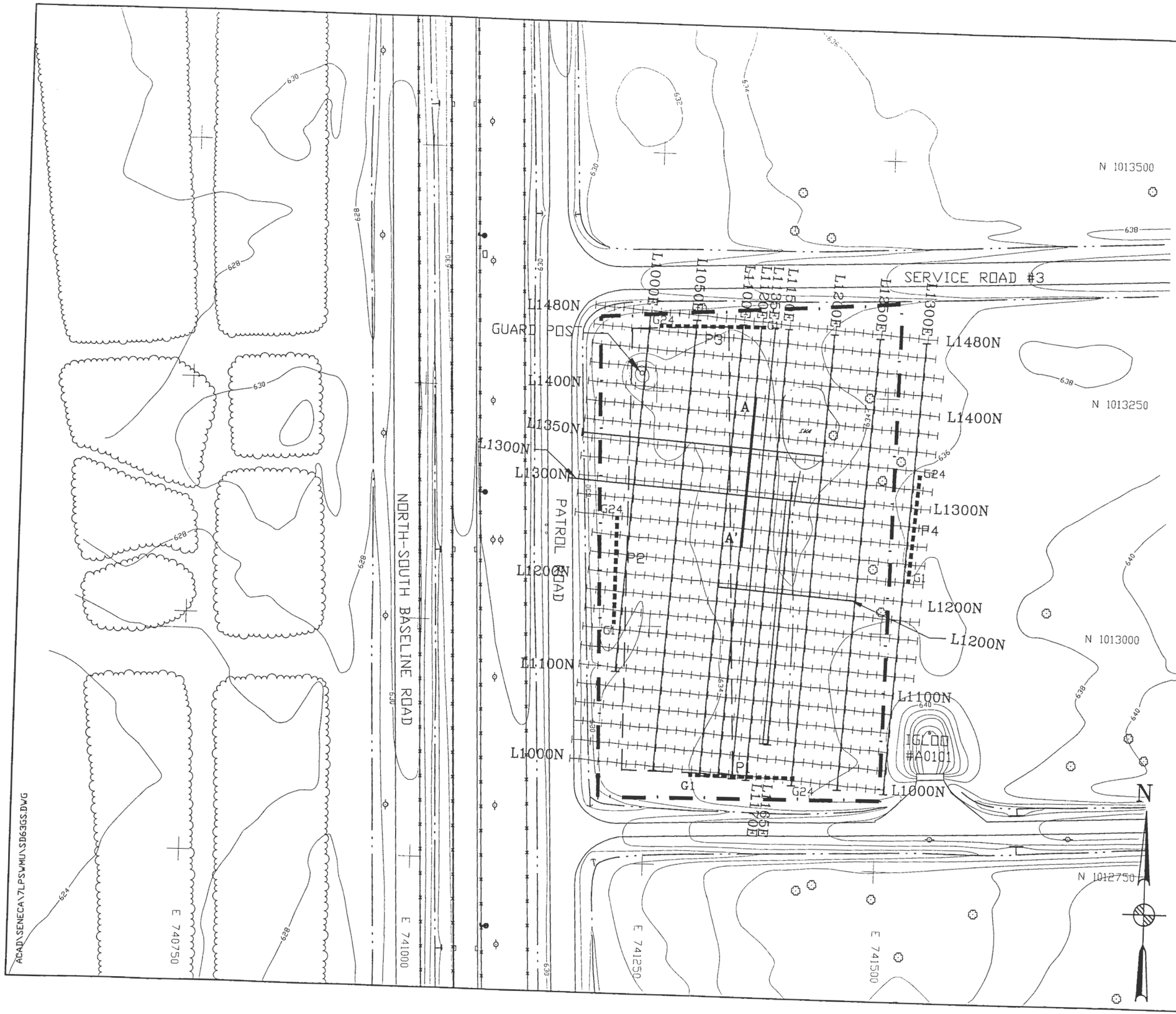
boundary of the AOC. The seismic refraction transect locations are shown in Figure 2.5-1. Data from the seismic survey were used to determine the direction of groundwater flow and to adjust the monitoring well locations to assure that one monitoring well was installed upgradient and two monitoring wells were installed downgradient of the AOC.

To locate the exact location of the miscellaneous burial pits, GPR and EM-31 surveys were performed throughout the AOC. The locations of the survey grids are shown in Figure 2.5-1. The electromagnetic data were collected along profiles spaced at 20 foot intervals with readings taken every 10 feet along each profile. GPR data were acquired along profiles spaced every 50 feet. Where electromagnetic anomalies possibly associated with buried metallic objects were detected, additional GPR data were collected to characterize the anomaly source. A total of 9,120 feet of EM-31 data and 5390 feet of GPR data were collected.

Soils

Fifteen soil samples were proposed for this AOC. Three soil samples were to be collected from test pits, nine soil samples were to be collected from three soil borings and three soil samples were to be collected from the upgradient monitoring well location. However, due to the nature of materials stored and potentially disposed of in this area, an amendment to this sampling plan was drafted following the completion of the geophysical surveys. The presence of large quantities of buried metallic objects in an area approximately 30 feet wide by 200 feet long had been revealed, and it was decided that a better identification of suspected buried objects could be obtained by performing test pits rather than performing the three originally proposed soil borings. This amendment, calling for the collection of one soil sample from each of 12 test pits was approved by NYSDEC and the EPA on 8 June, 1994, and 29 June, 1994, respectively.

Twelve test pit excavations were performed over areas of geophysical anomalies. The test pit locations are shown in Figure 2.5-2. The test pits were located in zones of disturbed soil as determined by the GPR survey, areas of elevated ground conductivity, areas of large EM-31 anomalies and areas with visible surface debris. One soil sample was collected from each of the twelve test pits (Table 2.5-1) and submitted for chemical analyses identified in Section 2.5-3.



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

APPROXIMATE EXTENT OF OPERATIONS PAD (FROM SEDA SITE MAPS)

L1300E — GPR TRANSECT

G1 P2 G24 — SEISMIC PROFILE AND GEOPHONE NUMBER

L1200E — EM TRANSECT

A — A' GPR RECORD SHOWN IN REPORT

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

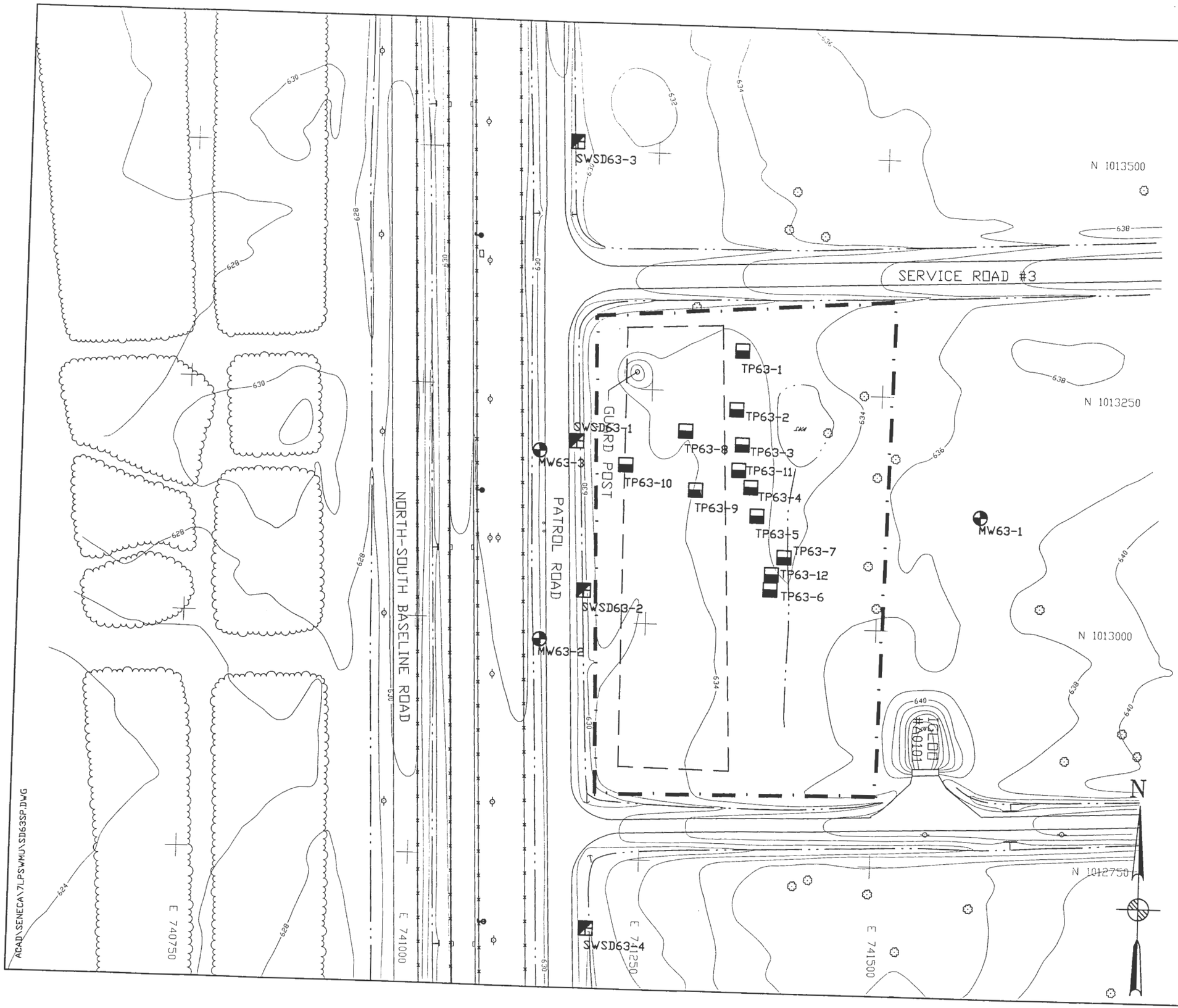
CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.5-1
SEAD-63
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV
1" = 100'	APRIL 1996	A



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- APPROXIMATE EXTENT OF OPERATIONS PAD (FROM SEDA SITE MAPS)
- MONITORING WELL
- TEST PIT
- SURFACE WATER/SEDIMENT

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.5-2
SEAD-63
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 100'	APRIL 1996	B

ACAD\SENECA\7LPSWMU\SD63SP.DWG

TABLE 2.5-1

SEAD-63 TEST PIT SAMPLING SUMMARY

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs

TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
TP63-1	TP63-1	3'
TP63-2	TP63-2	2'
TP63-3	TP63-3	6.5'
TP63-4	TP63-4	3'
TP63-5	TP63-5	2'
TP63-6	TP63-6	3'
TP63-7	TP63-7	1.5'
TP63-8	TP63-8	1.5'
TP63-9	TP63-9	2.5'
TP63-10	TP63-10	1.5'
TP63-11	TP63-11	3'
TP63-12	TP63-12	5'

Notes:

1) The sample number contains the sample location with a test pit (TP) identifier.
2) All SEAD-63 samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, cyanide, and radionuclides.

Groundwater

Three groundwater monitoring wells were installed at SEAD-63 as shown in Figure 2.5-2. One monitoring well (MW63-1) was installed upgradient of the AOC to obtain background groundwater quality data, while the remaining two monitoring wells were installed adjacent to and downgradient of the AOC to determine if hazardous constituents were present in the groundwater and to determine the direction of groundwater flow. The presumed direction of groundwater flow at this AOC was to the southwest, however, the geophysical survey showed the direction to be more to the west. The relocation of MW63-1 to the northwestern corner of the AOC and MW63-2 to the western boundary of the AOC was based upon the interpretation of the seismic refraction surveys.

One monitoring well was constructed at each designated location and was screened over the entire thickness of the aquifer above competent bedrock. Following installation and development, one groundwater sample was collected from each well and tested for the parameters listed in Section 2.5.3.

Surface Water and Sediment

Four surface water and sediment samples were collected from SEAD-63. All four samples were collected from the drainage ditch running along the eastern boundary of Patrol Road. The surface water and sediment sample locations are shown in Figure 2.5-2. These samples were collected and analyzed for the parameters listed in Section 2.5-3 to determine if surface water runoff is a transport pathway of contamination at SEAD-63.

2.5.3 Analytical Program

A total of 12 soil samples, 3 groundwater samples, and four surface water and sediment samples were collected from SEAD 63 for chemical testing. All the samples were analyzed for the following: TCL VOCs, SVOs, and Pesticides/PCBs and TAL Metals and Cyanide according to the NYSDEC CLP SOW, and radioactivity (Gross Alpha and Gross Beta only). A summary of the analytical program for SEAD 63 is presented in Table 2.1-3.

2.6 SEAD 64A: GARBAGE DISPOSAL AREA

This area was used for garbage disposal from 1974 to 1979 when the solid waste incinerator (SEAD-15) was not operating. The types of wastes landfilled at SEAD-64A are suspected

to be primarily household items, although metal drums and other industrial wastes were reported in the SWMU Classification Report. Debris (asphalt, wooden boards, concrete slabs, and corrugated drain pipe) were visible on the surface, although the site is mostly covered with dense vegetation. The primary migration pathways were expected to be transport in groundwater and leaching into the soil. No drinking water wells are present within the area and the groundwater at this site has been classified as GA, which means that the quality must be suitable for drinking.

2.6.1 Chemicals of Interest

The primary chemicals of interest are VOCs, SVOs, Pesticides/PCBs, and heavy metals.

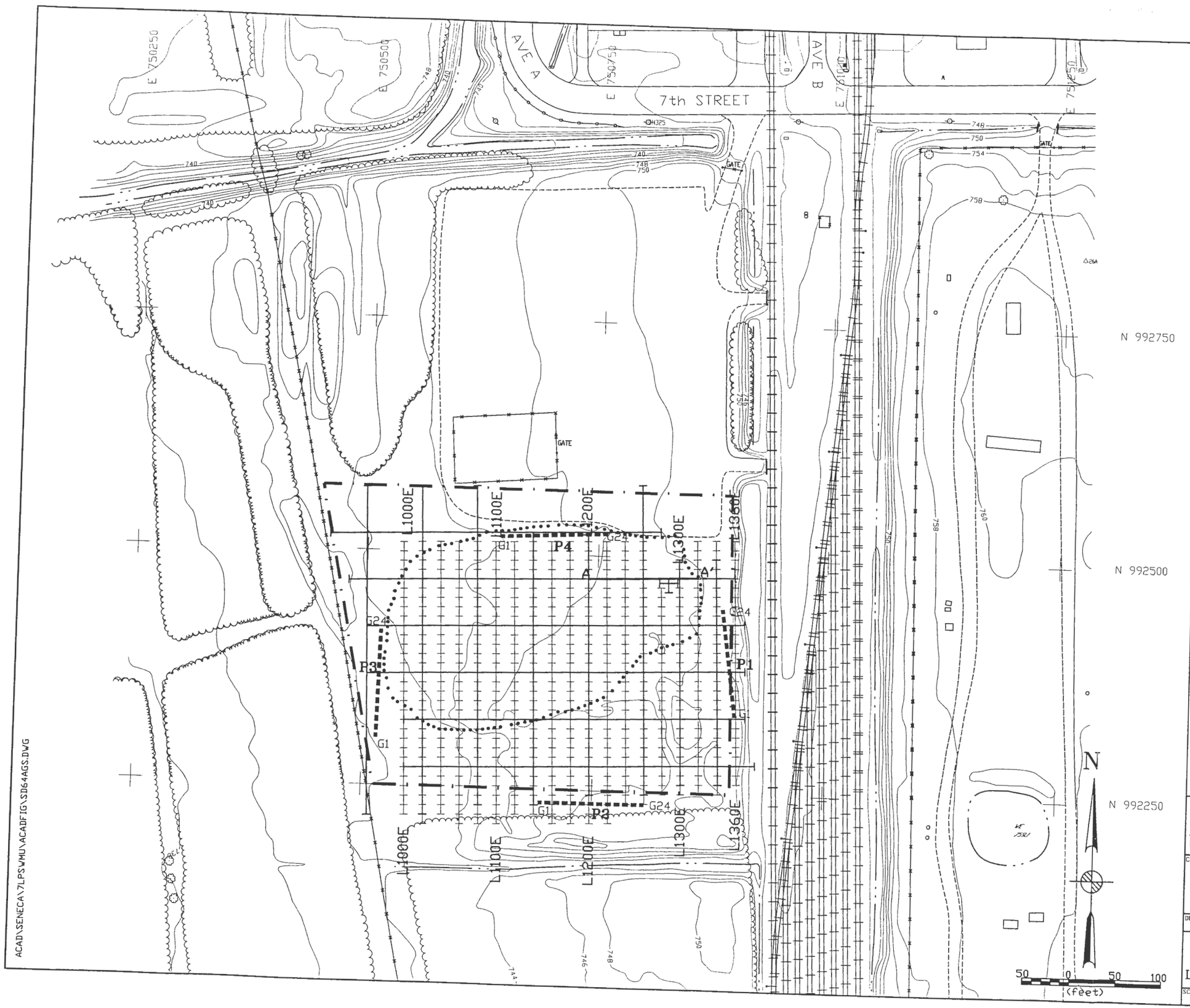
2.6.2 Media Investigated

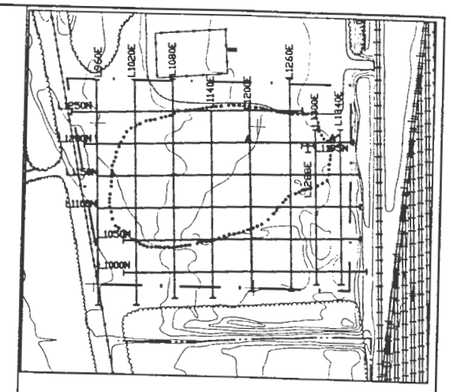
Geophysics

Four seismic refraction profiles, each 115-feet long, were surveyed along each boundary of SEAD-64A. Data from the seismic survey were used to determine the direction of groundwater flow and location of the upgradient and downgradient monitoring wells in the AOC. EM-31 and GPR surveys were also performed to delineate the limits of the landfill and identify locations where metallic objects may be buried. A grid of electromagnetic data was laid out and surveyed across the site. The profiles were spaced at 20-foot intervals with EM-31 measurements made at 20-foot intervals along each profile. GPR data were collected along profiles spaced at 50-foot intervals. In addition, GPR data were also collected over distinct EM-31 anomalies to provide better characterization of the suspected metallic sources. The location of the profiles and survey grids are shown in Figure 2.6-1. A total of 5,370 feet of EM-31 data and 4,595 feet of GPR data were collected at SEAD-64A.

Soils

A total of three soil borings were performed at SEAD-64A. The soil boring locations are shown in Figure 2.6-2. The three soils borings were drilled in detected geophysical anomalies, to determine the waste thickness, and provide subsurface samples for chemical analysis. Three soil samples were obtained from each boring. Three soil samples were also collected from the upgradient monitoring well location (MW-64A-1) to obtain background soil quality data. All of these soil samples (Table 2.6-1) were submitted for the chemical analyses in Section 2.6-3.





LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- L1200E — GPR TRANSECT
- G1 P2 G24 — SEISMIC PROFILE WITH GEOPHONE NUMBERS
- L1200N — EM TRANSECT
- A — A' GPR RECORD SHOWN IN REPORT

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.6-1
SEAD 64A
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV
1" = 100'	APRIL 1996	A

ACAD\SENECA\7LPSVMU\ACADFIG\SD64AGS.DWG

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- MONITORING WELL LOCATION
- TEST PIT LOCATION
- SOIL BORING LOCATION

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING

Dwg. No. 720518-01002

FIGURE 2.6-2
SEAD 64A
LOCATION OF SAMPLING POINTS

SCALE 1" = 100'

DATE APRIL 1996

REV A

ACAD\SENECA\7LPS\WMU\ACADFIG\SD64ASP.DWG

TABLE 2.6-1

SEAD-64A SOIL BORING SAMPLING SUMMARY

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs

BORING NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
SB64A-1	SB64A-1.00	0-2"
	SB64A-1.02	2-4'
	SB64A-1.04	6-8'
SB64A-2	SB64A-2.00	0-2"
	SB64A-2.02	2-4'
	SB64A-2.03	4-7'
SB64A-3	SB64A-3.00	0-2"
	SB64A-3.01	0-2'
	SB64A-3.02	2-3'
MW64A-1	MW64A-1.00	0-2"
	MW64A-1.02	2-4'
	MW64A-1.03	4-6'

Notes:

1) The sample number contains the sample location with a soil boring (SB) or monitoring well (MW) identifier.
2) All SEAD-64A samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, and cyanide.

Three test pits were excavated at distinct geophysical anomalies detected during the EM-31 and GPR surveys. The purpose of these test pits was to visually identify the contents of the disposal area, and therefore no soil samples were collected. The test pit locations are shown in Figure 2.6-2.

Groundwater

Four monitoring wells were installed at SEAD-64A, although only three wells were proposed in the workplan. The monitoring well locations are shown in Figure 2.6-2. One monitoring well was installed in an upgradient location (MW64A-1) for background water quality and two monitoring wells were installed in downgradient locations to determine if hazardous constituents have migrated from this AOC. The additional fourth well (MW64A-1A) was intended to be an upgradient well but was erroneously placed on the southern perimeter of the site. The monitoring well was not sampled, but was utilized for groundwater level measurements.

One monitoring well was constructed at each location and was screened over the entire thickness of the aquifer. Following installation and development (MW64A-1A was not developed), one groundwater sample was collected from each well (except MW64A-1A) and tested for the parameters listed in Section 2.6.3.

2.6.3 Analytical Program

A total of twelve soil samples and three groundwater samples were collected from SEAD-64A for chemical testing. All of these samples were analyzed for TCL VOCs, SVOs, Pesticides/PCBs and TAL Metals and Cyanide according to the NYSDEC CLP SOW. A summary of the laboratory analysis for SEAD-64A is presented in Table 2.1-3.

2.7 SEAD-64B: GARBAGE DISPOSAL AREA

This area was used for garbage disposal from 1974 to 1979 when the solid waste incinerator (SEAD-15) was not operating. Two mounds of fill material are located in the area. Types of wastes landfilled are suspected to be primarily household items, although metal drums and other industrial wastes were reported in the SWMU Classification Report. The primary migration pathways were expected to be transport in groundwater and leaching into the soil. Additionally, surface water and sediments were also considered as migration pathways since a drainage ditch runs along the northern and southern perimeters of the site. No drinking

water wells within the area influenced by the site exist, however the groundwater at this site has been classified as GA, which means the quality must be suitable for drinking.

2.7.1 Chemicals of Interest

The primary chemicals of interest are VOCs, SVOs, pesticides/PCBs and heavy metals.

2.7.2 Media Investigated

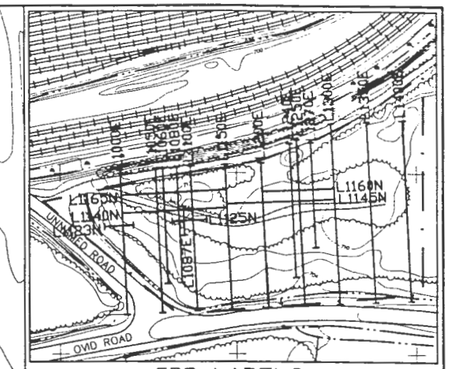
Geophysics

Four seismic refraction profiles, each 115-feet long, were surveyed along each boundary of SEAD-64B. Data from the seismic survey were used to determine the direction of groundwater flow and location of the upgradient and downgradient monitoring wells in the AOC. EM-31 and GPR surveys were also performed to delineate the limits of the landfill and identify locations where metallic objects may be buried. A grid of electromagnetic data was collected across the site. The profiles were spaced at 20-foot intervals with EM-31 measurements made at 10-foot intervals along each profile. GPR data were collected along profiles spaced at 50-foot intervals. In addition, GPR data were collected over distinct EM-31 anomalies to provide better characterization of the suspected metallic sources. The locations of the profiles and survey grids are shown in Figure 2.7-1. A total of 5,240 feet of EM-31 data and 3,310 feet of GPR data were collected at SEAD-64B.

Soils

A total of three soil borings were performed at SEAD-64B. The soil boring locations are shown in Figure 2.7-2. The locations of the soil borings were based upon the result of the geophysical surveys. The soil borings were drilled to determine the thickness of waste and to provide subsurface samples for chemical analysis. Three soil samples were obtained from each soil boring. Three soil samples were also collected from the upgradient monitoring well (MW64B-1) to obtain background soil quality data. These soil samples (Table 2.7-1) were submitted for the chemical analyses identified in Section 2.7.3.

Three test pits were excavated at SEAD-64B. The test pits were conducted where geophysical anomalies, thought to be associated with buried metallic objects, were detected.



GPR LABELS
NO SCALE

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

L1000E — GPR TRANSECT

G1 P2 G24 — SEISMIC PROFILE AND GEOPHONE NUMBERS

L1200E — EM TRANSECT

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.7-1
SEAD 64B
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV
1" = 100'	APRIL 1998	B

ACAD\SENECA\7LPSW\MU\ACADDWG\SD64PBS2.DWG

E 748000
E 748250
E 748500
E 748750
E 749000
N 986250
N 986000
N 985750
N 985500
SWSD64B-1
SWSD64B-2
SWSD64B-3
MW64B-3
SB64B-1
SB64B-3
SB64B-2
TP64B-3
TP64B-1
TP64B-2
MW64B-1
MW64B-2
UNNAMED ROAD
OVID ROAD
700
702
704
706
708
710
712
714
716

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- MONITORING WELL
- SOIL BORING
- SURFACE WATER/ SEDIMENT SAMPLE
- TEST PIT

50 0 50 100
(feet)

N

ACAD\SENECA\7LPSW\MU\ACADFIG\SD64BSF.DWG

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.7-2
SEAD 64B
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 100'	APRIL 1996	A

The test pit locations are shown in Figure 2.7-2. The purpose of the test pits was to visually identify the contents of the fill within the disposal area. No soil samples were collected from these test pits.

Groundwater

Three monitoring wells were installed at SEAD-64B and were located as shown in Figure 2.7-2. One monitoring well (MW64B-1) was installed upgradient of SEAD-64B to obtain background water quality data. Two monitoring wells were installed adjacent to and downgradient of this AOC to evaluate whether hazardous constituents have migrated from this AOC and to determine the groundwater flow direction. The presumed groundwater flow direction for this AOC was to the southwest. However, the geophysical survey indicated the direction to be to the northwest. As a result of this information, monitoring well MW64B-1 was moved to the southeastern perimeter of the site and MW64B-2 was relocated from the southern boundary of the disposal area to the north-northwestern boundary of the disposal area.

One monitoring well was installed at each location and was screened over the entire thickness of the aquifer. Following installation and development, one groundwater sample was collected from each well and analyzed for the parameters listed in Section 2.7.3.

Surface Water and Sediment

Three surface water and sediment samples were collected from SEAD-64B. All three samples were collected from the drainage ditch that flows to the west along the northern perimeter of this SEAD. The surface water and sediment sample locations are shown in Figure 2.7-2. These samples were collected and analyzed for the parameter listed in Section 2.7-3 to determine if surface water runoff is a transport pathway of contamination at SEAD-64B.

2.7.3 Analytical Program

A total of 12 soil samples, three groundwater samples, three surface water samples, and three sediment samples were collected from SEAD-64B for chemical analysis. All the samples were analyzed for TCL VOCs, SVOs, Pesticides/PCBs, and TAL metals and cyanide according to the NYSDEC CLP SOW. A summary of the laboratory analyses for SEAD-64B is presented in Table 2.1-3.

2.8 SEAD-64C: GARBAGE DISPOSAL AREA

This area is the site of a proposed landfill. The AOC was never used for landfilling but information within the SWMU Classification report suggests that limited dumping may have occurred in this area. A 20 foot by 15 foot concrete pad is located in this area, but it is unknown what the concrete pad was used for. During the 15 SWMU site inspection, transmission power lines were visible on the ground surface and are believed to be buried throughout the AOC.

The primary migration pathways were expected to be contaminant transport in the groundwater and contaminant leaching into the soil. No drinking water well exists within the area influenced by this site. The groundwater at this site has been classified as GA.

2.8.1 Chemicals of Interest

The primary chemicals of interest are VOCs, SVOs, Pesticides/PCBs, and heavy metals.

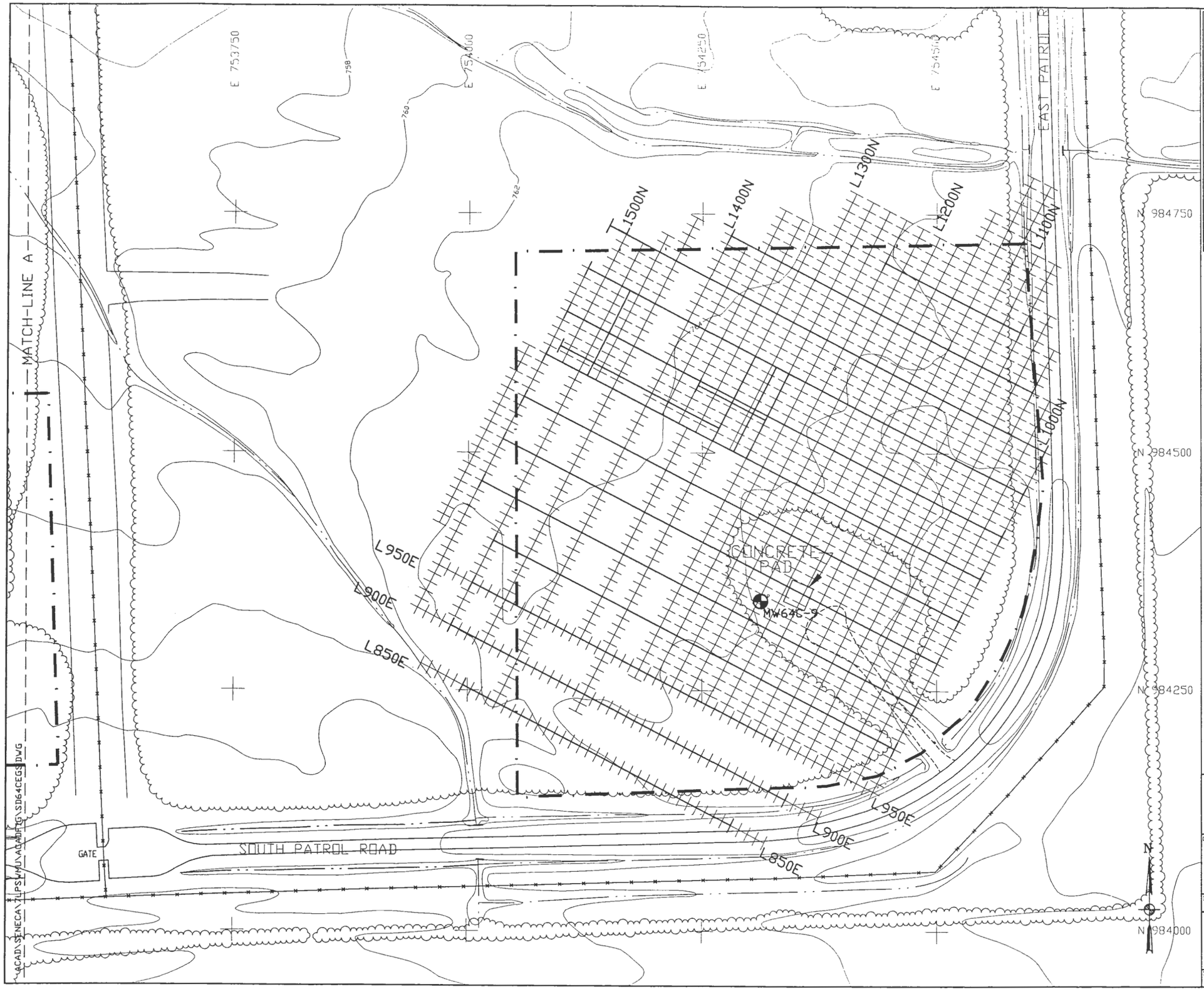
2.8.2 Media Investigated

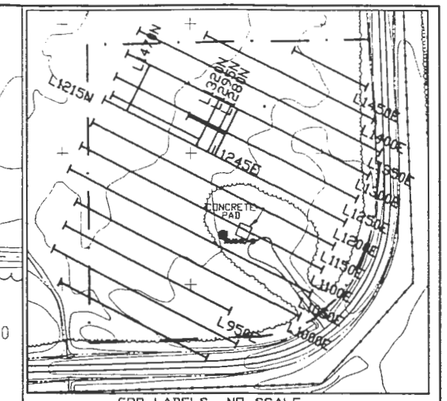
Geophysics

An EM-31 survey was performed on a 10 foot by 20 foot grid throughout the survey area as shown in Figure 2.8-1 and on a 10 foot by 40 foot grid throughout the survey area as shown in Figure 2.8-2. The objective of the EM-31 survey was to delineate the limits of the landfill and to identify locations where metallic objects may be buried. Subsequent to the EM-31 survey, a GPR survey was performed. The GPR data were collected along profiles spaced at 50 foot intervals as shown in Figure 2.8-1. These data were used to supplement the EM-31 interpretation to define the waste limits, and to provide better characterization of suspected buried metallic sources. A GPR survey was not performed in the western area of SEAD-64C because no EM-31 anomalies of unknown origin were detected in this areas. A total of 26,000 feet of EM-31 data and 6,370 feet of GPR data were collected at SEAD-64C.

Soils

Three test pits were performed at SEAD-64C, in areas of distinct geophysical anomalies. The test pit locations are shown in Figure 2.8-3. Two soil samples were collected from each test pit.





GPR LABELS NO SCALE

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- L1300E — GPR TRANSECT
- L1200E — EM TRANSECT

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

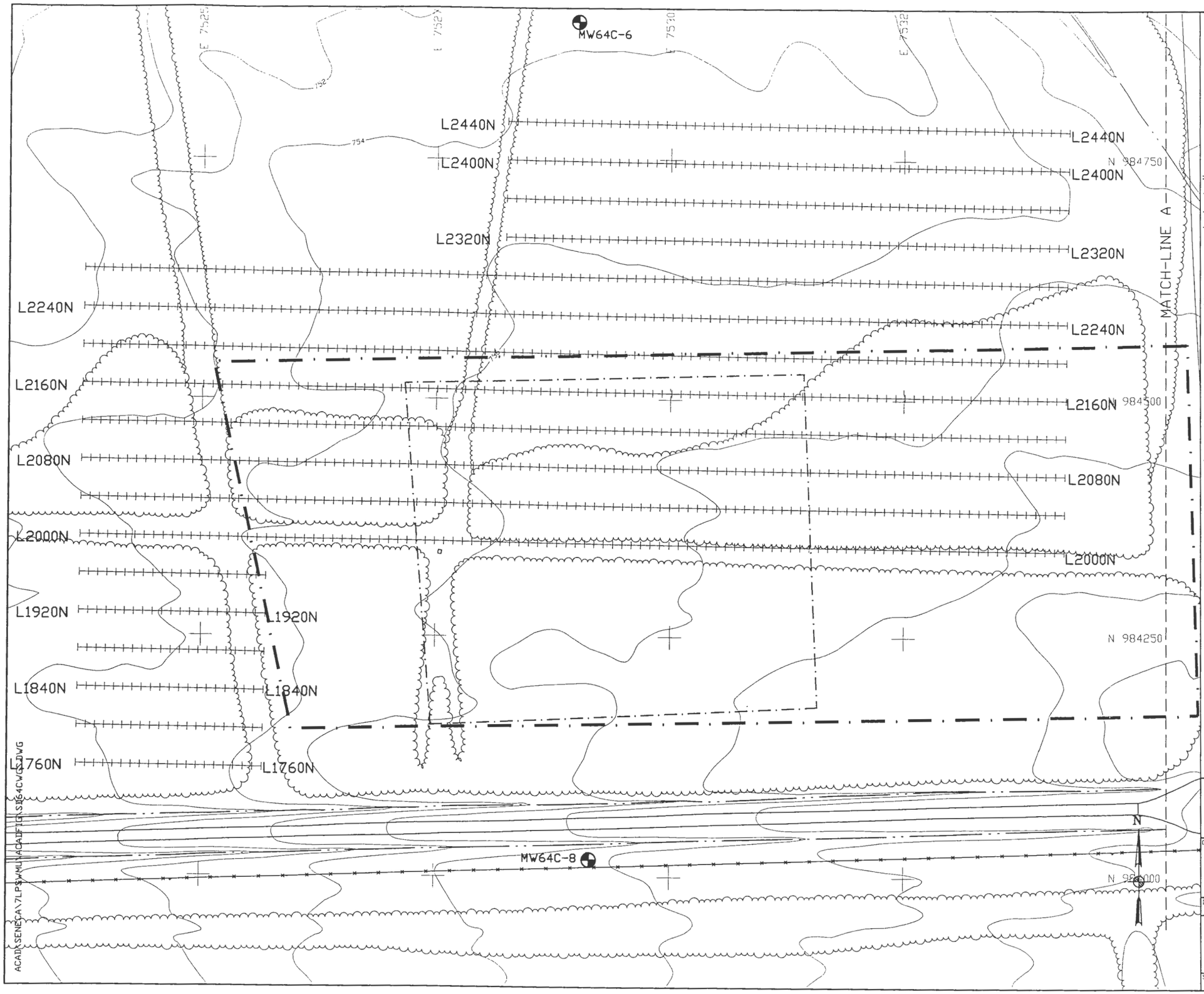
CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.8-1
SEAD-64C EAST
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV
1" = 100'	APRIL 1996	B



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMT DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.8-2

SEAD-64C WEST LOCATION OF
GEOPHYSICAL SURVEY (10 X 40 FOOT GRID)

SCALE	DATE	REV
1" = 100'	APRIL 1996	B

E. 752250
E. 752500
E. 752750
E. 753000
E. 753250
E. 753500
E. 753750
E. 754000
E. 754250
E. 754500
N 985250
N 985000
N 984750
N 984500
N 984250
N 984000
N 983750
UNNAMED ROAD
SWSD44A-3
MW64C-6
MW64C-7
MW64C-8
MW64C-1
MW64C-9
TP64C-1
TP64C-2
TP64C-3
SS64C-1
SS64C-2
SS64C-3
CONCRETE PAD
GATE
SOUTH PATROL ROAD
EAST PATROL ROAD
N

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN
- MONITORING WELL
- SURFACE SOIL SAMPLE
- TEST PIT

100 0 100 200
(feet)

ACAD\SENECA\7LPSWMU\ACADFIG\SD64CSP.DWG

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.8-3
SEAD-64C
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 200	APRIL 1996	A

The workplan proposed that three surface soil samples were to be collected from a depth of 0.2 feet below grade next to the concrete pad at SEAD-64C. Since no geophysical anomalies were detected next to the concrete pad, the three surface soil samples were collected north of the concrete pad, in areas of distinct geophysical anomalies. The surface soil sample locations are shown in Figure 2.8-3.

These soil samples (Table 2.8-1) were analyzed for the parameters described in Section 2.8.3.

Groundwater

Four groundwater monitoring wells existed at SEAD-64C prior to the beginning of this expanded site inspection at locations shown in Figure 2.8-3. Groundwater elevations from the four existing monitoring wells at SEAD-64C, relative to an arbitrary datum established for these groundwater elevation measurements, are as follows:

- MW-64C-6 -15.67 feet
- MW-64C-7 -21.80 feet
- MW-64C-8 - 3.23 feet
- MW-64C-9 - 1.63 feet

A review of these data showed that the groundwater flow direction at SEAD-64C was to the west.

In addition, the geophysical surveys also detected a large anomaly located north of monitoring well MW64C-9. Based on these observations, MW64C-9 is considered to be an upgradient well. A fifth monitoring well (MW64C-1) was installed at SEAD-64C. MW64C-1 was installed downgradient of the large geophysical anomaly to evaluate whether hazardous constituents have migrated from the AOC. MW64C-1 was screened over the entire thickness of the aquifer and located as shown in Figure 2.8-3.

All the monitoring wells at SEAD-64C, the four existing wells and the newly installed well, were developed and one groundwater sample was collected from each well and analyzed for the parameters listed in Section 2.8.3.

TABLE 2.8–1

SEAD–64C SOIL SAMPLING SUMMARY

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs

TEST PITS

TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
TP64C–1	TP64C–1.1	3'
	TP64C–1.2	4'
TP64C–2	TP64C–2.1	2'
	TP64C–2.2	2'
TP64C–3	TP64C–3.1	2'
	TP64C–3.2	2'

SURFACE SOILS

SAMPLE NUMBER	SAMPLE DEPTH
SS64C–1	0–2"
SS64C–2	0–2"
SS64C–3	0–2"

Notes:

1) The sample number contains the sample location with a test pit (TP) or surface soil (SS) identifier.
2) All SEAD–64C samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, and cyanide.

2.8.3 Analytical Program

A total of five groundwater samples, six subsurface soil samples and three surficial soil samples were collected from SEAD-64C for chemical analyses. All of the samples were analyzed for TCL VOCs, SVOs, Pesticides/PCBs, TAL metals and cyanide according to the NYSDEC CLP SOW. A summary of the laboratory analysis for SEAD-64C is presented in Table 2.1-3.

2.9 SEAD-64D: GARBAGE DISPOSAL AREA

This area was used for garbage disposal from 1974 to 1979 when the solid waste incinerator (SEAD-15) was not operating. During the 15 SWMU site inspection, domestic waste, metal drums, pails, and wires were observed on the ground surface. Stressed vegetation was observed along West Patrol Road, while the remainder of the site is densely vegetated with trees, brush, and tall grass. The primary migration pathways were expected to be transport of hazardous constituents in the groundwater and leaching of hazardous constituents into the soil. No drinking water wells exist within the area influenced by this site. The groundwater at this site has been classified as GA, which means the quality must be suitable for drinking.

2.9.1 Chemicals of Interest

The primary chemicals of interest are VOCs, SVOs, Pesticides/PCBs, and heavy metals.

2.9.2 Media Investigated

Geophysics

Four seismic refraction profiles, each 115-feet long, were performed throughout the area of SEAD-64D. Data from the seismic survey were used to determine the direction of groundwater flow and the locations of the upgradient and downgradient monitoring wells. EM-31 and GPR surveys were also performed to delineate the limits of the landfill and identify locations where metallic objects may be buried. A grid of electromagnetic data was collected across the site. The profiles were spaced at 20 and 40 foot intervals with EM-31 measurements made at 10-foot intervals along each profile. GPR data were collected along profiles spaced at 40-foot intervals and included profiles over distinct EM-31 anomalies which provided a better characterization of the suspected buried metallic sources. The profiles and

survey grids are shown on Figure 2.9-1. A total of 115,890 feet of EM-31 data and 57,200 feet of GPR data were collected at SEAD-64D.

Soil Gas Survey

A soil gas survey was conducted at SEAD-64D to determine if concentrations of gaseous volatile organic compounds were present. Soil gas samples were collected from 162 grid locations positioned throughout the disposal area. The soil gas sample locations are shown on Figure 2.9-2.

Soils

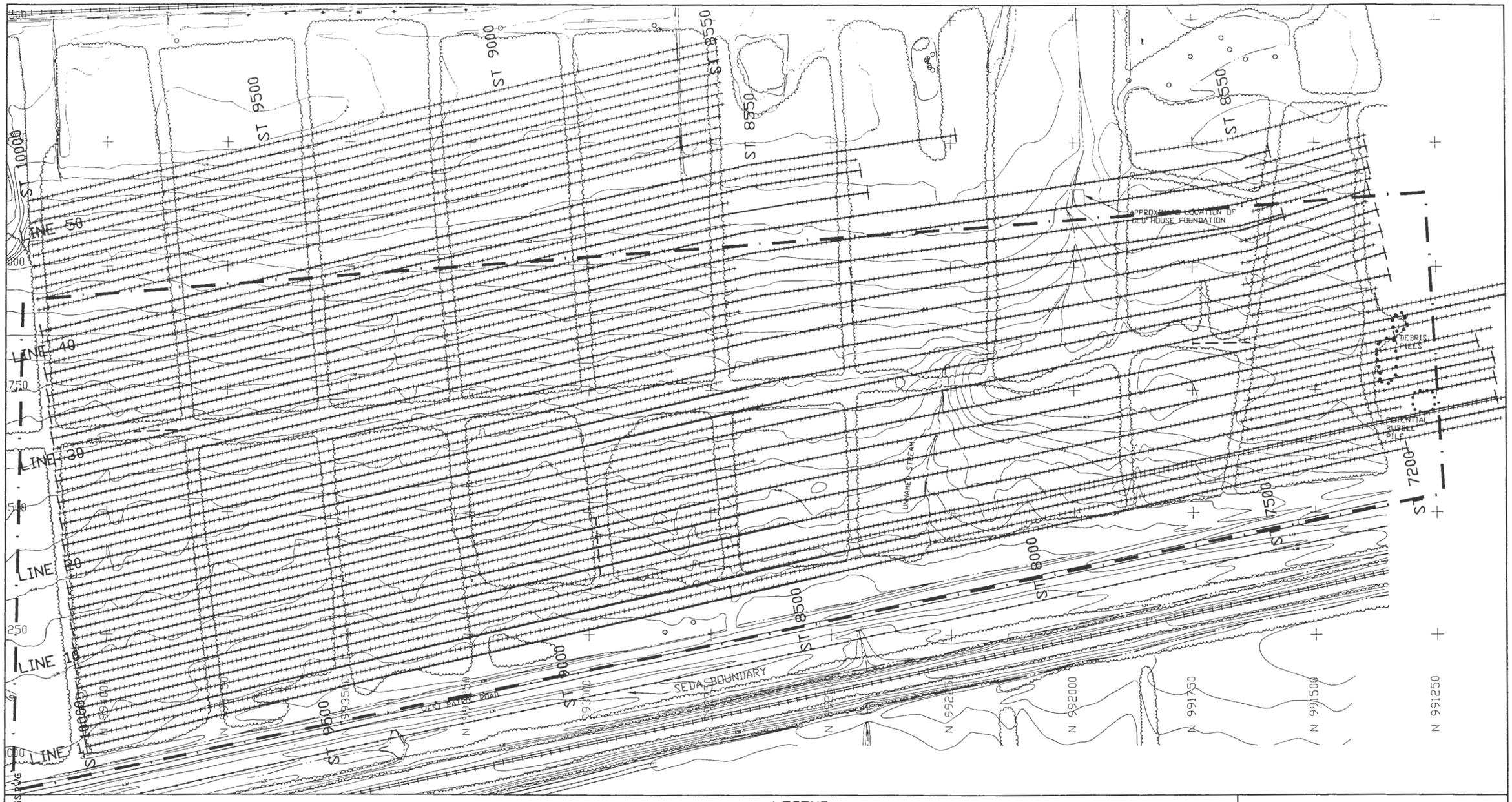
A total of ten soil borings were completed at SEAD-64D at the locations shown in Figure 2.9-3. The borings were advanced within the suspected disposal areas as located by the geophysical and soil gas results. Three samples from each soil boring (Table 2.9-1) were submitted for the chemical analyses identified in Section 2.9-3.

Three test pits were excavated at SEAD-64D at the locations shown in Figure 2.9-3. The final test pit locations were based on the results of the geophysical and soil gas surveys. The objective of these test pits was to identify the source of distinct geophysical anomalies and to visually evaluate the waste characteristics within the disposal area. No soil samples were collected from the test pits.

Five surficial soil samples, collected from 0.2 feet below grade, were collected from the stressed vegetation area adjacent to West Patrol Road at the locations shown in Figure 2.9-3. These samples were submitted for the chemical analyses identified in Section 2.9-3.

Groundwater

Five monitoring wells were installed to assess the potential impact of this disposal area on the groundwater quality. The monitoring well locations are shown in Figure 2.9-3. One monitoring well (MW64D-1) was installed upgradient of the AOC to monitor background water quality data. The four remaining monitoring wells were located downgradient of four separate electromagnetic anomalies.



N

100 0 100 200

(feet)

LINE 1 — EM TRANSECT AND STATION NUMBERS

ST10000

APPROXIMATE AOC EXTENT

LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- APPROXIMATE LANDFILL EXTENT
- RAILROAD
- GROUND SURFACE ELEVATION CONTOUR (760)
- ELECTRIC UTILITY LINE
- UNDERGROUND WATER UTILITY LINE

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

ACAD\SENECA\7LPSWMU\ACADFIG\SD64DGS.DWG

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720518-01002

FIGURE 2.9-1
SEAD-64D
LOCATION OF GEOPHYSICAL SURVEYS
PAGE 1 OF 2

SCALE 1" = 200' | DATE APRIL 1996 | REV B

NON-COMBUSTIBLE FILL AREA

APPROXIMATE LOCATION OF OLD HOUSE FOUNDATION

DEBRIS PILES

POTENTIAL RUBBLE PILE

UNNAMED STREAM

WEST PATCH ROAD

SEDA BOUNDARY

E 741250
E 741000
E 740750
E 740500
E 740250
E 740000

N 993000
N 993250
N 993500
N 993750
N 992000
N 992250
N 992000
N 991750
N 991500
N 991250

LINE 41
LINE 37
LINE 33
LINE 29
LINE 25
LINE 21
LINE 17
LINE 13
LINE 9
LINE 5
LINE 1

P1
P2
P3
P4
G1
G24

ACAD\SENECA\7LPSWMU\ACADFIG\SD64DGS2.DWG

LEGEND

LINE 1 — GPR TRANSECT

G1 P2 G24 — SEISMIC PROFILE WITH GEOPHONE NUMBERS

N

100 0 100 200
(feet)

APPROXIMATE AOC EXTENT

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
APPROXIMATE LANDFILL EXTENT
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
760
ELECTRIC UTILITY LINE
UNDERGROUND WATER UTILITY LINE

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING

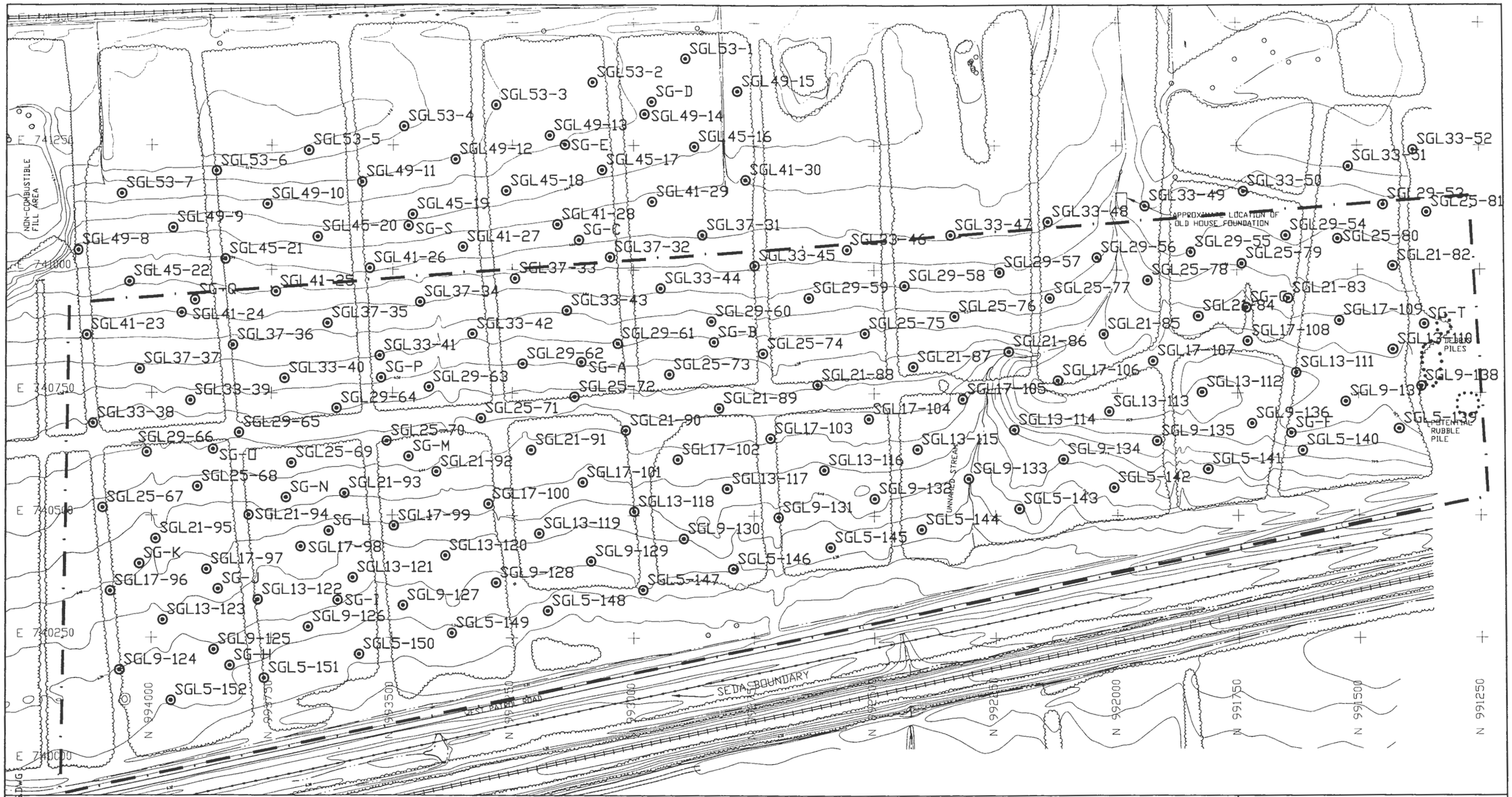
Dwg. No. 720518-01002

FIGURE 2.9-1
SEAD-64D
LOCATION OF GEOPHYSICAL SURVEYS
PAGE 2 OF 2

SCALE 1" = 200'

DATE APRIL 1996

REV A



ACAD\SENECA\7LPSVMU\ACADFIG\SD64DSGD.DWG

N

100 0 100 200

(feet)

SGL41-29 SOIL GAS LOCATION

APPROXIMATE AOC EXTENT

LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- APPROXIMATE LANDFILL EXTENT
- RAILROAD
- 760 GROUND SURFACE ELEVATION CONTOUR
- ELECTRIC UTILITY LINE
- UNDERGROUND WATER UTILITY LINE

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

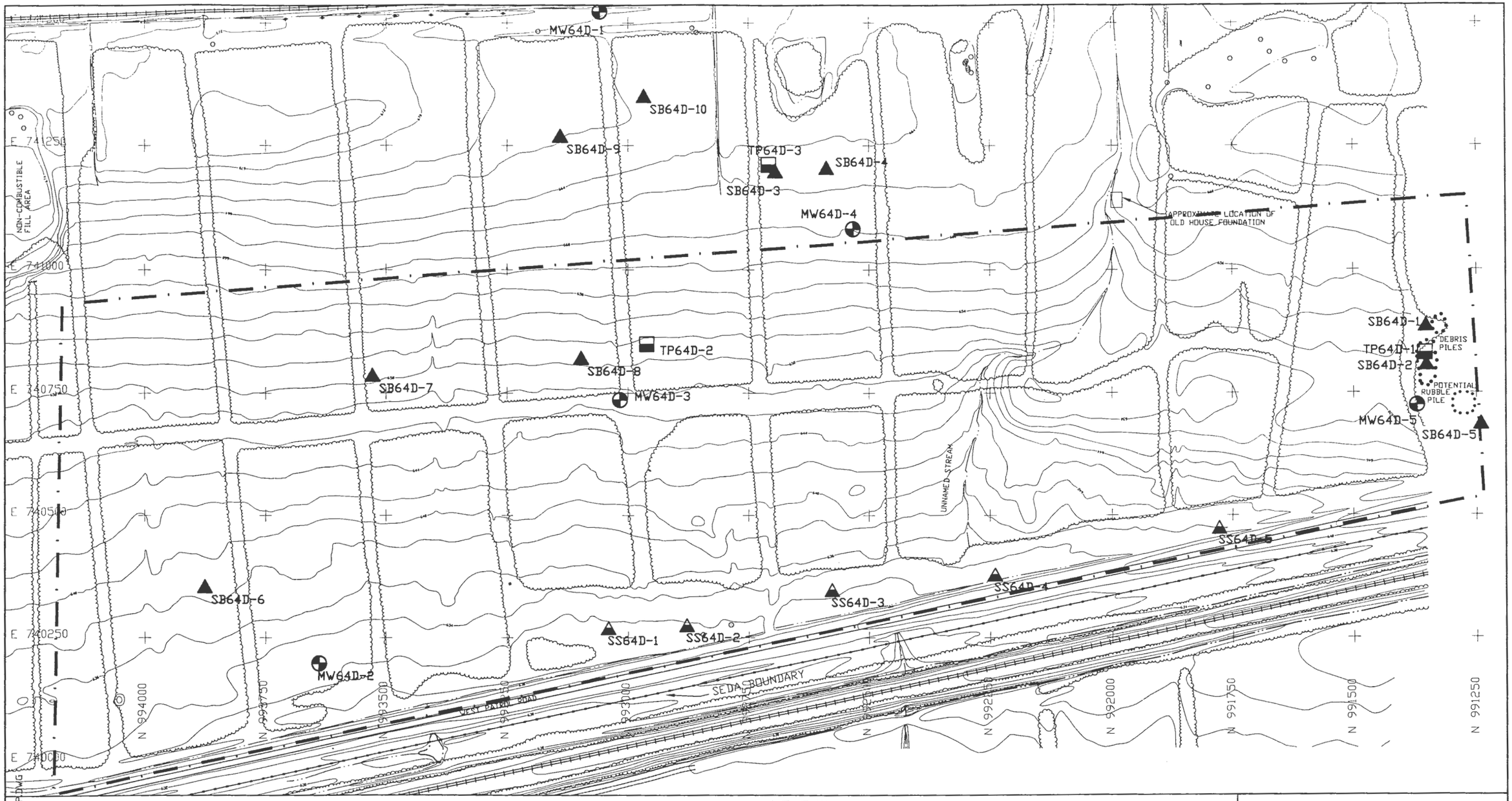
CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING | Dwg. No. 720518-01002

FIGURE 2.9-2
SEAD-64D LOCATION OF
SOIL GAS SAMPLING POINTS

SCALE 1" = 200' | DATE APRIL 1996 | REV A



ACAD\SENECA\7LPSWMU\ACADFIG\SD64DSP.DWG

MONITORING WELL
SOIL BORING
SURFACE SOIL SAMPLE
TEST PIT

N

100 0 100 200
(feet)

APPROXIMATE AOC EXTENT

LEGEND

MINOR WATERWAY
MAJOR WATERWAY
FENCE
UNPAVED ROAD
BRUSH LINE
APPROXIMATE LANDFILL EXTENT
RAILROAD
GROUND SURFACE ELEVATION CONTOUR
760
ELECTRIC UTILITY LINE
UNDERGROUND WATER UTILITY LINE

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.9-3
SEAD-64D
LOCATION OF SAMPLING POINT

SCALE	DATE	REV
1" = 200'	APRIL 1998	B

TABLE 2.9–1

SEAD–64D SOIL SAMPLING SUMMARY

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs

BORINGS

BORING NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
SB64D–1	SB64D–1.00	0–2"
	SB64D–1.01	0.2–1.2'
	SB64D–1.02	2–3'
SB64D–2	SB64D–2.00	0–2"
	SB64D–2.02	2–3.5'
	SB64D–2.03	4–6'
SB64D–3	SB64D–3.00	0–2"
	SB64D–3.01	0.2–2'
	SB64D–3.02	2–3.2'
SB64D–4	SB64D–4.00	0–2"
	SB64D–4.01	0.2–2'
	SB64D–4.02	2–4'
SB64D–5	SB64D–5.00	0–2"
	SB64D–5.02	2–4'
	SB64D–5.03	4–6'
SB64D–6	SB64D–6.00	0–2"
	SB64D–6.01	0.2–2'
	SB64D–6.02	2–4'
SB64D–7	SB64D–7.00	0–2"
	SB64D–7.01	0.2–2'
	SB64D–7.02	2–4'
SB64D–8	SB64D–8.00	0–2"
	SB64D–8.01	0.2–2'
	SB64D–8.02	2–4'
SB64D–9	SB64D–9.00	0–2"
	SB64D–9.01	0.2–2'
	SB64D–9.02	2–4'
SB64D–10	SB64D–10.00	0–2"
	SB64D–10.01	0.2–2'
	SB64D–10.03	4–5.1'

SURFACE SOILS

SAMPLE NUMBER	SAMPLE DEPTH
SS64D–1	0–2"
SS64D–2	0–2"
SS64D–3	0–2"
SS64D–4	0–2"
SS64D–5	0–2"

Notes:

1) The sample number contains the sample location with a soil boring (SB) or a surface soil (SS) identifier.
2) All SEAD–64D samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, and cyanide.

H:\ENG\SENECA\7SWMU.LOW\TABLES\64DSBSUM.WK1

One monitoring well was installed at each location and was screened over the entire thickness of the aquifer. Following installation and development, one groundwater sample was collected from each well and analyzed for the parameters listed in Section 2.9.3.

2.9.3 Analytical Program

A total of five groundwater samples, thirty subsurface soil samples, and five surficial soil samples were collected from SEAD-64D for chemical analysis. All samples were analyzed for TCL, VOCs, SVOs, Pesticides/PCBs, TAL metals and cyanide according to the NYSDEC CLP SOW. A summary of the laboratory analysis for SEAD-64D is presented in Table 2.1-3.

2.10 SEAD 67 - DUMP SITE EAST OF SEWAGE TREATMENT PLANT NO.4

SEAD 67 is composed of several waste piles located east of sewage treatment plant No. 4 and south of West Romulus Road. A wetlands area is located approximately 300 feet north west of this AOC. It is not known what wastes were disposed of in this area or when these disposals may have occurred. Because any constituents in these waste piles could leach into the soil and the groundwater, these media were considered as the primary migration pathways at SEAD 67. No drinking water wells exist within the area influenced by the site, and the groundwater at this site has been classified as GA.

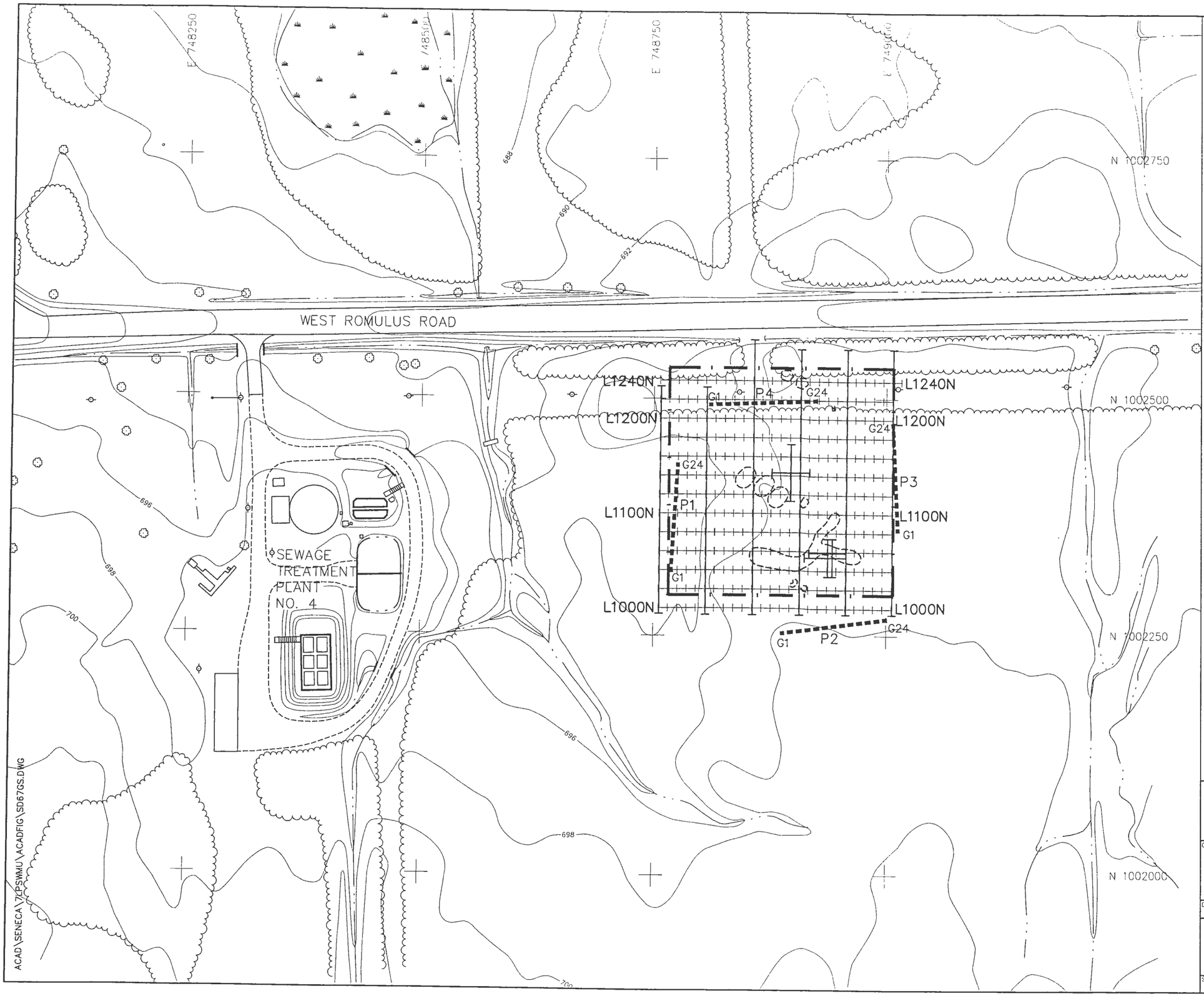
2.10.1 Contaminants of Interest

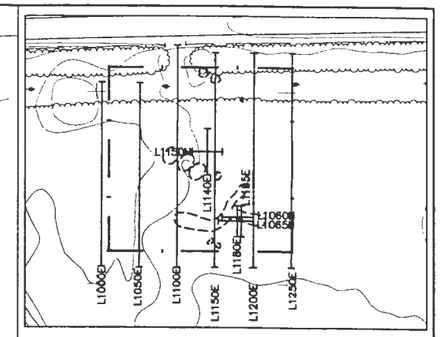
It is unknown what materials were disposed of at this dump site. Therefore, VOCs, SVOs, Pesticides/PCBs and heavy metals were considered to be contaminants of interest.

2.10.2 Media Investigated

Geophysics

Four 115 foot long seismic refraction profiles were surveyed along 4 lines positioned adjacent to the boundaries of the AOC. The seismic refraction profile locations are shown in Figure 2.10-1. Data from this survey were used to determine the direction of groundwater flow and to adjust the location of the monitoring wells to assure that one monitoring well was installed upgradient and two monitoring wells were installed downgradient of the AOC.





GPR LABELS NO SCALE

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- L1000E GPR TRANSECT
- G1 P2 G24 SEISMIC PROFILE WITH GEOPHONE NUMBERS
- L1200E EM TRANSECT
- APPROXIMATE LOCATION OF DEBRIS PILE

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.10-1
SEAD-67
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV
1" = 100'	APRIL 1996	B

ACAD\SENECA\7CPSWMU\ACADFIG\SD67GS.DWG

An EM-31 survey was performed throughout this AOC to delineate the limits of the dump sites and to identify locations where metallic objects may have been buried. EM-31 data were collected every 10 feet along east-west survey lines spaced at 20 foot intervals. The EM-31 survey grid is shown in Figure 2.10-1.

GPR profiles were surveyed along lines spaced every 50 feet to provide additional data on the subsurface conditions at this AOC. The GPR profile locations are shown in Figure 2.10-1. Additional GPR profiles were also surveyed at three locations where the electromagnetic data indicated anomalies possibly associated with buried metallic objects. A total of 3,250 feet of EM-31 data and 1,875 feet of GPR data were collected.

Soils

One soil boring was completed as part of the upgradient monitoring well installation (MW67-2) to obtain background soil quality data. Three soil samples were collected (Table 2.10-1) and submitted for the chemical analyses identified in Section 2.10-3. This location is shown in Figure 2.10-2.

A total of five test pit excavations were performed at SEAD-67. The test pit locations are shown in Figure 2.10-2. One excavation was advanced through each of the five piles identified in the workplan. In each case, the test pit bisected the entire pile allowing a complete visual inspection of the fill material. One soil sample was collected from each test pit (Table 2.10-1) and submitted for the chemical analyses identified in Section 2.10-3.

Groundwater

Three groundwater monitoring wells were installed at this AOC at the locations shown in Figure 2-10.2. One monitoring well (MW67-2) was installed upgradient of the AOC to obtain background water quality data, while the remaining two monitoring wells were installed adjacent to and downgradient of the AOC to determine if hazardous constituents have migrated from the site and to determine the direction of groundwater flow. The presumed direction of groundwater flow at this AOC was to the northeast. The geophysical survey showed the direction to be more to the northwest. Adjustments to the monitoring well locations were based upon the seismic survey interpretation. Specifically, the upgradient monitoring well was placed near the southeast corner of the AOC and the two downgradient monitoring wells were placed along the northern boundary of the AOC.

TABLE 2.10–1

SEAD–67 SOIL SAMPLING SUMMARY

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs

BORINGS

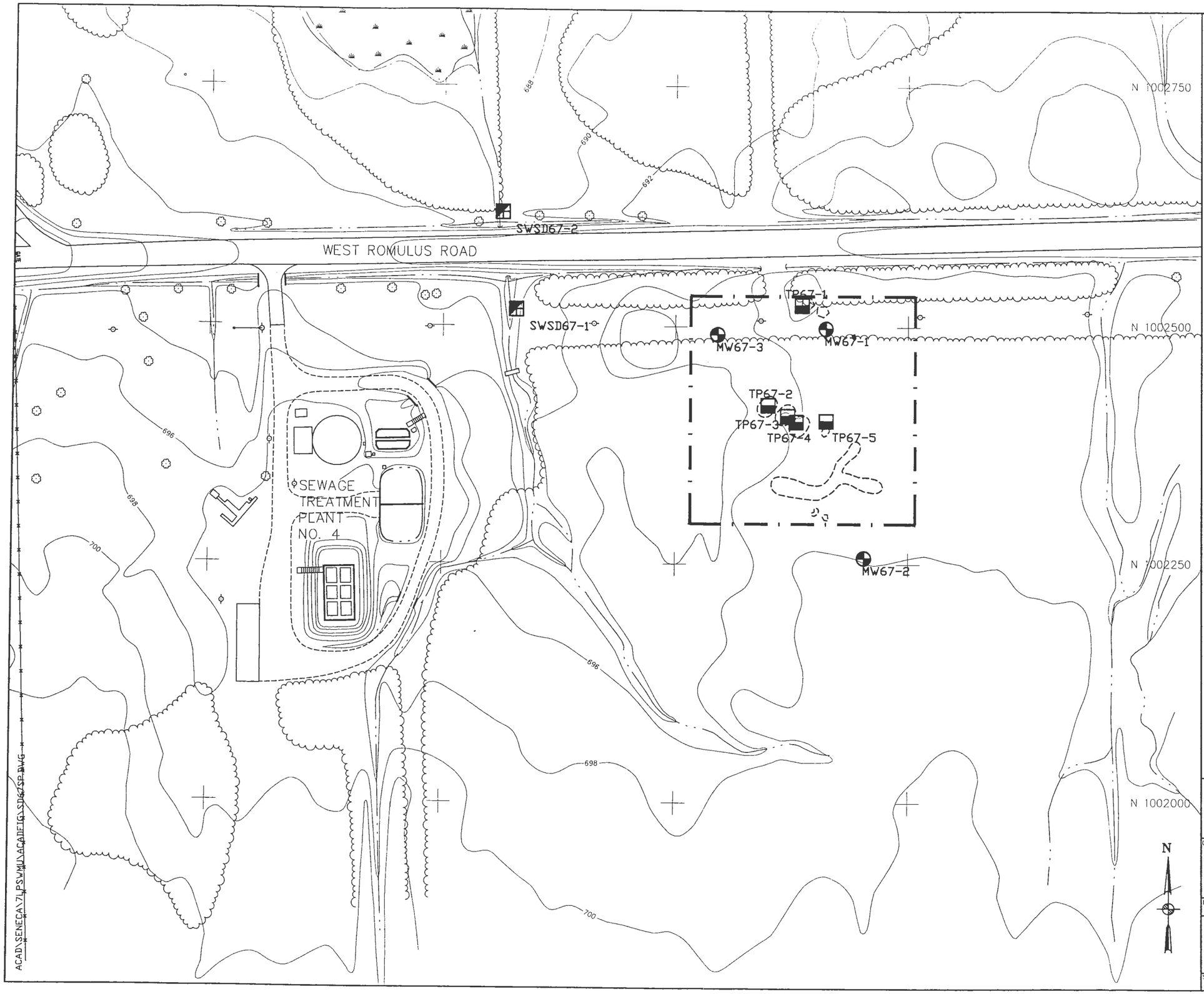
BORING NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
MW67–2	MW67–2.00	0–2"
	MW67–2.02	2–4'
	MW67–2.03	4–5'

TEST PITS

TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
TP67–1	TP67–1	2–3'
TP67–2	TP67–2	2–3'
TP67–3	TP67–3	2–3'
TP67–4	TP67–4	2–3'
TP67–5	TP67–5	2–3'

Notes:

1) The sample number contains the sample location with a monitoring well (MW), or test pit (TP) identifier.
2) All SEAD–67 samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides\PCBs, metals, and cyanide.



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

APPROXIMATE LOCATION OF DEBRIS PILE

50 0 50 100
(feet)

N

ACAD\SENECA\7LPSV\MU\ACADFIG\SD67SP.DWG

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.10-2
SEAD-67
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 100'	APRIL 1998	A

One monitoring well was constructed at each designated location and was screened over the entire thickness of the aquifer above competent bedrock. Following installation and development, one groundwater sample was collected from each well and tested for the parameters listed in Section 2.10.3.

Surface Water and Sediment

Two surface water and sediment samples were collected at SEAD-67. One sample was collected from the drainage ditch due north of the debris piles while the second sample was collected from the wetlands north of West Romulus Road. The surface water and sediment sample locations are shown in Figure 2.10-2. These samples were collected and analyzed for the parameters listed in Section 2.10-3 to determine if surface water runoff is a transport pathway of contamination and if the wetlands at the site have been impacted.

2.10.3 Analytical Program

A total of 8 soil samples, 3 groundwater samples, and two surface water and sediment samples were collected from SEAD-67 for chemical testing. All the samples were analyzed for TCL VOCs, SVOs, and Pesticides/PCBs and TAL Metals and Cyanide according to the NYSDEC CLP SOW. A summary of the laboratory analysis for SEAD 67 is presented in Table 2.1-3.

2.11 SEAD 70 FILL AREA ADJACENT TO BUILDING T-2110

Directly east of Building T-2110 is a fill area that measures approximately 200 feet by 200 feet. This fill area has previously been used to dispose of construction debris. Building T-2110 is old and dilapidated with piles of hay and sawdust located inside. The primary migration pathways of potential constituents considered for SEAD 70 were transport in the groundwater and leaching into the soils. Transport of airborne particulates as well as surface waters and sediments were also considered as potential migration pathways. No drinking water wells exist within the area influenced by the site, and the groundwater at the site has been classified as GA.

2.11.1 Chemicals of Interest

It is unknown what materials may have been disposed of in this fill area besides construction debris. Therefore, VOCs, SVOs, Pesticides/PCBs and heavy metals were considered to be contaminants of interest.

2.11.2 Media Investigated

Geophysics

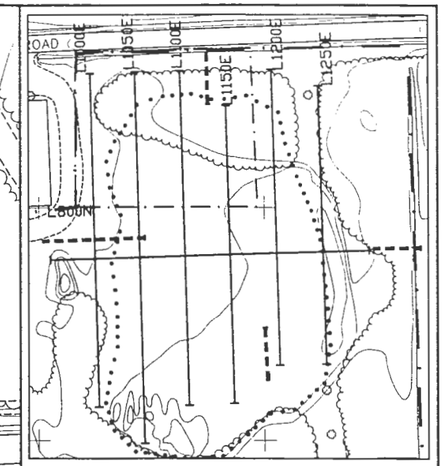
Four 115 foot long seismic refraction profiles were surveyed along 4 lines positioned perpendicular to and near the center of the boundaries of the AOC. The locations of the seismic refraction transects are shown in Figure 2.11-1. Data from this survey were used to determine the direction of groundwater flow and to adjust the location of the monitoring wells to assure that one monitoring well was installed upgradient and three monitoring wells were installed downgradient of the AOC.

An EM-31 survey was performed throughout the AOC to define the limits of the fill area and to identify locations where metallic objects may have been buried. Electromagnetic data were collected at 10 foot intervals along east-west running lines spaced at 20 foot intervals. A GPR survey was also performed to provide additional data on the subsurface conditions of the AOC. The GPR data were collected along six north-south running lines spaced over the fill area at 50 foot intervals. The locations of the lines are shown in Figure 2.11-1. A total of 8,220 feet of EM-31 data and 2,395 feet of GPR data were collected.

Soils

Three soil borings were advanced in the fill area of SEAD-70. The soil boring locations are shown in Figure 2.11-2. The soil borings were drilled at the approximate locations shown in the workplan. The objectives of these soil borings were to determine the depth of the fill and to provide subsurface samples for chemical analysis. Three soil samples were collected from each soil boring (Table 2.11-1) and submitted for the chemical analyses identified in Section 2.11-3.

A total of three test pit excavations were performed at this AOC at the locations shown in Figure 2.11-2. All three test pits were located within the fill area and were performed solely to provide a visual identification of fill materials. No soil samples were collected from these test pits.



GPR AND SEISMIC LABELS
NO SCALE

EAST - WEST BASELINE ROAD

BUILDING T2110

L1000N
L900N
L800N
L700N
L600N
L540N

P1
P2
P3
P4
G1
G24

N 1007500
N 1007250
N 1007000

E 740000
E 740250
E 740500
E 740750

50 0 50 100
(feet)

N

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- L1000E GPR TRANSECT
- G1 P2 G24 SEISMIC PROFILE WITH GEOPHONE NUMBERS
- L900E EM TRANSECT

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.11-1
SEAD-70
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV.
1" = 100'	APRIL 1996	B

ACAD\SENECA\7LPSWMU\ACADFIG\SD70GS.DWG

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN
- MONITORING WELL
- SOIL BORING
- SURFACE WATER/ SEDIMENT SAMPLE
- TEST PIT

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.11-2
SEAD 70
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 100'	APRIL 1996	B

TABLE 2.11-1

SEAD-70 SOIL BORING SAMPLING SUMMARY

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs

BORING NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
SB70-1	SB70-1.01	0-2"
	SB70-1.02	2-4'
	SB70-1.03	4-6'
SB70-2	SB70-2.01	0-2"
	SB70-2.03	4-6'
	SB70-2.05	8-10'
SB70-3	SB70-3.01	0-2"
	SB70-3.03	4-6'
	SB70-3.05	8-10'
MW70-1	MW70-1.00	0-2"
	MW70-1.02	2-4'
	MW70-1.03	4-6'

Notes:

1) The sample number contains the sample location with a soil boring (SB) or monitoring well (MW) identifier.
2) All SEAD-70 samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, and cyanide.

Groundwater

Four groundwater monitoring wells were installed at SEAD-70 as shown in Figure 2.11-2. One monitoring well (MW70-1) was installed upgradient of the AOC to obtain background water quality data, while the remaining three monitoring wells were installed adjacent to and downgradient of the AOC to determine if hazardous constituents have migrated from the site and to determine the direction of groundwater flow. The presumed direction of groundwater flow from the workplan was to the northwest, however, the geophysical survey showed the direction to be more to the west. Adjustments to the locations of all four monitoring wells were based upon the seismic survey. MW70-1 was placed upgradient of the fill area (along the eastern boundary) and the other three monitoring wells were placed downgradient of the fill area along the western boundary of the site.

One monitoring well was constructed at each designated location and was screened over the entire thickness of the aquifer above competent bedrock. Following installation and development, one groundwater sample was collected from each well and tested for the parameters listed in Section 2.11.3.

Surface Water and Sediment

Two surface water and sediment samples were collected from the wetlands area downgradient of the fill area. The surface water and sediment sample locations are shown in Figure 2.11-2.

These samples were collected and analyzed for the parameters listed in Section 2.11-3 to determine if surface water and sediment have been impacted at the site.

2.11.3 Analytical Program

A total of 9 soil samples, 4 groundwater samples, and 2 surface water and sediment samples were collected from SEAD-70 for chemical testing. All the samples were analyzed for TCL VOCs, SVOs, and Pesticides/PCBs and TAL Metals and Cyanide according to the NYSDEC CLP SOW. A summary of the laboratory analysis for SEAD 70 is presented in Table 2.1-3.

2.12 SEAD 71 RUMORED PAINT AND SOLVENT BURIAL PIT

SEAD 71 is a rumored paint and/or solvent disposal area. This disposal area was described in the work plan as being located within a fenced storage compound west of Building 127.

Discussions with SEDA personnel during the 15 SWMU site inspection led to an expansion of the area of investigation to include a 150 foot by 200 foot area immediately west of the storage compound. The primary migration pathways were expected to be transport in the groundwater and leaching into the surrounding soils. No drinking water wells exist within the area influenced by this site, and the groundwater at this site has been classified as GA.

2.12.1 Chemicals of Interest

The primary chemicals of interest are VOCs, SVOs, pesticides/PCBs and heavy metals.

2.12.2 Media Investigated

Geophysics

Four 115 foot long seismic refraction profiles were surveyed along 4 lines positioned near the boundaries of the AOC. The seismic refraction profile locations are shown in Figure 2.12-1. Data from these surveys were used to determine the direction of groundwater flow and to adjust the location of the monitoring wells to assure that one monitoring well was installed upgradient and two monitoring wells were installed downgradient of the AOC.

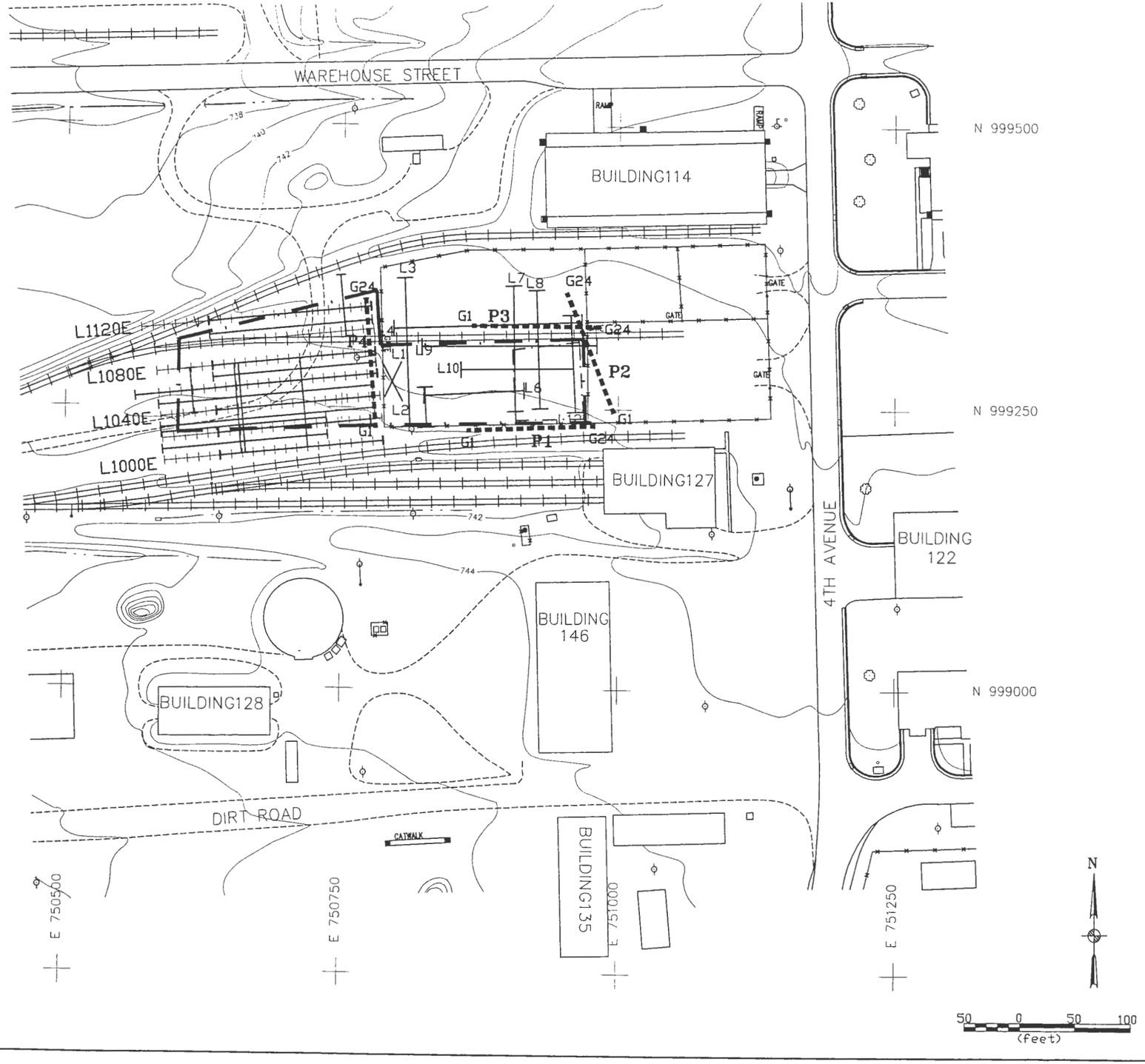
An EM-31 survey was performed throughout the expanded area to help locate the suspected burial pits. EM-31 data were collected at 10 foot intervals along east-west running lines spaced at 20 foot intervals. EM-31 data could not be collected within fenced area of SEAD-71 because numerous metalic objects and construction vehicles are being stored in this area.

A GPR survey was also performed to aid in locating the suspected burial pits. Continuous GPR survey profiles were collected in the expanded area west of the storage compound over north-south running lines spaced at 20 foot intervals and over east-west running lines spaced at 10 foot intervals. The GPR survey conducted within the storage compound was restricted to 12 lines located along access paths between stored supplies and equipment.

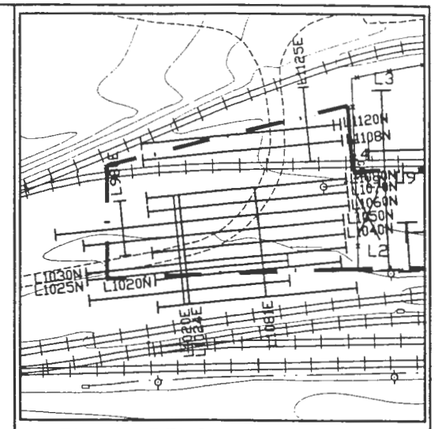
The extent of the surveys is shown in Figure 2.12-1. A total of 1,200 feet of EM-31 data and 3,450 feet of GPR data were collected at SEAD-71.

Soils

Two test pit excavations were performed at this AOC at the locations shown in Figure 2.12-2. One test pit was located within the storage compound and was centered over an area with



ACAD\SENECA\7LPSWMU\SD71GS.DWG



GPR LABELS - NO SCALE

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN
- L980E GPR TRANSECT
- G1 P2 G24 SEISMIC PROFILE WITH GEOPHONE NUMBERS
- L1120E EM TRANSECT

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

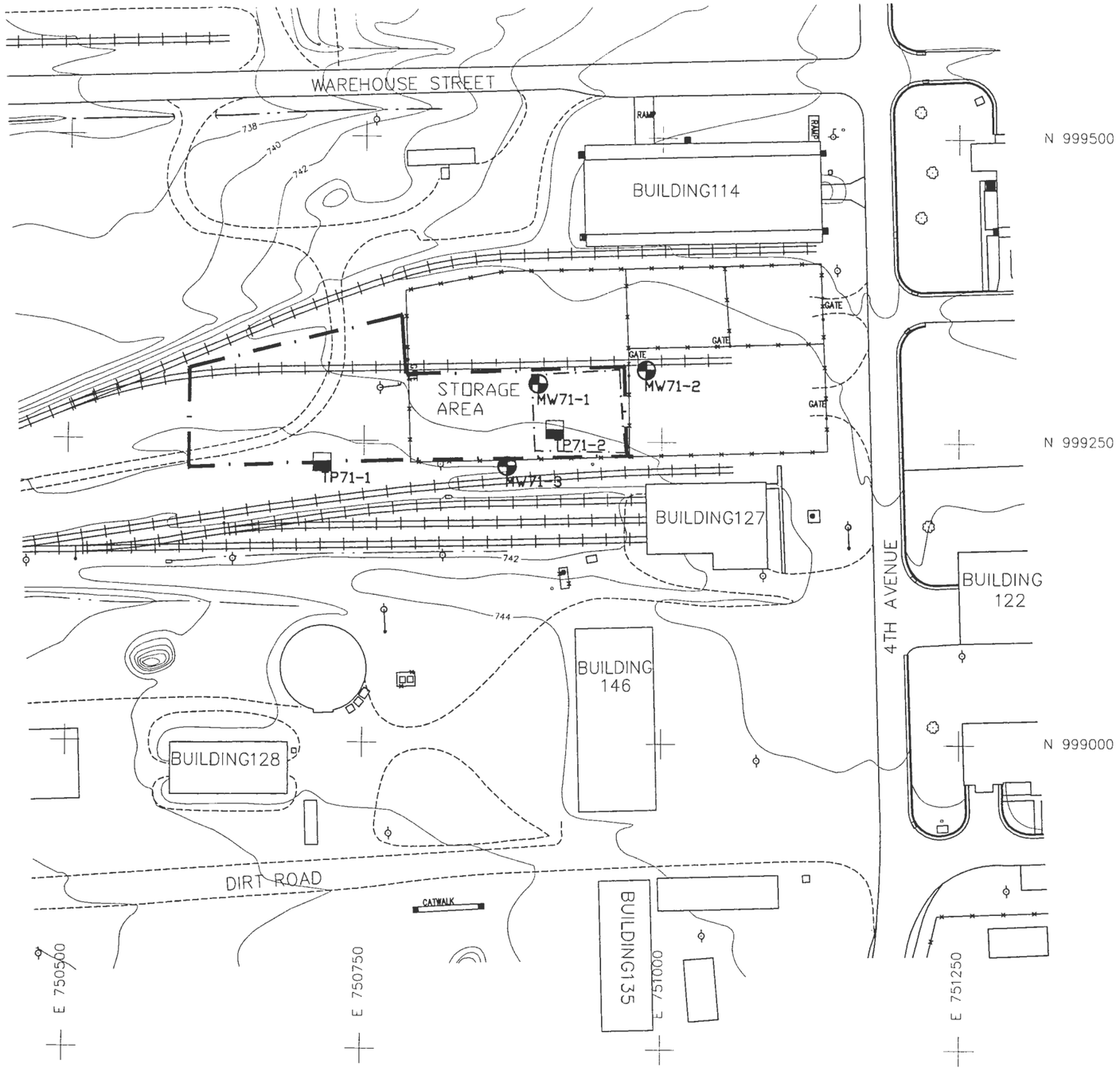
CLIENT/PROJECT TITLE

SENECA army DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.12-1
SEAD-71
LOCATION OF GEOPHYSICAL SURVEYS

SCALE	DATE	REV
1" = 100'	APRIL 1996	B



N

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN
- MONITORING WELL
- TEST PIT

50 0 50 100
(Feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA army DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 2.12-2
SEAD-71
LOCATION OF SAMPLING POINTS

SCALE	DATE	REV
1" = 100'	APRIL 1996	A

ACAD\SENECA\7LPSWMU\ACADFIG\SD71SP.DWG

several GPR anomalies. The second test pit was located in the expanded area west of the storage compound where both the electromagnetic and the GPR data indicated the presence of buried metallic objects. Four soil samples were collected from each pit (Table 2.12-1) and analyzed for the parameters listed in Section 2.12-3.

Groundwater

Three groundwater monitoring wells were installed at SEAD-71 as shown in Figure 2-12.2. One monitoring well (MW71-2) was installed upgradient of the AOC to obtain background water quality data. The remaining two monitoring wells were installed adjacent to and downgradient of the storage compound. These monitoring wells were installed prior to learning of the potential burial sites further to the west. These two monitoring wells were installed to determine if hazardous constituents have migrated from the site and to determine the direction of groundwater flow. Both the workplan and the seismic survey results indicated a southwest groundwater flow direction. Based upon this information, adjustments to the locations of the downgradient monitoring wells placed them closer to the boundaries of the AOC as defined in the workplan.

One monitoring well was installed at each designated location and was screened over the entire thickness of the aquifer above competent bedrock. Following installation and development, one groundwater sample was collected from the two downgradient wells and tested for the parameters listed in Section 2.12.3. The upgradient well was dry and could not be sampled.

2.12.3 Analytical Program

A total of 8 soil samples and 2 ground water samples were collected from SEAD 71 for chemical testing. All the samples were analyzed for TCL VOCs, SVOs, and Pesticides/PCBs and TAL Metals and Cyanide according to the NYSDEC CLP SOW. A summary of the laboratory analysis for SEAD 71 is presented in Table 2.1-3.

TABLE 2.12-1

SEAD-71 TEST PIT SAMPLING SUMMARY

SENECA ARMY DEPOT
7 LOW PRIORITY AOCs

TEST PIT NUMBER	SAMPLE NUMBER	SAMPLE DEPTH
TP71-1	TP71-1.1	3'
	TP71-1.2	3'
	TP71-1.3	3'
	TP71-1.4	4'
TP71-2	TP71-2.1	1'
	TP71-2.2	2'
	TP71-2.3	3-5'
	TP71-2.4	2-4'

Notes:

1) The sample number contains the sample location with a test pit (TP) identifier.
2) All SEAD-71 samples were chemically analyzed for the following: volatile organics, semivolatile organics, pesticides/PCBs, metals, and cyanide.

3.0 GEOLOGICAL, GEOPHYSICAL, AND HYDROLOGICAL SETTING

3.1 SEAD-60: OIL DISCHARGE ADJACENT TO BUILDING 609

3.1.1 Site Geology

Based on the results of the drilling program, till and calcareous shale are the two major types of geologic materials present on-site. The till lies stratigraphically above the shale. In all of the soil borings, a thin soil horizon was present (within 1 foot of the ground surface). The depths of the borings at this site were up to 24.5 feet below the ground surface.

The till is generally grey brown and consists of silt, with little clay, little very fine sand, and little dark grey-black shale fragments (up to 0.75 inch in diameter). Larger shale fragments (rip-up clasts) were observed at some locations near the till-weathered shale contact. Areas of oxidized till were observed in the upper portion of the till strata.

One of the soil borings, SB60-2, was advanced in the visibly stained oil spill area. The top 0.3 foot of the soil consisted of dark grey-black silt, with some very fine sand, trace organic material, and trace amounts of shale fragments (up to 1-inch in diameter). The stained soil contained a strong petroleum odor and an oily sheen. Elevated Organic Vapor Meter (OVM) readings were recorded at SB60-2 as follows:

0.0 to 0.3 foot below ground surface - 65 ppm
0.3 to 0.65 foot below ground surface - 4.3 ppm
0.65 to 1.0 foot below ground surface - 1.3 ppm
1.0 to 1.15 feet below ground surface - 0.6 ppm

No other borings conducted at SEAD-60 exhibited signs of stained soils or elevated OVM readings.

Competent, calcareous dark grey to black shale was encountered at depths between approximately 9 and 19 feet below the ground surface. The competent shale was not encountered at some of the boring locations. Due to the extensive weathering of the shale

(minimum of 3.0 feet) as determined through split spoon sampling and augering, competent shale was not observed in all of the soil borings.

3.1.2 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by the local topography, and four drainage swales (Figure 1.1-14). The site topography generally slopes to the west. SEDA railroad tracks originate at the oil spill area and run through the northwestern section of the site. Drainage swales run along each side of the railroad tracks. The railroad tracks intersect a third drainage swale approximately 200 feet northwest of the spill area. This drainage swale runs east to west, near the northern boundary of the site. The fourth drainage swale flows south to north and runs along the western perimeter of the site. Its confluence is where the railroad and the east-west running drainage swale meet. The fourth drainage swale discharges into the east to west flowing drainage swale.

The groundwater flow direction in the till/weathered shale aquifer on the site is to the west based on groundwater elevations measured in the three monitoring wells on July 6, 1994 and July 25, 1994 (Table 3.1-1 and Figure 3.1-1). Recharge of water to the monitoring wells during sampling was good.

3.2 SEAD-62 NICOTINE SULFATE DISPOSAL AREA

3.2.1 Site Geology

Based on the results of the drilling program, till and calcareous shale are the two major types of geologic materials present on-site. The till lies stratigraphically above the shale. At all three soil boring locations, a thin soil horizon was present within 0.9 foot of the ground surface. The depths of the borings at this site were up to 18.3 feet below the ground surface.

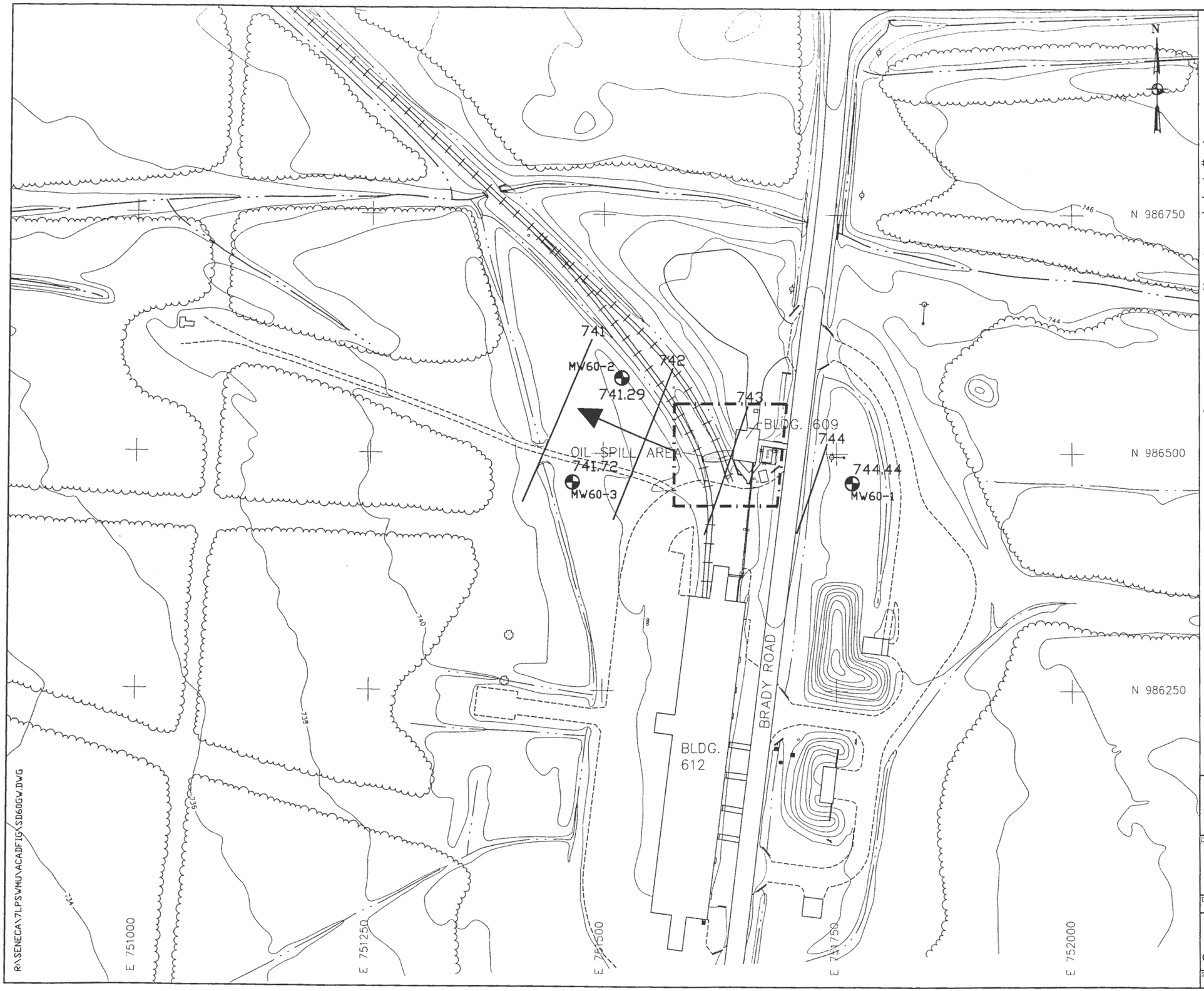
The till is light brown and composed of silt and very fine sand, with little clay, and little grey to dark grey shale fragments (up to 1-inch in diameter); however, large shale fragments (rip-up clasts) were observed near the till-weathered shale contact. Areas of oxidized till were noted in the middle to upper portions of the till strata.

Competent, calcareous dark grey shale was encountered at depths between approximately 6.2 and 9.8 feet below the ground surface. The elevations of the competent bedrock determined

TABLE 3.1-1
SEAD-60, MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-60

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)
MW60-1	747.86	3/31/94	2.88	744.98	7/7/94	3.63	744.23	7/6/94	3.42	744.44
								7/25/94	4.5	743.36
MW60-2	745.53	3/30/94	3.51	742.02	7/7/94	4.42	741.11	7/6/94	4.24	741.29
								7/25/94	5.29	740.24
MW60-3	744.42	3/5/94	2.48	741.94	3/29/94	1.75	742.67	7/6/94	2.7	741.72
								7/25/94	3.94	740.48



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

MW60-1
744.44
MONITORING WELL WITH WATER TABLE ELEVATION

744
GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/06/94

50 0 50 100
(feet)

R:\SENECA\7LPS\WMU\ACADFIG\SD60GW.DWG

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720518-01002

FIGURE 3.1-1
SEAD-60
GROUNDWATER ELEVATION AND TOPOGRAPHY

SCALE 1" = 100'
DATE APRIL 1996
REV A

during drilling and seismic programs indicate that the shale slopes to the west, mimicking the land surface. One of the three soil borings (MW62-3) revealed a 3.5 foot thick layer of weathered shale overlying competent shale bedrock.

3.2.2 Geophysics

3.2.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEAD-62 are shown in Table 3.2-1. The seismic refraction profiles detected 4 to 11 feet of unconsolidated overburden (1,170 to 1,470 ft./sec.) overlying bedrock (8,000 to 10,700 ft./sec.). Saturated overburden was not detected by the seismic survey. Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (<2 feet) overlying the bedrock surface would be undetectable.

To better define the regional bedrock topography in the area of SEAD-62, the seismic data from this SEAD were used in conjunction with those of SEAD-44B (northwest of SEAD 62) and SEADs-43, 56, and 69 (north and east of SEAD-62). The locations of these seismic profiles are shown in Figure 2.4-1. The relative elevations of the bedrock surface, as determined by these surveys, indicate that the bedrock slopes to the west, generally following the surface topography. Groundwater flow is also expected to be to the west, following the slope of the bedrock.

3.2.2.2 EM-31 Survey

Figure 3.2-1 shows the apparent ground conductivity measured in the grid surveyed at SEAD-62. Figure 3.2-1 represents EM-31 data that were collected over a grid with a line spacing of 50 feet. The EM-31 can detect a buried 55-gallon drum at a lateral distance of approximately 10 feet. Therefore, although the information presented on Figure 3.2-1 (as well as Figure 3.2-2) shows information that has been extrapolated to cover 100% of the area investigated, the actual surface area investigated at SEAD-62 covers about 40% of the total surface area of the site.

Six localized conductivity anomalies were identified throughout the grid. A follow up inspection of the site revealed that the conductivity anomalies located at station 3130E on L7 and station 1020E on L16 corresponded to drainage culverts while the conductivity anomaly located at station 2160E on L16 corresponded to a concrete slab. A third culvert,

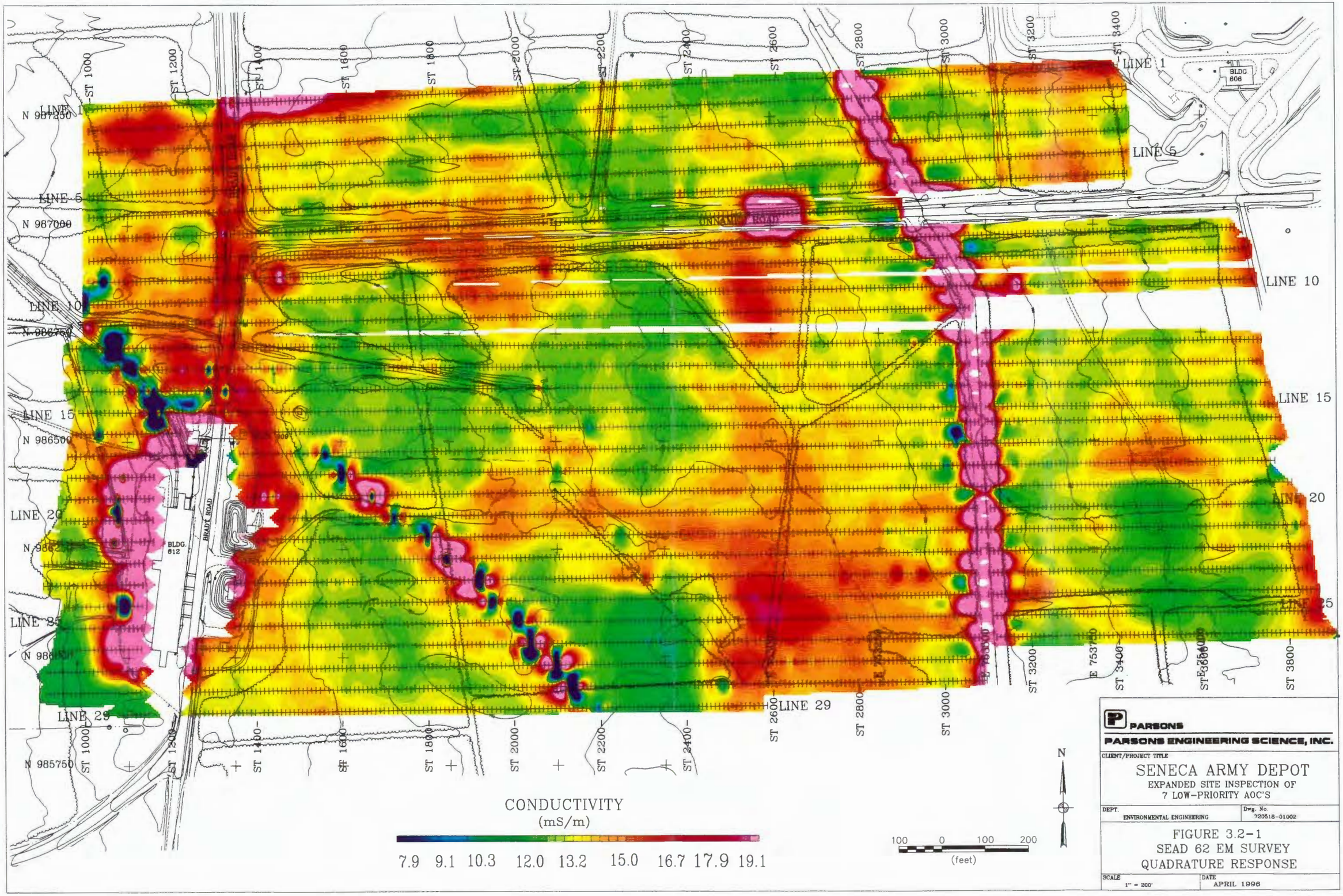
TABLE 3.2-1
SEAD 62

Expanded Site Inspection
Results of Seismic Refraction Survey

Profile	Distance[1]	Ground Elevation[2]	Water Table		Bedrock	
			Depth	Elev[2].	Depth	Elev[2].
P1	-5 57.5 120	107.5 106.6 106.5			9.3 10.5 9.7	98.2 96.1 96.8
P2	-5 120	102.1 102.1			5.5 4.0	96.6 98.1
P3	-5 57.5 120	108.6 109.1 109.6			11.1 8.4 9.2	97.5 100.7 100.4
P4	-5 57.5 120	113.5 114.5 115.2			7.1 6.8 5.6	106.4 107.7 109.6

1. All distances are in feet along the axis of each seismic profile and were measured from geophone #1 of each profile.

2. All elevations are relative to an arbitrary datum established at geophone #24 of the SEAD-44B seismic profile P4.


LINE 1
LINE 5
LINE 10
LINE 15
LINE 20
LINE 25
LINE 29
ST 1000
ST 1200
ST 1400
ST 1600
ST 1800
ST 2000
ST 2200
ST 2400
ST 2600
ST 2800
ST 3000
ST 3200
ST 3400
ST 3600
ST 3800
N 987250
N 987000
N 986750
N 986500
N 986250
N 985750
E 753750
E 754000
BLDG 608
BLDG 612
BRADY ROAD
UNNAMED ROAD
CONDUCTIVITY
(mS/m)
7.9 9.1 10.3 12.0 13.2 15.0 16.7 17.9 19.1
100 0 100 200
(feet)
N
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S
DEPT.
ENVIRONMENTAL ENGINEERING
Dwg. No.
720518-01002
FIGURE 3.2-1
SEAD 62 EM SURVEY
QUADRATURE RESPONSE
SCALE
1" = 200'
DATE
APRIL 1996

at station 1400E on L7 was not apparent in the conductivity data. The three remaining anomalies, located at station 1040E on L9, station 1450E on L9, and station 2050E on L14, could not be associated to any cultural features. Three zones of elevated ground conductivities were also identified from the conductivity data, each coincided with a marshy area. All other conductivity anomalies detected in the EM-31 grid were attributed to cultural features.

The in-phase response of the EM survey at SEAD-62 is shown in Figure 3.2-2. Overall the site shows a generally featureless response. Two of the unknown localized anomalies as well as the three culverts mentioned above were apparent in the in-phase response data. No other anomalies were observed which could not be attributed to known cultural features.

3.2.2.3 GPR Survey

A GPR survey was conducted in all the zones of the EM grid where EM-31 anomalies of unknown origin were detected. Data quality was degraded in certain areas due to standing water in the marshy areas. The location of the GPR survey profiles are shown in Figure 2.4-1. No evidence of buried drums was found in any of these zones.

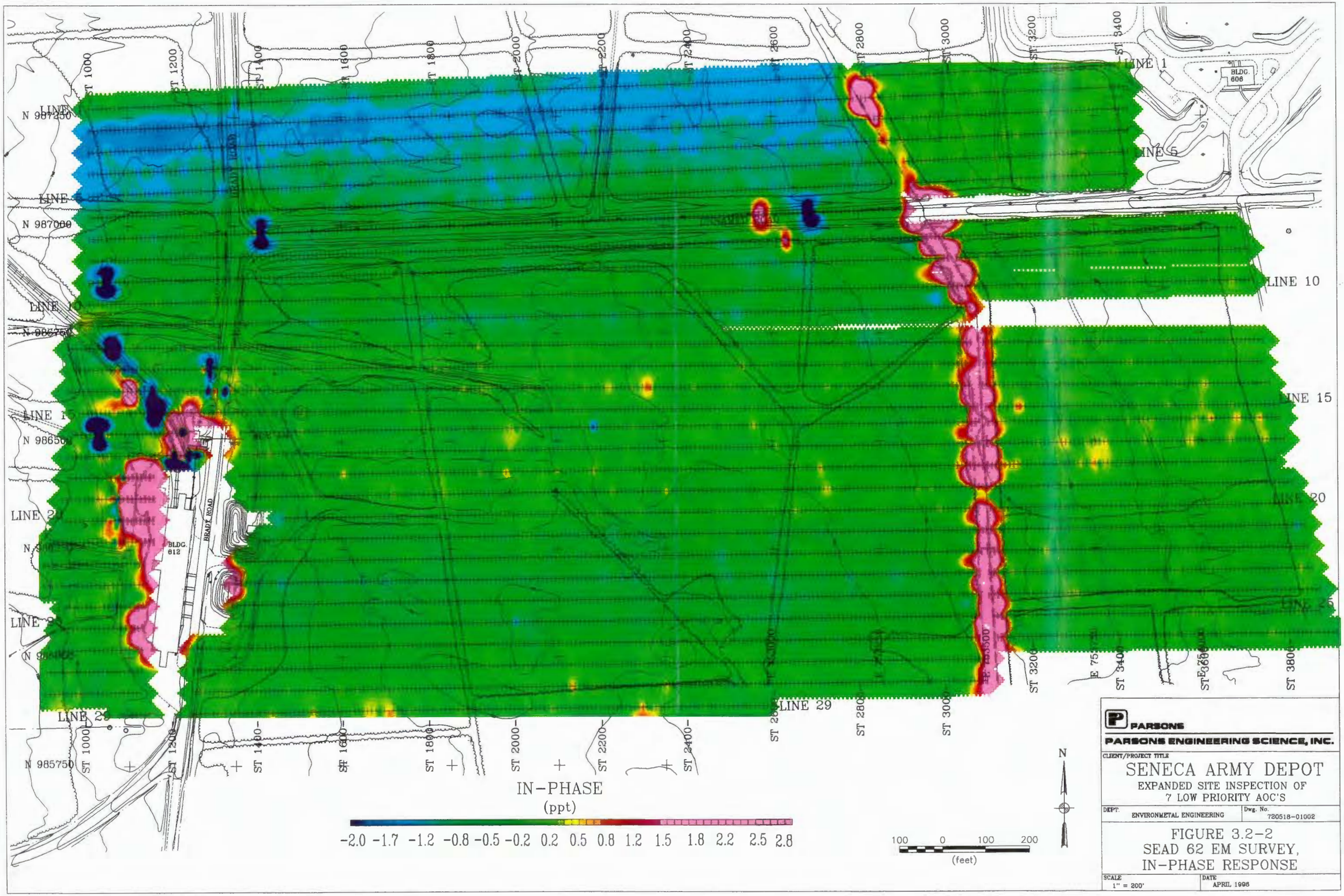
Typical penetration depths of the radar signals were 3 to 5 feet. Within this depth range, no evidence of disturbed soils or burial pits was evident in the areas surveyed.

3.2.2.4 Test Pitting Program

Three test pits were excavated in SEAD-62. Two test pits were excavated in the field to the east of Building 612 (TP62-1 and TP62-2), and the remaining test pit (TP62-3) was excavated in a densely vegetated area along the western boundary of SEAD-62. The test pit logs are presented in Appendix B.

TP62-3 was excavated at the EM anomaly along the northwestern boundary of SEAD-62. Metal strapping, 1.5 inches wide, and a 0.5 inch diameter metal rod were found at TP62-3. A large quantity of deteriorated red brick was also unearthed along with several large boulders, typically one to two feet in diameter.

Test pits TP62-1 and TP62-2 were centered on EM anomalies at station 2160E on L16 and station 2050E on L14, respectively. Buried metallic objects were not encountered in either



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMETAL ENGINEERING	720518-01002

FIGURE 3.2-2
SEAD 62 EM SURVEY, IN-PHASE RESPONSE

SCALE	DATE
1" = 200'	APRIL 1996

excavation. TP62-1 was advanced under a concrete slab measuring 9.4 feet long by 4.5 feet wide by 0.8 feet thick. A 1.2 foot diameter hole was located in the center of the concrete slab. Remnants of yellow paint were observed on the bottom surface of the slab. Native olive gray silt was encountered at a depth of 1 foot below the concrete slab, indicating that no previous excavation of the soils had occurred at this location. The excavation at TP62-2 revealed naturally layered soil to a depth of 4.2 feet below grade, again showing no evidence of anthropomorphic intrusions.

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro Rhems per hour of radiation) were observed during the excavation.

3.2.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography including a marshy area and two drainage swales (Figure 1.1-15). In the southeastern section of the site, surface water is believed to drain into a marshy area. The surface water flow in the western portion of the site is believed to be partly controlled by a well defined intermittent drainage swale which originates in the central section of the site and flows westward along the northern perimeter of SEAD-60.A poorly defined drainage swale located approximately 400 feet south and parallel to the above mentioned drainage swale also collects surface water from the western portion of the SEAD-62. In addition, surface water accumulates in topographically low-lying areas along the northern section of the site.

The groundwater flow direction in the till/weathered shale aquifer at SEAD-62 is to the west based on groundwater elevations measured in the three monitoring wells on July 25, 1994 (Table 3.2-2 and Figure 3.2-3). Water was observed in drainage ditches where the groundwater elevation contours are above the ground surface. The groundwater contours shown in this figure are intended to represent regional flow directions at the site. The groundwater contours established from the groundwater elevation survey were not altered to attempt to illustrate detailed flow near the drainage ditches. Recharge of water to the monitoring wells during sampling was generally poor. Two of the three monitoring wells had slow recharge rates; the third monitoring wells recharge rate was good.

TABLE 3.2-2
SEAD-62, MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-62

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)
MW62-1	753.01	6/21/94	2.34	750.67	7/20/94	2.92	750.09	7/6/94	2.09	750.92
								7/25/94	5.32	747.69
MW62-2	749.46	7/5/94	1.9	747.56	7/20/94	2.71	746.75	7/25/94	3.01	746.45
MW62-3	750.41	7/12/94	3.28	747.13	7/20/94	3.46	746.95	7/25/94	4.14	746.27

N 987250

N 987000

N 986750

N 986500

N 986250

N 986000

BRADY ROAD

UNNAMED ROAD

BLDG. 606

BLDG. 609

BLDG. 612

747.69
MW62-1

746.45
MW62-2

746.27
MW62-3

743.36
MW60-1

740.24
MW60-2

740.48
MW60-3

741
742
743
744
745
746
747

E 751500
E 751750
E 752000
E 752250
E 752500
E 752750
E 753000
E 753250
E 753500
E 753750
E 754000

LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- APPROXIMATE LANDFILL EXTENT
- RAILROAD
- 760 GROUND SURFACE ELEVATION CONTOUR
- ELECTRIC UTILITY LINE
- UNDERGROUND WATER UTILITY LINE

ROAD SIGN
DECIDUOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
COORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT
(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

MW62-1
747.69
MONITORING WELL WITH WATER TABLE ELEVATION

746
GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES GENERAL DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/25/94

N

100 0 100 200
(feet)

ACAD\SENECA\7LPS\WMU\ACADFIG\SD62GW.DWG

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEEERING
Dwg. No. 720518-01002

FIGURE 3.2-3
SEAD-62
GROUNDWATER ELEVATION AND TOPOGRAPHY

SCALE 1" = 200'
DATE APRIL 1996
REV A

3.3 SEAD-63: MISCELLANEOUS COMPONENTS BURIAL SITE

3.3.1 Site Geology

Based on results of the drilling program, till and calcareous dark grey shale are the two major types of geologic materials present on-site. The till has stratigraphically above the shale. In all three borings, a very thin soil horizon (0.2 to 0.3 feet) was observed overlying the till. The depths of the borings at SEAD-63 were up to 8.6 feet below the ground surface. The till is generally light brown to live grey and consists of very fine sand and silt, with little clay and traces amounts of dark grey shale fragments. Oxidized areas of till were noted in the upper till strata.

Competent calcareous dark grey shale was encountered at only one of the borings at a depth of 8.6 feet below the ground surface. The weathered shale horizon was observed to be up to 3.6 feet thick. The elevations of the competent bedrock determined during the drilling and seismic programs indicate the shale slopes generally to the west.

3.3.2 Geophysics

3.3.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEAD 63 are shown in Table 3.3-1. The seismic refraction profiles showed 6 to 9 feet of unconsolidated overburden (estimated at 1,600 ft./sec.) overlying bedrock (11,200 to 13,400 ft./sec.). The mid-spread data of profile P3 revealed a compact, 3900 ft./sec., overburden layer. Saturated overburden was not detected by the seismic survey. Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (<2 feet) overlying the bedrock surface would be undetectable.

Poor surface conditions prevailed during this seismic survey. Snow melt waters and slush covered much of the site and in many areas water was pooled over frozen ground. These conditions resulted in unusually high velocities of the direct arrival waves from the surface layer (typically 2,600 to 4,700 ft./sec.). Therefore, the surface velocities were manually reduced to a value of 1,600 ft./sec. (the surface wave velocity detected from unfrozen ground on profile P3) during the data interpretation phase. The depths to bedrock calculated from

TABLE 3.3-1
SEAD 63

Expanded Site Inspection
Results of Seismic Refraction Survey

Profile	Distance[1]	Ground Elevation[2]	Water Table		Bedrock	
			Depth	Elev[2].	Depth	Elev[2].
P1	-5 120	98.8 100			6.0 5.1	92.8 94.9
P2	-5 57.5 120	97.1 96.9 96.6			9.9 7.8 6.7	87.2 89.1 89.9
P3	-5 57.5 120	98.3 97.3 98.1			8.3 8.2 6.9	90.0 89.1 91.2
P4	-5 120	101.4 100.2			8.2 7.1	93.2 93.1

1. All distances are in feet along the axis of each seismic profile and were measured from geophone #1 of each profile.

2. All elevations are relative to an arbitrary datum established at geophone #24 of the SEAD-63 seismic profile P1.

these interpretations were corroborated by the depths to bedrock measured during the monitoring well installations at SEAD 63.

The elevations of the bedrock surface, as determined by these surveys, indicate that the bedrock slopes to the west, generally following the surface topography. Groundwater flow is also expected to be directed to the west, following the slope of the bedrock.

3.3.2.2 EM-31 Survey

Figure 3.3-1 shows the apparent ground conductivity measured at SEAD-63. A square shaped conductivity anomaly was detected in the northwest portion of the grid. This anomaly was correlated to the suspected miscellaneous components burial sites. The large conductivity anomaly at the southeastern corner of the grid corresponded to Igloo A0101. A linear anomaly running the length of the western boundary of the grid was presumably associated with underground utilities or to an accumulation of road salt in the drainage ditch along Patrol Road. The guard post in the northwestern corner of the grid was also detected. In general, the ground in the western portion of the grid exhibited slightly higher apparent conductivities than the ground in the eastern portion.

The in-phase response of the EM-31 survey is shown in Figure 3.3-2. The anomaly in the north-central area of the grid better defines the boundaries of the suspected burial pits; however, the square feature identified by the apparent conductivity survey was not detected. Anomalies associated with the guard post, the underground utility and Igloo A0101 were also observed.

3.3.2.3 GPR Survey

A GPR survey was also conducted at SEAD 63 to delineate the extent of the suspected burial pits. A layer of conductive shale gravel, typically 12 inches thick, overlaid the western portion of the survey area, greatly reducing the radar signal penetration through the underlying native soils. In spite of this limitation, the GPR data revealed the presence of several areas where the radar signal reflections from the base of the gravel fill and underlying layers disappeared. Figure 3.3-3 shows a typical GPR profile illustrating anomalies of this type. The burial pit boundaries delineated by these anomalies coincided with the boundaries established by the in-phase data from the EM-31 survey.

N

N 1013500

N 1013250

N 1013000

N 1012750

SERVICE ROAD #3

L1480N

L1400N

L1300N

L1200N

L1100N

L1000N

IGLOO #A0101

E 741500

E 741250

E 741000

GUARD POST

PATROL ROAD

NORTH SOUTH BASELINE ROAD

638

640

634

636

630

632

628

50 0 50 100
(feet)

GEOSOFT

CONDUCTIVITY
(mS/m)

23.2
22.8
22.4
22.0
21.6
21.2
20.8
20.4
20.0
19.6
19.2
18.8
18.4
18.0
17.6
17.2
16.8
16.4
16.0
15.8
15.4
15.0
14.6
14.2
13.8
13.4
13.0
12.6
12.2
11.8
11.4
11.0
10.6
10.2
9.8
9.4
9.0
8.6
8.2
7.8

LEGEND

- APPROXIMATE EXTENT OF OPERATIONS PAD (FROM SEDA SITE MAP)
- EXTENT OF OPERATIONS PAD IDENTIFIED BY EM-31 SURVEY
- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- LANDFILL EXTENT
- RAILROAD
- 780 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

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.
ENVIRONMENTAL ENGINEERING

720518-01002

FIGURE 3.3-1
SEAD-63 EM SURVEY, QUADRATURE RESPONSE

SCALE
1" = 100'

DATE
APRIL 1996

REV

3.3.2.4 Test Pitting Program

A total of twelve test pits were excavated in SEAD-63 to characterize the sources of the geophysical anomalies. Nine test pits were excavated in the area of suspected burial pits located by the in-phase response data and the GPR records from SEAD-63 (TP63-1 through TP63-7, TP63-11, and TP63-12). Three test pits were excavated in the square shaped area of increased apparent ground conductivities identified by the EM-31 survey (TP63-8 through TP63-10). The test pit logs are presented in Appendix B.

Miscellaneous military components were found in test pits TP63-1, TP63-3, TP63-4, TP63-7, and TP63-11. Each of these excavations were characterized by dark gray shale gravel fill overlying the burial pits. The base of the burial pits could not be determined in any of these five excavations due to the presence of a perched water layer within the buried materials. Test pit TP63-6 identified two fifty-five gallon drums buried in an up-right position with their tops approximately one foot below grade. Both drums were in good condition and very little rust was noted on their surfaces. One of these drums had the words "BURIAL PIT" stenciled on its side. This drum was opened during the test pitting activities and electronics components were observed within it. No liquids were observed in the drum and all radiation and organic vapor field screening measurements that were taken around and within the drum had readings that were equal to background levels. Soil sample TP63-6-1 was collected from the soils at the base of this drum. Test pits TP63-2, TP63-8, TP63-9, TP63-10 and TP63-12 revealed only a layer of shale gravel to a depth of 1 foot, which would explain the source of the elevated ground conductivity observed by the EM-31 survey.

The excavated material was continuously screened for organic vapors with an OVM-580B and for radioactivity with a Victoreen-190 alpha-beta-gamma rate meter, a Ludlum-19 micro-R beta and gamma rate meter and a Ludlum 2221 alpha scintillometer. No readings above background levels (0 ppm for the OVM, 10-15 micro Rhems per hour for the beta and gamma meters, and 6 counts per minute on the alpha meter) were observed during the excavations.

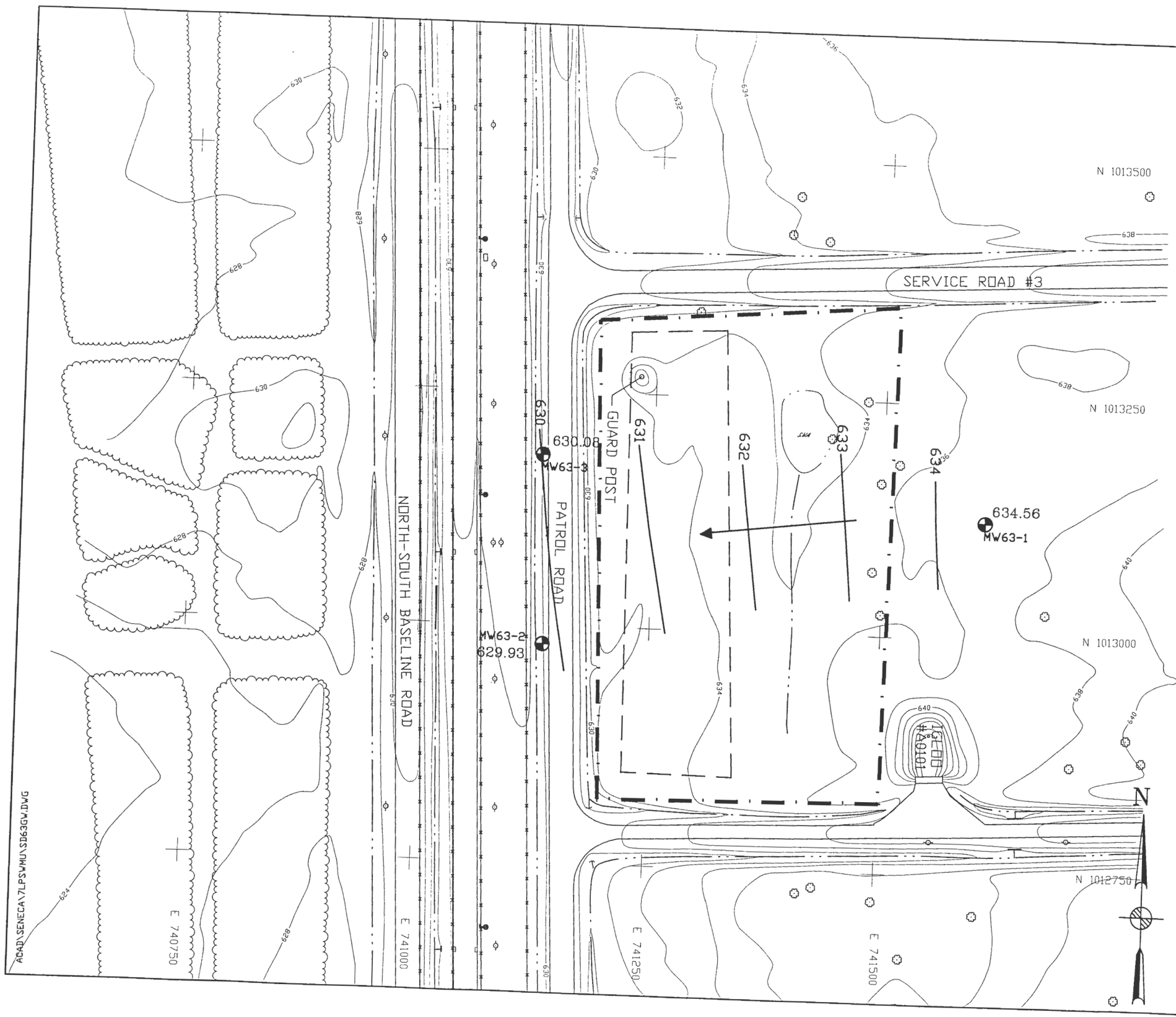
3.3.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography and mostly by an intermittent drainage ditch which flows north to south, along the western boundary of the site (Figure 1.1-16). The local surface water flow is believed to be controlled by the overall west-southwest sloping ground surface.

TABLE 3.3-2
SEAD-63, MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-63

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)
MW63-1	639.69	6/26/94	5.98	633.71	7/11/94	5.54	634.15	7/6/94	5.13	634.56
								7/26/94	6.39	633.30
MW63-2	632.32	6/25/94	2.98	629.34	7/11/94	3.06	629.26	7/6/94	2.39	629.93
								7/26/94	4.02	628.30
MW63-3	633.19	6/26/94	4.15	629.04	7/11/94	4.19	629.00	7/6/94	3.11	630.08
								7/26/94	5.21	627.98



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT

APPROXIMATE EXTENT OF OPERATIONS PAD (FROM SEDA SITE MAPS)

- 634.56 MW63-1 MONITORING WELL WITH WATER TABLE ELEVATION
- GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/06/94

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	DWG. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.3-4
SEAD-63
GROUNDWATER ELEVATION AND TOPOGRAPHY

SCALE	DATE	REV
1" = 100'	APRIL 1998	A

TABLE 3.4-1
SEAD 64A

Expanded Site Inspection
Results of Seismic Refraction Survey

Profile	Distance[1]	Ground Elevation[2]	Water Table		Bedrock	
			Depth	Elev[2].	Depth	Elev[2].
P1	.5 57.5 112.5	104.7 103.2 103.8			7.5 6.8 7.5	97.2 96.4 96.3
P2	.5 57.5 112.5	100.1 101.1 102.7			10.5 8.6 9.2	89.6 92.5 96.4
P3	.5 57.5 112.5	95.7 96.0 97.0			7.1 5.9 6.3	88.6 90.1 90.7
P4	.5 57.5 112.5	99.5 100.3 101.2			7.7 6.9 7.8	91.8 93.4 93.4

1. All distances are in feet along the axis of each seismic profile and were measured from geophone #1 of each profile.

2. All elevations are relative to an arbitrary datum established at the southwest corner of the chain link fence surrounding the stockpile of zinc ingots.

limitations of the seismic refraction method, a thin layer of saturated overburden (<2 feet) overlying the bedrock surface would be undetectable.

An unusually low bedrock velocity (9000 ft./sec.) was detected along profile P3. This velocity is characteristic of weathered rock.

3.4.2.2 EM-31 Survey

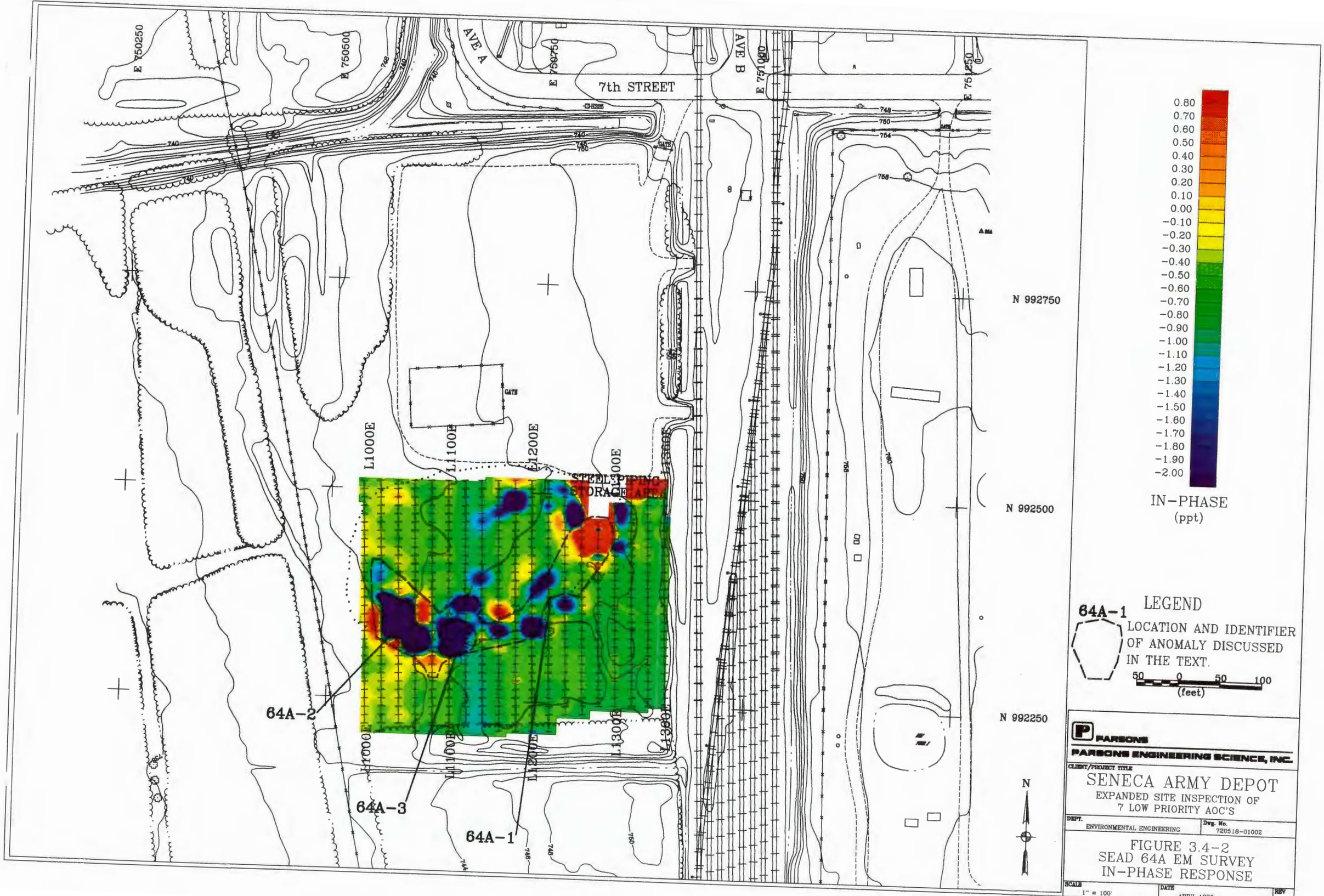
Figure 3.4-1 shows the results of the apparent ground conductivity survey performed at SEAD-64A. A series of conductivity anomalies, forming an arc, approximately 75 feet in width, was detected across the west central and northeastern sections of the survey area (anomaly 64A-1 in Figures 3.4-1 and 3.4-2). A follow up inspection revealed that the southern boundary of this arc coincided with a 1 to 2 foot step in the ground topography which was interpreted as the southern boundary of the landfill area. In addition, the large and negative anomalies (anomalies 64A-2 and 64A-3) in the western portion of the arc were associated with disposed culverts that were visible on the ground surface. The linear anomaly along the eastern portion of the northern boundary of the grid was caused by six inch diameter steel piping being stored at this site. Excluding the anomalies detected from this survey, the data over the entire grid, including a large portion of the suspected area of the landfill, displayed a relatively uniform distribution of apparent ground conductivities.

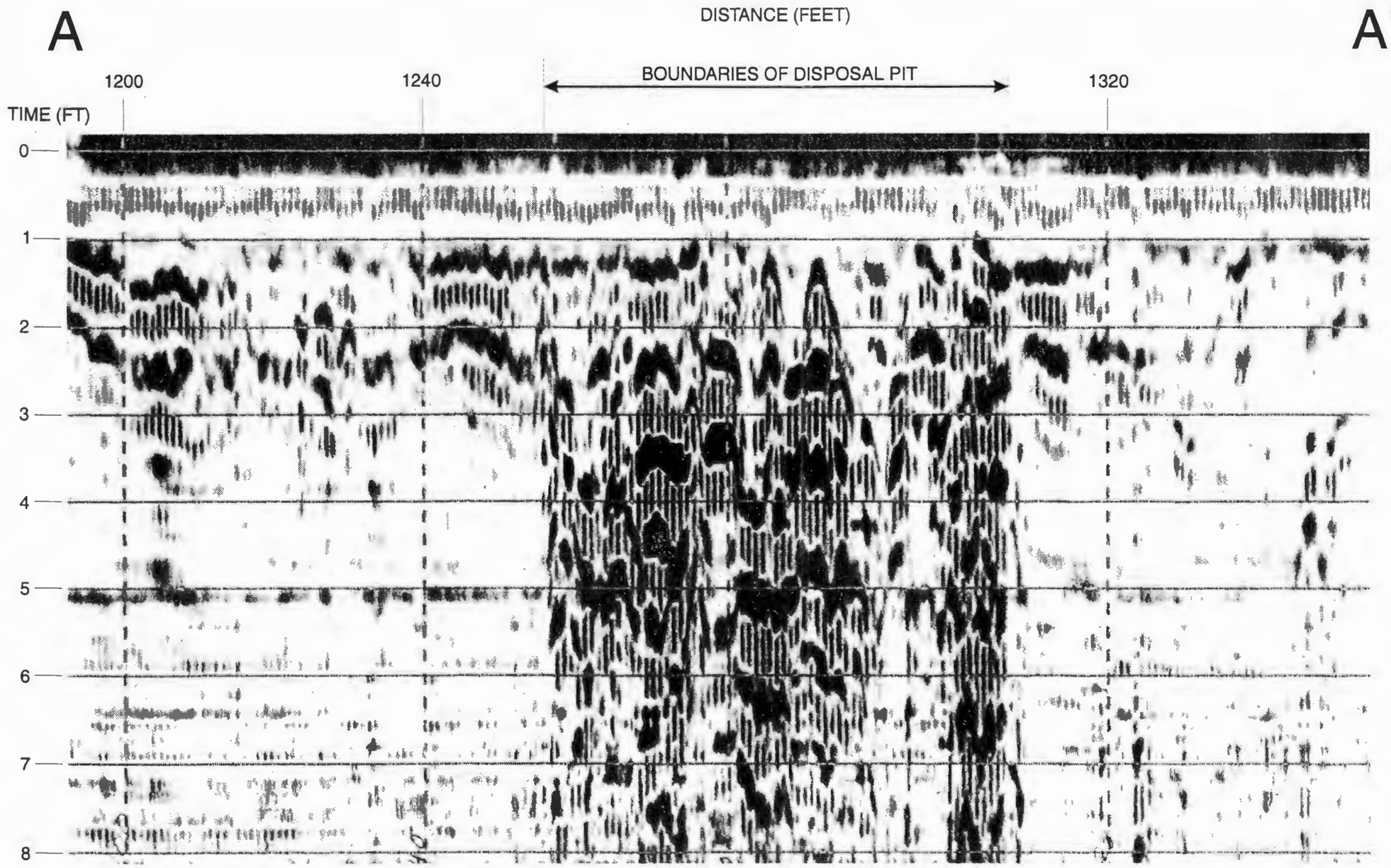
The in-phase response of the EM-31 survey is shown in Figure 3.4-2. These results show the same anomaly features as described above. It should be noted that neither the apparent conductivity measurements nor the in-phase response measurements could delineate the northern and western boundaries of the landfill area.

3.4.2.3 GPR Survey

A GPR survey was conducted at SEAD-64A to determine the extent of the landfill site, to provide additional information on the depth of fill, and to provide a better definition of the buried metallic objects detected by the EM-31 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, measuring 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-31 anomalies. Figure 3.4-3 shows one of the GPR profiles acquired over this burial pit.

E 750250
E 750500
E 750750
E 751000
E 751250
AVE A
AVE B
7th STREET
N 992750
N 992500
N 992250
L1000E
L1100E
L1200E
L1300E
STEEL PIPING STORAGE AREA
64A-1
64A-2
64A-3
17.4
17.2
17.0
16.6
16.4
16.2
16.0
15.8
15.4
15.2
15.0
14.8
14.4
14.2
14.0
13.8
13.6
13.2
13.0
12.8
12.6
12.2
12.0
11.8
11.6
11.4
11.0
10.8
10.6
10.4
10.0
9.8
9.6
9.4
9.2
8.8
8.6
8.4
8.2
7.8
CONDUCTIVITY (mS/m)
LEGEND
64A-1
LOCATION AND IDENTIFIER OF ANOMALY DISCUSSED IN THE TEXT.
50 0 50 100
(feet)
N
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA army DEPOT
EXPANDED SITE INSPECTION OF 7 LOW-PRIORITY AOC'S
DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720518-01002
FIGURE 3.4-1
SEAD-64A EM SURVEY
QUADRATURE RESPONSE
SCALE 1" = 100'
DATE APRIL 1996
REV A


E 750250
E 750500
E 750750
E 751000
E 751250
AVE A
AVE B
7th STREET
N 992750
N 992500
N 992250
L1000E
L1100E
L1200E
L1300E
STEEL PIPING STORAGE AREA
64A-1
64A-2
64A-3
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
−0.10
−0.20
−0.30
−0.40
−0.50
−0.60
−0.70
−0.80
−0.90
−1.00
−1.10
−1.20
−1.30
−1.40
−1.50
−1.60
−1.70
−1.80
−1.90
−2.00
IN-PHASE
(ppt)
LEGEND
64A-1
LOCATION AND IDENTIFIER OF ANOMALY DISCUSSED IN THE TEXT.
50 0 50 100
(feet)
N
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOC'S
DEPT.
ENVIRONMENTAL ENGINEERING
Dwg. No.
720518-01002
FIGURE 3.4-2
SEAD 64A EM SURVEY
IN-PHASE RESPONSE
SCALE
1" = 100'
DATE
APRIL 1996
REV
A



PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOCs

DEPT	DWG NO
ENVIRONMENTAL ENGINEERING	720518-02000

FIGURE 3.4-3
SEAD-64A, GPR PROFILE A-A'

SCALE	DATE
	NOVEMBER 1994

R:\GRAPHICS\SENECA\RADAR\FIG3-4-3.CDR

The GPR survey was also able to map a subsurface contact in the suspected landfill area which was associated with the base of fill/native soil contact. Figure 3.4-4 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. The approximate areal extent of the landfill is 250 by 350 feet. The GPR survey was able to accurately locate the southern landfill boundary and not accurately locate the western, northern, and eastern boundaries.

3.4.2.4 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 and were centered on EM-31 and GPR anomalies. The test pit logs are presented in Appendix B.

TP64A-1 was excavated in the disposal pit in the northeast section of the landfill. Crushed army-navy (AN) canisters, originally 12 inches in diameter and 14 inches long, as well as rail road ties and construction debris characterized the majority of the fill material from this excavation. Stencilling on the AN 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 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 two foot ten inches thick fill layer. TP64A-3 was excavated at the EM anomaly at the southwestern section of the landfill. Buried drainage culverts, constantine wire, municipal wastes, and construction debris was encountered. The base of fill at this location was measured at two feet eight inches below grade.

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro Rhems per hour of radiation) were observed during the excavation.

E 750250
E 750500
E 750750
E 751000
E 751250
AVE A
AVE B
7th STREET
N 992750
N 992500
N 992250
N
SB64A-1
(2 ft.)
STEEL PIPING
STORAGE AREA
TP64A-1
(3.3 ft)
SB64A-3
(NO FILL OBSERVED)
TP64A-3
(2.7 ft)
SB64A-2
(1.7 ft)
TP64A-2
(2.9 ft)
GATE
4.8
4.7
4.6
4.5
4.4
4.3
4.2
4.1
3.9
3.8
3.7
3.6
3.5
3.4
3.3
3.2
3.1
3.0
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
1.9
1.8
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1.0
THICKNESS OF FILL
(FEET)
LEGEND
TP64A-1
(3.3 ft)
TEST PIT LOCATION AND THICKNESS OF FILL OBSERVED
SB64A-1
(2.7 ft)
SOIL BORING LOCATION AND THICKNESS OF FILL OBSERVED
50 0 50 100
(feet)
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S
DEPT.
ENVIRONMENTAL ENGINEERING
Dwg. No.
720518-01002
FIGURE 3.4-4
SEAD 64A
THICKNESS OF FILL
SCALE
1" = 100'
DATE
APRIL 1996
REV
A

3.4.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography which slopes gently to the west. There are no sustained surface water bodies on-site. SEDA railroad tracks are located approximately 50 feet east of the eastern perimeter of the site. The site is approximately 10 feet higher in elevation than the railroad tracks, there is a potential for surface water to drain from the site towards the SEDA railroad tracks. However, since the site slopes to the west, it is believed that the railroad tracks, are affected minimally by surface water runoff from the site. The groundwater flow direction in the till/weathered shale aquifer on the site is to the west based on the groundwater elevations measured in the monitoring wells on July 6, 1994 and July 26, 1994 (Table 3.4-2 and Figure 3.4-5).

3.5 SEAD-64B: GARBAGE DISPOSAL AREA

3.5.1 Site Geology

Based on the results of the drilling, program, till and calcareous grey to dark grey shale are the two major types of geologic materials present on site. The till lies stratigraphically above the shale. Fill was also observed at SEAD-64B. The boring depths at this site were up to 26.2 feet below ground surface.

Topsoil up to 0.6 feet thick was encountered in most of the explorations. Fill was encountered at all soil boring and test pit locations, except at the upgradient and downgradient monitoring well locations. The base of the fill was observed to be 1.3 to 8.4 feet deep, except at SB64B-3 which was on a berm where the fill was 10.5 feet deep. The fill material consisted primarily of soil: light brown to grey silt with little very fine sand and clay, and trace amounts of grey shale fragments (up to 1.0 inch in diameter). In the upgradient and downgradient well locations, a thin soil horizon was observed within 0.6 feet of the ground surface. A 1.5 foot piece of constantine wire was encountered in the fill at TP64B-3. Municipal trash (glass, cans, plastic, used oil filter, etc.) was encountered in TP64B-2 at a depth range of 5 to 7.5 feet.

The till generally consists of light brown silt with little very fine sand, and trace amounts of grey shale fragments (up to 1.0 inch in diameter). Oxidized areas of the till were noted in the upper portion of the till strata.

TABLE 3.4-2
SEAD-64A, MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-64A

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

E 750250
E 750500
E 750750
E 751000
E 751250
AVE A
AVE B
7th STREET
740
748
750
754
758
760
OH325
GATE
732
733
734
735
736
MW64A-2
732.94
MW64A-T
736.88
MW64A-3
731.93
MW64A-1A
733.71
N 992750
N 992500
N 992250
N

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

MW64A-1
736.88
MONITORING WELL WITH WATER TABLE ELEVATION

732
GROUNDWATER ELEVATION CONTOUR
(ARROW INDICATES GENERAL DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/06/94

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.4-5
SEAD 64A
GROUNDWATER ELEVATION AND TOPOGRAPHY

SCALE	DATE	REV
1" = 100'	APRIL 1996	A

ACAD\SENECA\7LPSWMU\ACADFIG\SD64AGW.DWG

There is a stratigraphic division within the till (an upper and lower unit) which is defined more by a change in density than by a change in composition. The relative density of the lower till, as measured by blow counts during split spoon sampling, is greater than that for the upper till. Blow counts for the upper till were generally between 10 and 30 blows per 6 inches of penetration of the spoon, and for the lower till are between 30 and 100 blows. The density change may be explained by a difference in mode of deposition for the two till units, such that the lower till (lodgement till) was deposited directly beneath a moving glacier, and the upper till (ablation till) was deposited by a stagnant, ablating glacier. Another explanation may be weathering of the upper portion of the till, rendering it less dense than the unweathered till below.

In the northwestern portion of the site, approximately 3.5 feet of weathered shale overlies the competent shale bedrock. Competent, calcareous grey to dark grey shale was encountered at depths between approximately 14 and 22 feet below the ground surface. The elevations of the competent bedrock determined during the drilling and seismic programs indicate that the shale slopes to the west-northwest mimicking the land surface.

3.5.2 Geophysics

3.5.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEAD-64B are shown in Table 3.5-1. The seismic refraction profiles detected 10 to 18 feet of unconsolidated overburden (1,020 to 5,370 ft./sec.) overlying bedrock (10,000 to 12,400 ft./sec.). In particular, the unconsolidated material included unsaturated overburden (1,020 to 3,100 ft./sec.) and saturated overburden (4,500 to 5,370 ft./sec.).

A review of the water table elevations in Table 3.5-1 suggest that groundwater flow would be to the west or northwest.

3.5.2.2 EM-31 Survey

Figure 3.5-1 shows the results of the apparent ground conductivity survey performed at SEAD-64B. The prominent lineament along the western and southern boundaries of the grid is due to underground utilities and a buried 2 inch metal pipe. A localized anomaly (anomaly 64B-1 on Figure 3.5-1), situated 25 feet east of the western buried utilities/pipe lineament, was characterized by high and low conductivity measurements. The source or sources of the

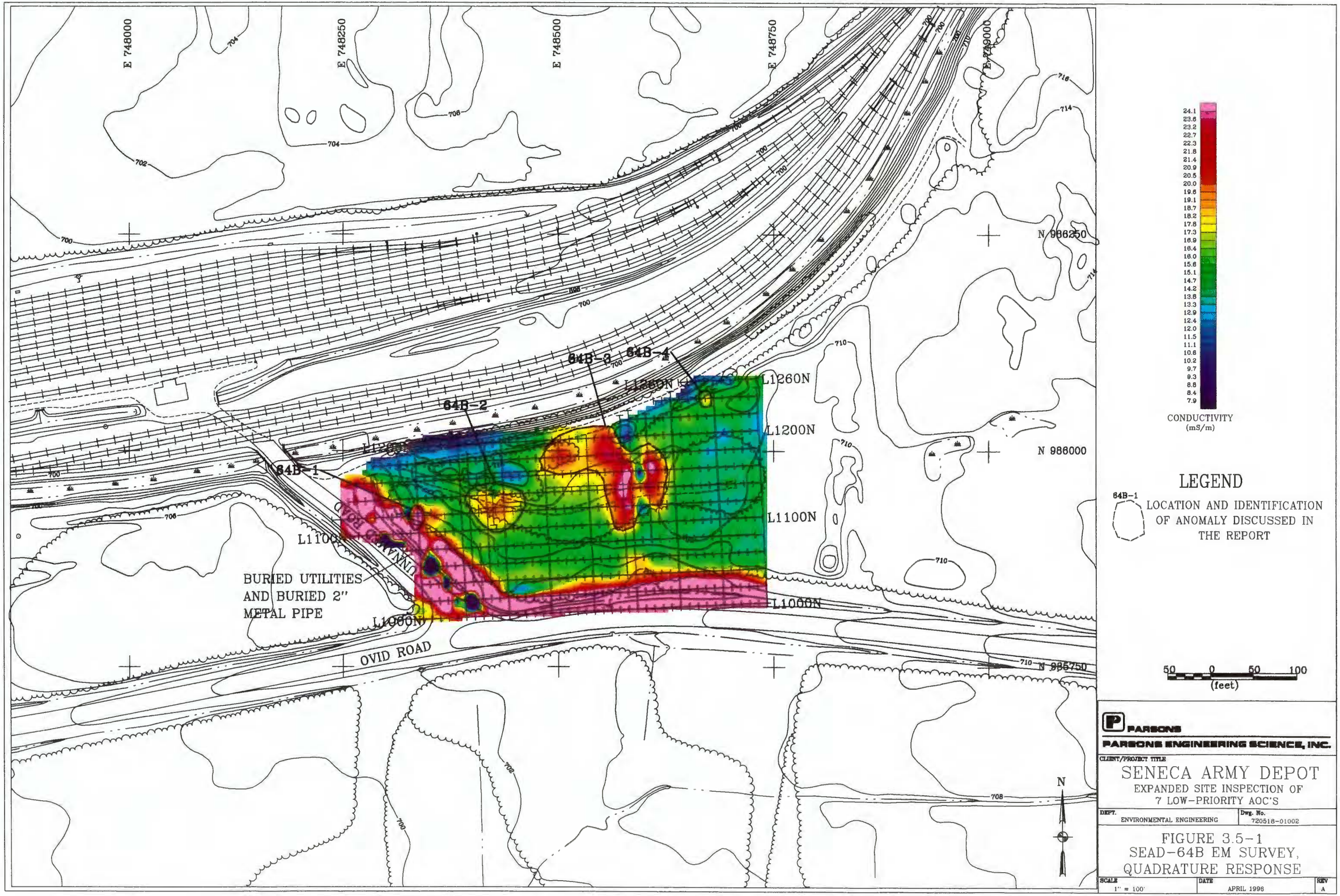
TABLE 3.5-1
SEAD 64B

Expanded Site Inspection
Results of Seismic Refraction Survey

Profile	Distance[1]	Ground Elevation[2]	Water Table		Bedrock	
			Depth	Elev[2].	Depth	Elev[2].
P1	.5	105.4	4.9	100.5	9.4	96.0
	57.5	105.9	5.3	100.6	14.4	91.5
	112.5	106.0	5.6	100.4	15.3	90.7
P2	.5	103.9	3.7	100.2	10.5	93.4
	57.5	103.7	4.1	99.6	11.3	92.4
	112.5	103.5	3.6	99.9	9.6	93.9
P3	.5	100.8			3.8	97.0
	57.5	100.0			5.1	94.9
	112.5	100.3			4.8	96.0
P4	.5	109.6	6.9	102.7	22.1	87.5
	57.5	111.1	8.4	102.7	25.3	85.8
	112.5	110.4	7.1	103.3	24.7	85.7

1. All distances are in feet along the axis of each seismic profile and were measured from geophone #1 of each profile.

2. All elevations are relative to an arbitrary datum established at geophone #12 of the SEAD-64B seismic profile P3.



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.5-1
SEAD-64B EM SURVEY, QUADRATURE RESPONSE

SCALE	DATE	REV
1" = 100'	APRIL 1996	A

conductivity anomalies situated in the northeastern portion of the grid (anomalies 64B-2 and 64B-4) are unknown. In general, the area of the suspected landfill exhibits slightly elevated ground conductivities (in the range of 15 to 18 millisiemens per meter), however, distinct landfill boundaries were not evident.

The in-phase response of the EM-31 survey is shown in Figure 3.5-2. The lineament associated with the buried utilities/pipe is reduced in magnitude allowing a better definition of the localized anomaly (anomaly 64B-1) previously described. A second localized anomaly, approximately 20 feet south of the western surface pile at this site (anomaly 64B-2), consisted of a moderate increase in the measured in-phase percentage and corresponded to the center of an increased ground conductivity zone.

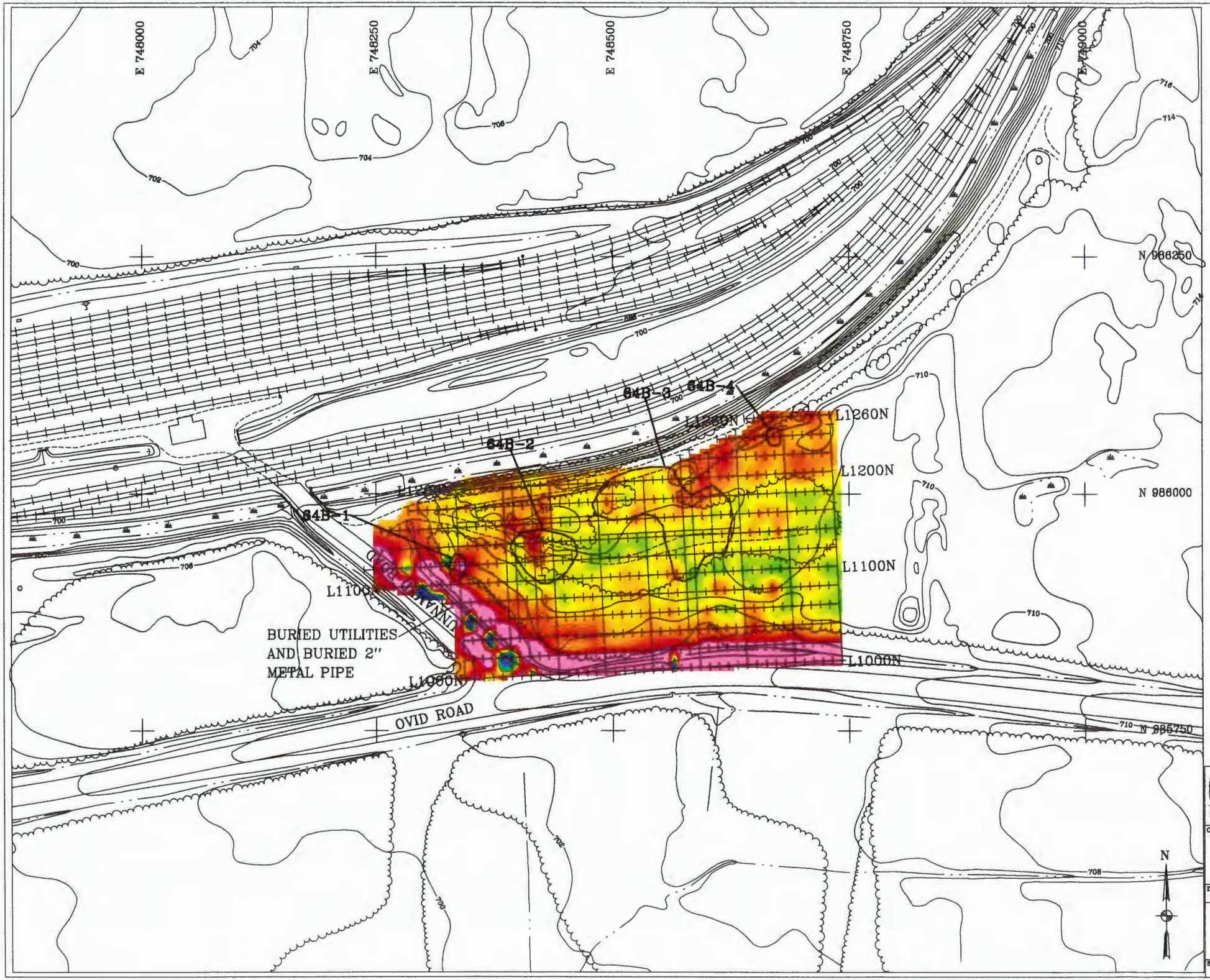
3.5.2.3 GPR Survey

The GPR survey conducted at this site revealed several anomalies at depths of 1 to 3.5 feet. One of these anomalies was associated with the in-phase anomaly located twenty feet south of the western surface pile. A second anomaly was detected in the zone of conductivity anomalies situated in the northeastern portion of the grid. Although these two anomalies did exhibit characteristic radar reflections from metallic objects (a strong ringing of the signal), neither showed characteristic signals associated with cylindrical objects.

3.5.2.4 Test Pitting Program

A total of three test pits were excavated in SEAD 64B to characterize the sources of the geophysical anomalies. All three test (TP64B-1, TP64B-2, and TP64B-3) pits were excavated in the suspected landfill area. The test pit logs are presented in Appendix B.

TP64B-2 was excavated at the EM and GPR anomalies located south of the berm located in the northwestern section of the site (anomaly 64B-2). The source of the anomalies was a steel cable buried 1 foot below the ground surface. A light brown silt fill layer was observed to a depth of 5 feet under which a 2 foot thick layer of municipal waste was present. The base of this municipal waste layer, at a depth of 7 feet below grade, marked the base of fill at this location. TP64B-1 was excavated at EM anomaly 64B-1, which is located in the western section of the suspected fill area. The source of this anomaly was not determined; however, a metal detector, used to screen the test pit for metallic objects as it was being advanced, indicated the presence of ferrous material in the near surface soils. A visual inspection of these soils could not reveal the source of the magnetic and electromagnetic


E 748000
E 748250
E 748500
E 748750
E 749000
N 986250
N 986000
N 985750
L1260N
L1200N
L1100N
L1060N
64B-3
64B-4
64B-2
64B-1
BURIED UTILITIES
AND BURIED 2"
METAL PIPE
OVID ROAD
1.78
1.68
1.57
1.47
1.36
1.26
1.15
1.05
0.94
0.84
0.73
0.63
0.52
0.42
0.31
0.21
0.10
0.00
−0.10
−0.21
−0.31
−0.42
−0.52
−0.63
−0.73
−0.84
−0.94
−1.05
−1.15
−1.26
−1.36
−1.47
−1.57
−1.66
−1.78
−1.89
−1.99
IN-PHASE
(ppt)
LEGEND
64B-1
LOCATION AND IDENTIFICATION OF ANOMALY DISCUSSED IN THE REPORT
50 0 50 100
(feet)
N
PARSONS
PARSONS ENGINEERING SCIENCE, INC.
CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S
DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720518-01002
FIGURE 3.5-2
SEAD-64B EM SURVEY,
IN-PHASE RESPONSE
SCALE 1" = 100'
DATE APRIL 1998
REV A

anomalies. The material excavated from TP64B-3, located at EM anomaly 64B-3, revealed a 5 foot thick fill layer of silt with shale fragments and one eighteen inch long strand of constantine wire. The wire strand may have contributed to the increased apparent ground conductivity anomaly measured in the vicinity of this test pit location, but it did not cause the entire anomaly. The cause of the anomaly is unknown.

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro Rhems per hour of radiation) were observed during the excavation.

3.5.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography including a perimeter drainage swale that surrounds the site to the south and west. The general site slop is to the south-southwest.

Along the northern perimeter of the site there is a steep embankment (approximately 15 feet) that was created by the railway cut of the SEDA switch yard located immediately north of the site. An intermittent drainage ditch is located at the bottom of this embankment. Any precipitation that falls along the northern perimeter of the site which does not drain to the south or west, is believed to flow down the flanks of the embankment and into the drainage ditch. The drainage ditch flows to the west and eventually discharges into Silver Creek (Figure 1.1-18).

The groundwater flow direction in the till/weathered shale aquifer on the site is to the west-northwest based on the groundwater elevations measured in three monitoring wells on July 6, 1994 and July 25, 1994 (Table 3.5-2 and Figure 3.5-3). Recharge of water to the monitoring wells during sampling was good.

3.6 SEAD-64C: GARBAGE DISPOSAL AREA

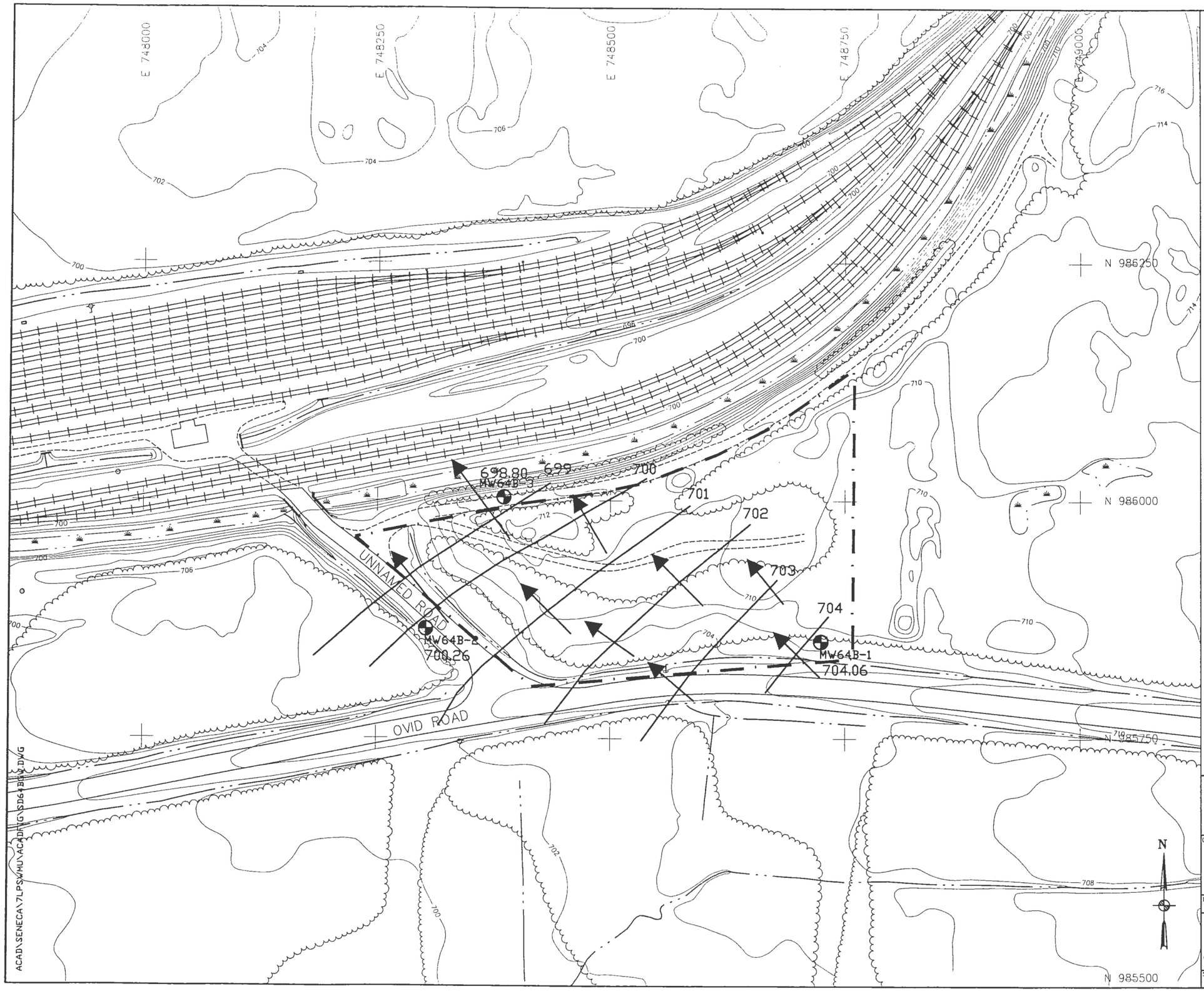
3.6.1 Site Geology

Only one monitoring well (no soil borings) was drilled at SEAD-64C. Monitoring well MW64C-1 was drilled in the west-central section of the site. Based on the results of the drilling at MW64C-1, till and weathered dark grey shale are the two major types of geologic

TABLE 3.5-2
SEAD-64B, MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-64B

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)
MW64B-1	707.45	5/24/94	3.29	704.16	7/10/94	4.19	703.26	7/6/94 7/25/94	3.39 5.07	704.06 702.38
MW64B-2	703.77	5/24/94	4.23	699.54	7/10/94	4.17	699.60	7/6/94 7/25/94	3.51 5.46	700.26 698.31
MW64B-3	710.64	5/25/94	12.55	698.09	7/10/94	12.24	698.40	7/6/94 7/25/94	11.84 12.86	698.80 697.78



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

MW64B-1
704.06
MONITORING WELL WITH WATER TABLE ELEVATION

703
GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/06/94

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.5-3
SEAD 64B
GROUNDWATER ELEVATION AND TOPOGRAPHY

SCALE	DATE	REV
1" = 100'	APRIL 1998	A

ACAD\SENECA\7LPS\WU\ACADFIG\SD61B64.DWG

materials present on-site. The till lies stratigraphically above the weathered shale. The boring depth of MW64C-1 was 16 feet below ground surface.

The till generally consists of grey-brown silt and very fine sand with trace amounts of dark grey shale fragments (up to 1.0 inch diameter). Larger shale fragments (rip-up clasts) were observed near the till weathered shale contact.

There is a stratigraphic division within the till (an upper and lower unit) which is defined more by a change in density than by a change in composition. The relative density of the lower till, as measured by blow counts during split spoon sampling, is greater than that for the upper till. Blow counts for the lower till were generally between 40 and 100 blows. The density change may be due to a difference in mode of deposition for the two till units, such that the lower till (lodgement till) was deposited directly beneath a moving glacier, and the upper till (ablation till) was deposited by a stagnant, ablating glacier. Another explanation may be weathering of the upper portion of the till, rendering it less dense than the unweathered till below.

Weathered and fractured dark grey shale was encountered at 15 feet below ground surface. The weathered and fractured shale is at least 1 foot in thickness.

3.6.2 Geophysics

3.6.2.1 EM-31 Survey

EM-31 data were collected over two grids (eastern and western) in the area of SEAD-64C. The results of the apparent ground conductivity data from the eastern grid are shown in Figure 3.6-1. The results of the in-phase response data from this grid are shown in Figure 3.6-2. Two distinct anomalies are visible in both figures: 1) an oval area, approximately 500 feet long by 200 feet wide, of large positive and negative anomalies, and 2), a small, square, and predominantly negative anomaly, south of the first, which corresponded to the concrete pads located at this site. The EM-31 grid was extended beyond the boundaries of the anomalous zones in order to define background apparent conductivities of the subsurface. The electrical properties of the soils surrounding the anomalous zones are relatively uniform. However, increased conductivities were detected in the area to the south and west of the concrete pads and the areas along South Baseline Road and East Baseline Road. These elevated conductivity values could be attributed to several factors, such as increased clay content in the soil or a higher concentration of dissolved solids in the groundwater or soil

E 753750
E 754000
E 754250
E 754500
N 984750
N 984500
N 984250
760
765
MATCH-LINE A
L1500N
L1400N
L1300N
L1200N
L1100N
L1000N
L950E
L900E
L850E
EAST PATROL ROAD
SOUTH PATROL ROAD
GATE
50 0 50 100
(feet)
N

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

L1200E EM TRANSECT

CONDUCTIVITY
(mS/m)

19.4 19.0 18.6 18.4 18.2 17.8 17.6 17.2 17.0 16.8 16.4 16.0 15.8 15.6 15.2 15.0 14.8 14.4 14.0 13.8 13.4 13.2 12.8 12.6 12.8 12.0 11.8 11.4 11.2 10.8 10.6 10.2 10.0 9.8 9.4 9.0 8.6 8.4 8.2 7.9

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

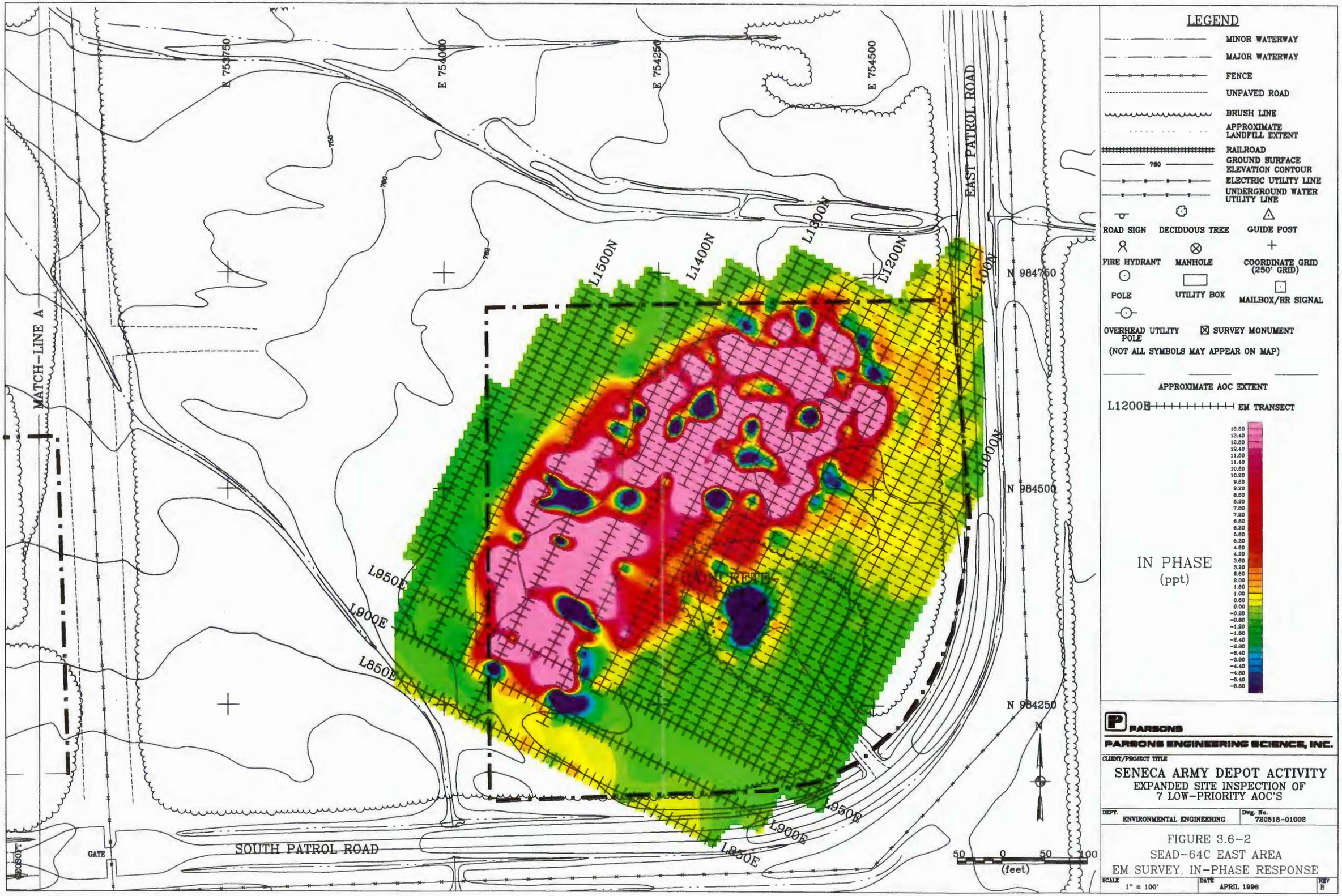
CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.6-1
SEAD-64C EAST AREA
EM SURVEY, QUANDRATURE RESPONSE

SCALE	DATE	REV
1" = 100'	APRIL 1998	B



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720516-01002

FIGURE 3.6-2
SEAD-64C EAST AREA
EM SURVEY, IN-PHASE RESPONSE

SCALE	DATE	REV
1" = 100'	APRIL 1996	B

moisture. Road salt should be considered a possible explanation for the increased apparent conductivities observed along the baseline roads.

A follow-up inspection of this site revealed several small gauge copper wires and quarter inch steel cables on the ground surface. The area where these wires were found roughly corresponded to the oval area of EM anomalies. These wires were presumably the source of the EM anomalies. Based on the size of the oval area of EM anomalies and the account of an electrical sub-station once being located on one of the concrete pads at SEAD-64C, the wires and cables may have functioned as a grounding grid for the electrical sub-station.

Figures 3.6-3 and 3.6-4 show the apparent conductivity and the in-phase response, respectively, of the EM-31 survey in the western grid of SEAD-64C. The only anomaly detected in this grid corresponded to a 30 foot by 20 foot burial pit, situated in the southwestern corner of the grid, which was identified by SEDA personnel as being filled with constantine wire to a depth of 6 to 8 feet. A review of the data over the remainder of the grid show a generally featureless response in the in-phase map and a gradual decrease of the ground conductivities towards the central portion of the grid. This decrease in ground conductivities may be attributed to decreased clay content in the overburden soils or to a decrease in the depth to bedrock.

3.6.2.2 GPR Survey

The GPR survey conducted in the eastern EM-31 grid revealed little information on the source or sources of the EM anomalies. The radar signal penetration range was between 3.5 to 4 feet, which coincided with the depth to a layer of fractured shale revealed during the test pit excavations. The GPR records acquired in the oval shaped zone of conductivity anomalies showed relatively homogeneous layered soils with no evidence of burial pits, buried metallic objects or areas of abrupt cuts in the soil layering.

In Section 3.6.2.1, it was noted that the baseline conductivity of the subsurface increased to the south and west of the concrete pads. This change in soil conductivity was also observed in the GPR records. The records acquired in this portion of the grid exhibit weak, near surface reflections. This is attributed to greater attenuation of radar waves traveling through more conductive soil.

L2440N
L2400N
L2320N
L2240N
L2160N
L2080N
L2000N
L1920N
L1840N
L1760N
MATCH-LINE A
762
754

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN
- L1200E EM TRANSECT

CONDUCTIVITY (mS/m)

24.1
23.7
23.3
22.8
22.4
22.0
21.6
21.2
20.7
20.3
19.9
19.5
19.1
18.6
18.2
17.8
17.4
16.9
16.5
16.1
15.7
15.3
14.8
14.4
14.0
13.6
13.2
12.7
12.3
11.9
11.5
11.1
10.6
10.2
9.8
9.4
8.9

N

50 0 50 100
1" = 100'

GEOSOFT

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720516-01002

FIGURE 3.6-3
SEAD-64 WEST EM SURVEY
QUADRATURE RESPONSE

SCALE	DATE	REV
1" = 100'	APRIL 1996	B

L2440N
L2400N
L2320N
L2240N
L2160N
L2080N
L2000N
L1920N
L1840N
L1760N
MATCH-LINE A
752
754
760
GEOSOFT

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN
- L1200E EM TRANSECT

IN-PHASE
(ppt)

3.75
3.63
3.51
3.39
3.26
3.14
3.02
2.90
2.78
2.65
2.53
2.41
2.29
2.17
2.04
1.92
1.80
1.68
1.55
1.43
1.31
1.18
1.07
0.95
0.83
0.70
0.58
0.46
0.34
0.21
0.09
-0.02
-0.14
-0.26
-0.39
-0.51
-0.63
-0.75
-0.87
-0.99

N

50 0 50 100
1" = 100'

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.6-4
SEAD-64C WEST EM SURVEY
IN-PHASE RESPONSE

SCALE	DATE	REV
1" = 100'	APRIL 1996	B

3.6.2.3 Test Pitting Program

A total of three test pits were excavated in SEAD-64C to characterize the sources of the geophysical anomalies in the eastern EM-31 survey grid. All three test pits were excavated in the oval shaped area of apparent conductivity and in-phase response anomalies (TP64C-1 through TP64C-3). The test pit logs are presented in Appendix B.

The three test pits were centered over areas of high gradients in the measured apparent ground conductivity and in-phase response. The sources of the EM anomalies at each location were not identified. Olive gray silt, with zones of shale fragments, fine sands, and large limestone boulders (typically 1 foot in diameter), was found in each test pit excavation. Individual strands of copper wire or steel cable were found in the upper 4 inches of the topsoil layer of test pits TP64C-1 and TP64C-3. A layer of weathered shale was encountered between three feet ten inches and four feet below grade in each of the test pits, hindering the advancement of the excavations to greater depths. Due to the shallow nature of the unconsolidated overburden observed in the test pit excavations, and to the absence of buried metallic objects in the areas of pronounced EM anomalies, the wires found along the ground surface were believed to be the sole cause of the EM anomalies. A second follow-up inspection of the area, utilizing a metal detector to screen the upper layer of the topsoil, revealed that some of these wires and cables were over 75 feet long. This information further confirmed the supposition that the source of the large area of EM anomalies could be attributed to these wires and cables at or near the ground surface.

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro Rhems per hour of radiation) were observed during the excavation.

3.6.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by the local topography, although very little relief is present on site. There are no sustained surface water bodies on-site.

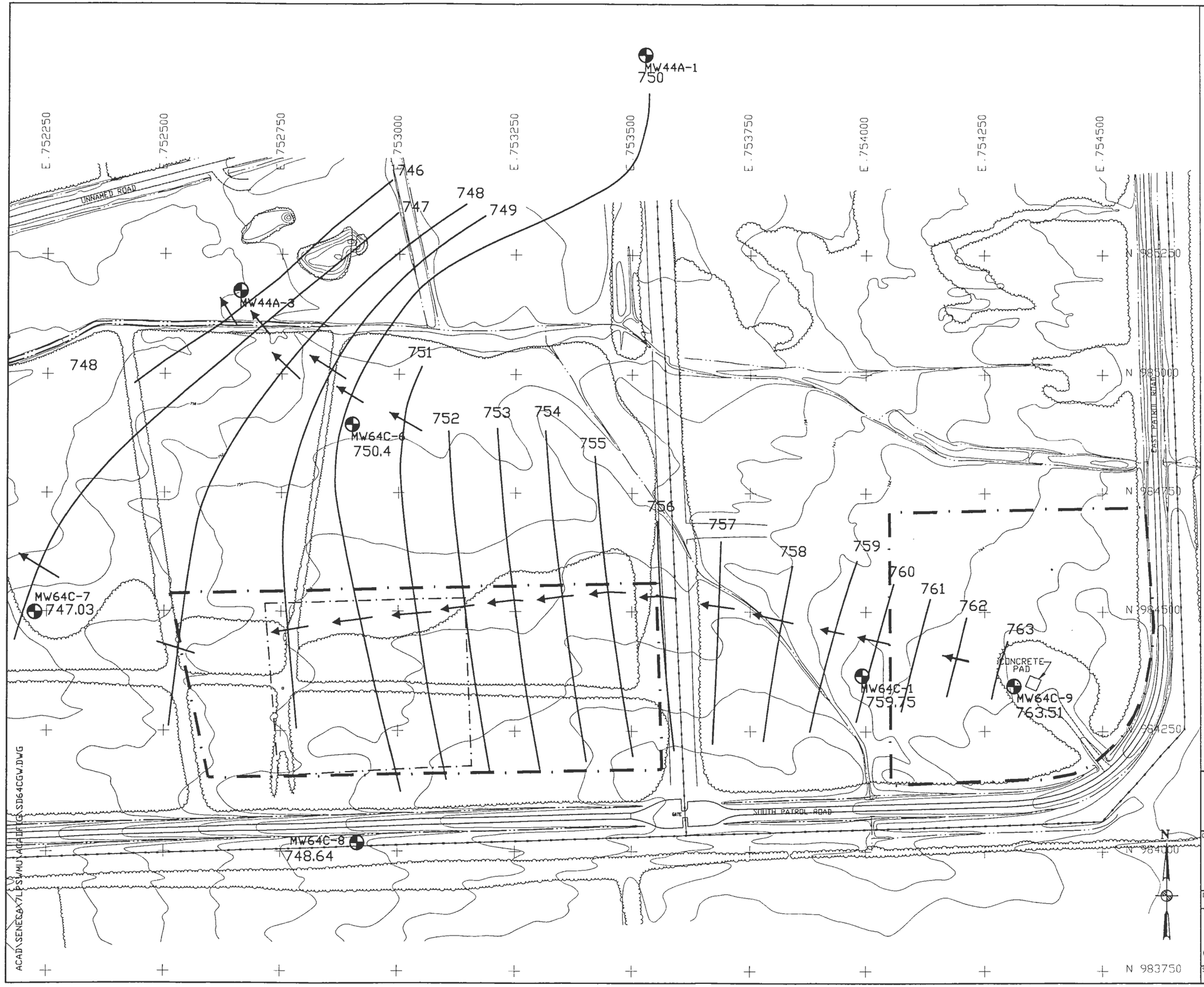
The groundwater flow direction in the till/weathered shale aquifer on the site is to the west-northwest, based on the groundwater elevations measured in five SEAD-64C and two SEAD-44A monitoring wells on July 25, 1994 (Table 3.6-1 and Figure 3.6-5). Recharge of water to monitoring well MW64C-1 during groundwater sampling was good.

TABLE 3.6-1
SEAD-64C, MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-64C

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)
MW64C-1	765.81	6/23/94	5.21	760.60	7/11/94	5.07	760.74	7/6/94	4.27	761.54
								7/25/94	6.06	759.75
MW64C-6	754.57	7/9/94	2.68	751.89	7/21/94	3.77	750.80	7/6/94	2.18	752.39
								7/25/94	4.17	750.40
MW64C-7	751.00	7/9/94	2.89	748.11	7/21/94	3.65	747.35	7/6/94	2.1	748.90
								7/25/94	3.97	747.03
MW64C-8	760.24	7/13/94	10.99	749.25	7/21/94	11.42	748.82	7/6/94	10.54	749.70
								7/25/94	11.63	748.61
MW64C-9	767.28	7/6/94	2.18	765.10	7/10/94	2.80	764.48	7/25/94	3.77	763.51
MW44A-1*	753.77	--	--	--	--	--	--	07/25/94	3.55	750.22
MW44A-3*	749.81	--	--	--	--	--	--	07/25/94	4.46	745.35

* SEAD-44A groundwater elevation data are included only for the purposes of determining regional groundwater flow patterns at SEAD-64C. The results of the SEAD-44A Expanded Site Inspection are presented in the Expanded Site Inspection, Eight Moderately Low Priority AOCs, SEADs 5,9, 12 (A and B), (43, 56, 69), 44(A and B), 50, 58 and 59 Draft Final Report.



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN

MW64C-1
759.75 MONITORING WELL WITH WATER TABLE ELEVATION

760 GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/25/94

100 0 100 200
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.6-5
SEAD-64C
GROUNDWATER ELEVATION AND TOPOGRAPHY

SCALE	DATE	REV
1" = 200	APRIL 1996	A

3.7 SEAD-64D: GARBAGE DISPOSAL AREA

3.7.1 Site Geology

Based on the results of the drilling program, till and calcareous grey shale are the two major types of geologic materials present on-site. The till lies stratigraphically above the shale.

In all but one of the soil borings (SB64D-1), a very thin soil horizon was observed stratigraphically above the till, within 1.2 feet of the ground surface. The depths of the borings at SEAD-64D were up to 10.2 feet below ground surface.

The only fill material encountered at SEAD-64D was near a berm at the south end of the area where 4 feet of household debris was observed in test pit 64D-1.

The till generally consists of light brown silt and very fine sand with little grey shale fragments (up to 1-inch in diameter) and trace amounts of clay. In some of the soil borings large shale fragments (rip-up clasts) were observed near the till/weathered shale contact. In several soil borings, the upper portion of the till strata contained clay (up to 3 feet in thickness) and oxidized areas.

At most soil borings, competent, calcareous grey shale was encountered at depths between approximately 5 and 8.5 feet below the ground surface. The elevations of the competent bedrock determined during the drilling and seismic programs indicate that the shale slopes to the west mimicking the ground surface. The upper portion of the competent shale (0 to 2.4 feet) is weathered.

3.7.2 Geophysics

3.7.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEAD-64D are shown in Table 3.7-1. The seismic refraction profiles detected 4 to 15 feet of unconsolidated overburden (1,050 to 4,900 ft./sec.) overlying bedrock (8,200 to 13,000 ft./sec.). In particular, the unconsolidated material included unsaturated overburden (1,050 to 1,370 ft./sec.) and saturated overburden

TABLE 3.7-1
SEAD 64D

Expanded Site Inspection
Results of Seismic Refraction Survey

Profile	Distance[1]	Ground Elevation[2]	Water Table		Bedrock	
			Depth	Elev[2].	Depth	Elev[2].
P1	-5	87.8	6.2	81.6	14.9	72.9
	57.5	88.6	5.4	83.2	15.2	73.4
	120	90.6			5.7	84.9
P2	-5	99.7			5.4	94.3
	57.5	100.2			5.5	94.7
	120	100.0	4.1	95.9	6.2	93.8
P3	.5	102.9			5.7	97.2
	57.5	105.7			5.9	99.8
	120	108.0			14.8	93.2
P4	-5	103.7			4.9	98.8
	57.5	103.5			4.6	98.9
	120	102.8			4.0	98.8

1. All distances are in feet along the axis of each seismic profile and were measured from geophone #1 of each profile.

2. All elevations were relative to an arbitrary datum established at geophone # 24 of the SEAD-64D seismic profile P2.

(4,580 to 4,900 ft./sec.). Saturated overburden was detected only on profiles P1 and P2. Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (<2 feet) overlying the bedrock surface would be undetectable.

Unusually low bedrock velocities (8,200 to 8,400 ft./sec.) were detected on profiles P1 and P3. However, on both profiles, the low velocity bedrock layer was detected only over a portion of the seismic transect. At distance 120 feet on profile P1, weathered rock was detected at a depth of 5.7 feet (refer to Table 3.7-1). On profile P3, weathered rock was detected at a depth of approximately 5.8 feet at distances -5 feet and 57.5 feet. At distance 120 feet of this profile, competent rock (13,000 ft/sec) was detected at a depth of 14.8 feet, suggesting that up to 9 feet of weathered rock may be present in the area of this profile.

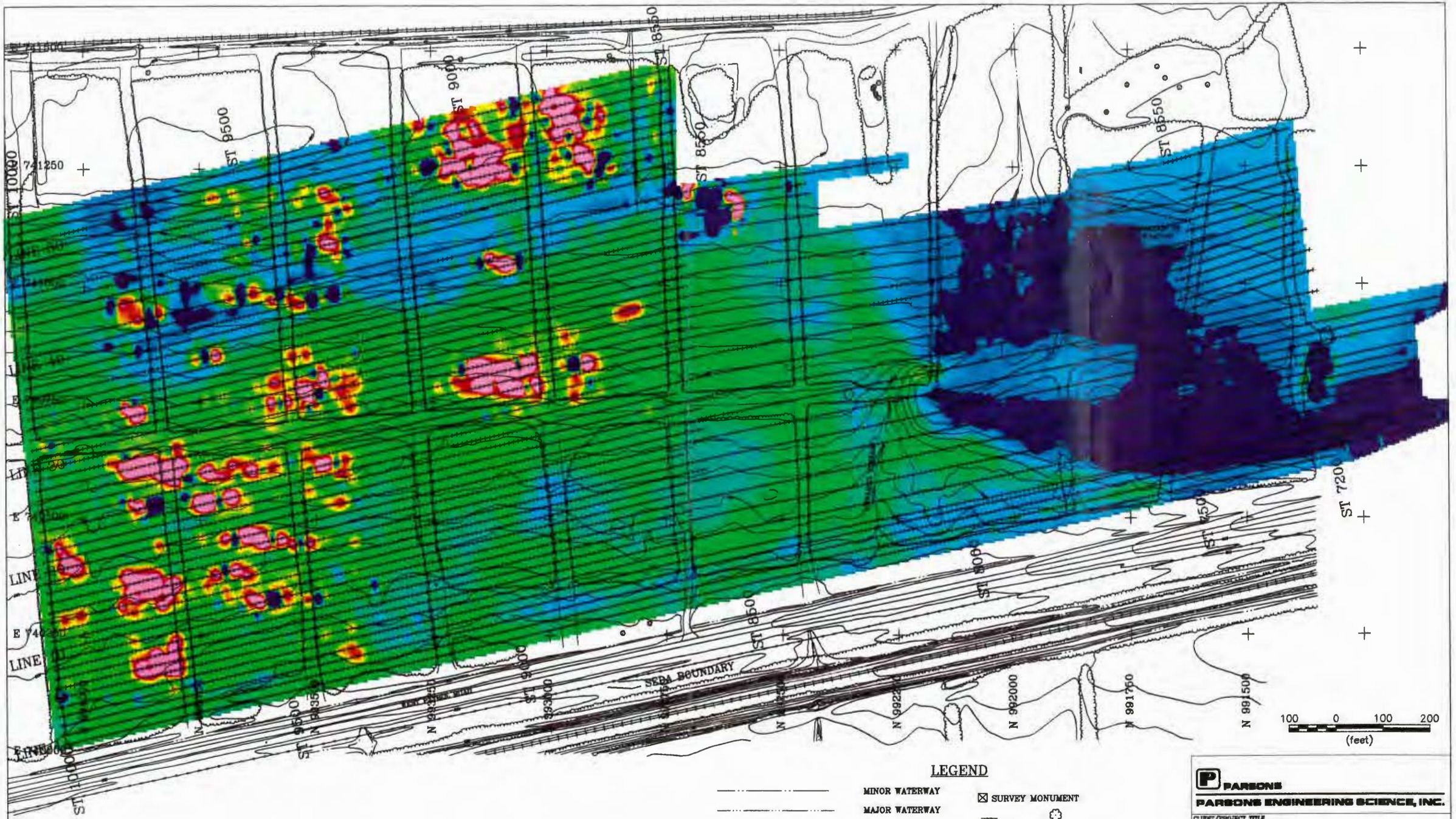
A review of Table 3.7-1 suggests that the bedrock slopes to the west, generally following the surface topography. Groundwater flow is also expected to be to the west, following the slope of the bedrock.

3.7.2.2 EM-31 Survey

Figure 3.7-1 shows the apparent ground conductivity measured in the grid surveyed at SEAD-64D. Three large areas of anomalous conductivity measurements were revealed in the northern half of the grid. These three areas were characterized by groups of smaller anomalies with typically high conductivity values. A follow-up inspection at SEAD-64D suggested that these anomalies were caused by small gauge wires running parallel to the furrows in the ground surface. These wires were often attached to tubular, four foot long, metal posts which were found throughout the northern one half of the grid. The wires and posts were typically covered by one half to two inches of decaying vegetation and/or topsoil. This area may have been used as a vineyard prior to the construction of SEDA.

Three zones of conductivity anomalies, each characterized by predominantly low conductivity values, were detected in the southern one half of the grid. The follow-up inspection at these locations revealed that these anomalies were located where waste material had been disposed on the ground surface.

The background conductivity values show a gradual decrease in the southern and the northeastern portions of the grid. These anomalies may be due to a decreased clay content in the overburden soils or to a decrease in the depth to bedrock.



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.7-1
SEAD-64D EM SURVEY,
QUADRATURE RESPONSE

SCALE	DATE	REV
1" = 200'	APRIL 1996	A

Test pit TP64D-2 was excavated to a depth of 4 feet 2 inches. Homogeneous, layered soils were observed to the surface of a weathered shale layer. No buried metallic objects were found in this pit. An east-west trending, four inch outside diameter, red clay pipe was intersected at a depth of 2 feet 3 inches. The interior of the pipe was dry and free of deposits. The EM anomaly may have been caused by a metal wire found on the ground surface near the test pit location.

TP64D-3 revealed homogenous layered soils, identical in composition to those found in TP64D-2, with no evidence of buried objects or previous excavations. The test pit was advanced to a depth of 4 feet where a layer of weathered shale was encountered.

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. Excluding the 3ppm OVM reading from the 2 to 4 foot interval of TP64D-1, no readings above background levels (0 ppm of organic vapors and 10-15 micro Rhems per hour of radiation) were observed during the excavations.

3.7.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography. The general site slops is to the west. There are no sustained surface water bodies on-site. In the southeastern section of the SEAD-64D, surface water accumulates in local topographic low areas. Surface water also collects in the topographic low areas along the western section of the site, adjacent to West Patrol Road (Figure 1.1-20).

The groundwater flow direction in the till/weathered shale aquifer on the site is to the west based on groundwater elevations measured in five monitoring wells on July 6, 1994 and July 25, 1994 (Table 3.7-2 and Figure 3.7-3). Recharge of water to the monitoring wells during sampling was good.

3.8 SEAD-67: DUMP SITE EAST OF SEWAGE TREATMENT PLANT NO.4

3.8.1 Site Geology

Based on the results of the drilling program, till and calcareous grey shale are the two major types of geologic materials present on-site. The till has stratigraphically above the shale. Fill

TABLE 3.7-2
SEAD-64D, MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-64D

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)
MW64D-1	667.79	6/23/94	4.71	663.08	7/8/94	3.82	663.97	7/6/94	3.43	664.36
								7/25/94	4.26	663.53
MW64D-2	635.20	6/28/94	4.05	631.15	7/9/94	4.87	630.33	7/6/94	4.45	630.75
								7/25/94	7.66	627.54
MW64D-3	648.88	6/27/94	3.72	645.16	7/8/94	3.42	645.46	7/6/94	2.99	645.89
								7/25/94	4.48	644.40
MW64D-4	661.33	6/27/94	7.94	653.39	7/8/94	6.54	654.79	7/6/94	6.23	655.10
								7/25/94	9.22	652.11
MW64D-5	652.49	6/27/94	7.34	645.15	7/18/94	7.24	645.25	7/6/94	5.53	646.96
								7/25/94	7.37	645.12

MW64D-1
664.36
MONITORING WELL WITH WATER TABLE ELEVATION

640
GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/06/94

N

100 0 100 200
(feet)

APPROXIMATE AOC EXTENT

LEGEND

- MINOR WATERWAY
- MAJOR WATERWAY
- FENCE
- UNPAVED ROAD
- BRUSH LINE
- APPROXIMATE LANDFILL EXTENT
- RAILROAD
- 760 GROUND SURFACE ELEVATION CONTOUR
- ELECTRIC UTILITY LINE
- UNDERGROUND WATER UTILITY LINE

ROAD SIGN
DECIDUOUS TREE
GUIDE POST
FIRE HYDRANT
MANHOLE
COORDINATE GRID (250' GRID)
POLE
UTILITY BOX
MAILBOX/RR SIGNAL
OVERHEAD UTILITY POLE
SURVEY MONUMENT
(NOT ALL SYMBOLS MAY APPEAR ON MAP)

ACAD\SENECA\7LPSW\MU\ACADFIG\SD64DGW.DWG

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF 7 LOW-PRIORITY AOC'S

DEPT: ENVIRONMENTAL ENGINEERING
Dwg. No.: 720518-01002

FIGURE 3.7-3
SEAD-64D
GROUNDWATER ELEVATION AND TOPOGRAPHY

SCALE: 1" = 200'
DATE: APRIL 1996
REV: A

was also observed at SEAD-67. The boring depths at this site were up to 11.8 feet below ground surface.

A very thin soil horizon was observed within 0.8 foot of the ground surface. Fill material was observed at the three soil boring locations at SEAD-67. The fill was encountered up to 4 feet below ground surface. The fill material generally consisted of brown silt and clay, with trace amounts of very fine sand and shale fragments (up to 1.0 inches in diameter). The till generally consist of light brown silt and very fine sand, little shale fragments (up to 3.0 inches in diameter) and trace amounts of clay.

Competent, calcareous grey shale was encountered at depths between approximately 7 and 12 feet below the ground surface. The upper section of the competent shale (approximately 1.4 feet) is weathered at the southern portion of the site.

3.8.2 Geophysics

3.8.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEAD 67 are shown in Table 3.8-1. The seismic refraction profiles showed 6 to 9 feet of unconsolidated overburden (850 to 1,400 ft./sec.) overlying bedrock (13,000 ft./sec.). Saturated overburden was not detected by this seismic survey. Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (<2 feet) overlying the bedrock surface would be undetectable.

Poor surface conditions prevailed during this seismic survey. Slush covered much of the site and in many areas water was pooled over frozen ground. These conditions resulted in unusually high velocities being detected from the direct surface waves in portions of all four profiles (typically 4000 to 6600 ft./sec.). Therefor, the surface velocities were manually reduced to a site average of 1200 ft./sec. during the data interpretation phase. The 1200 ft./sec. value represented the average value of direct arrival velocities detected through unfrozen ground over portions of profiles P2 and P3. In spite of these limitations, the overburden thicknesses calculated from this seismic survey were corroborated by the depths to bedrock measured during the monitoring well installations at SEAD 67.

TABLE 3.8-1
SEAD 67

Expanded Site Inspection
Results of Seismic Refraction Survey

Profile	Distance[1]	Ground Elevation[2]	Water Table		Bedrock	
			Depth	Elev[2].	Depth	Elev[2].
P1	120	96.5			6.0	90.5
P2	-5 57.5 120	100.4 100.7 100.4			7.4 7.5 8.8	93.0 93.2 91.6
P3	-5 120	100 99.4			8.2 9.0	91.8 90.4
P4	-5 57.5 120	97.9 99.4 98.8			9.3 9.6 8.7	88.6 89.8 90.1

1. All distances are in feet along the axis of each seismic profile and were measured from geophone #1 of each profile.

2. All elevations are relative to an arbitrary datum established at geophone #1 of the SEAD-67 seismic profile P3.

3.8.2.2 EM-31 Survey

Figure 3.8-1 shows the apparent ground conductivity measured at SEAD-67. In general. the apparent ground conductivities measured at SEAD-67 range from 10 to 12 millisiemens per meter, showing a relatively featureless response. Several low intensity localized anomalies were detected. All but one were attributed to cultural effects or to increased coupling of the EM signal when approaching, or retreating from, one of the surface piles. The one anomaly of unknown origin, located at Station 1070E online 1070N, was also observed in the in-phase response data.

The in-phase response of the EM-31 survey at SEAD 67 is shown in Figure 3.8-2. Overall, the site shows a generally featureless response. The pronounced anomaly in the northwestern corner of the grid is due to cultural effects. Two anomalies of unknown origin were detected in the south-central portion of the grid. The western most of these was associated with the one conductivity anomaly discussed in the preceding paragraph.

3.8.2.3 GPR Survey

The GPR survey conducted at SEAD 67 revealed homogeneous layered soils to depths of approximately five feet. No evidence of disposal pits was found nor were there any anomalies which could be correlated to buried metallic objects. GPR records acquired over the existing piles suggested that they had no vertical extent below the natural ground surface.

3.8.2.4 Test Pitting Program

A total of five test pits were excavated in SEAD 67 to characterize the nature of five of the existing piles located at this SEAD. The test pit logs are presented in Appendix B.

Test pits TP67-1 through TP67-5 were advanced through the five piles identified in the workplan. In each excavation, native soil (typically a light brown or light gray silt) was observed at a depth coincident with the ground surface surrounding the pile being investigated. TP67-1, TP67-2, and TP67-5 each contained large coarse gravel and various objects such as ceramic brick (found in TP67-1 and TP67-2) and asphalt fragments (found in TP67-5).

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

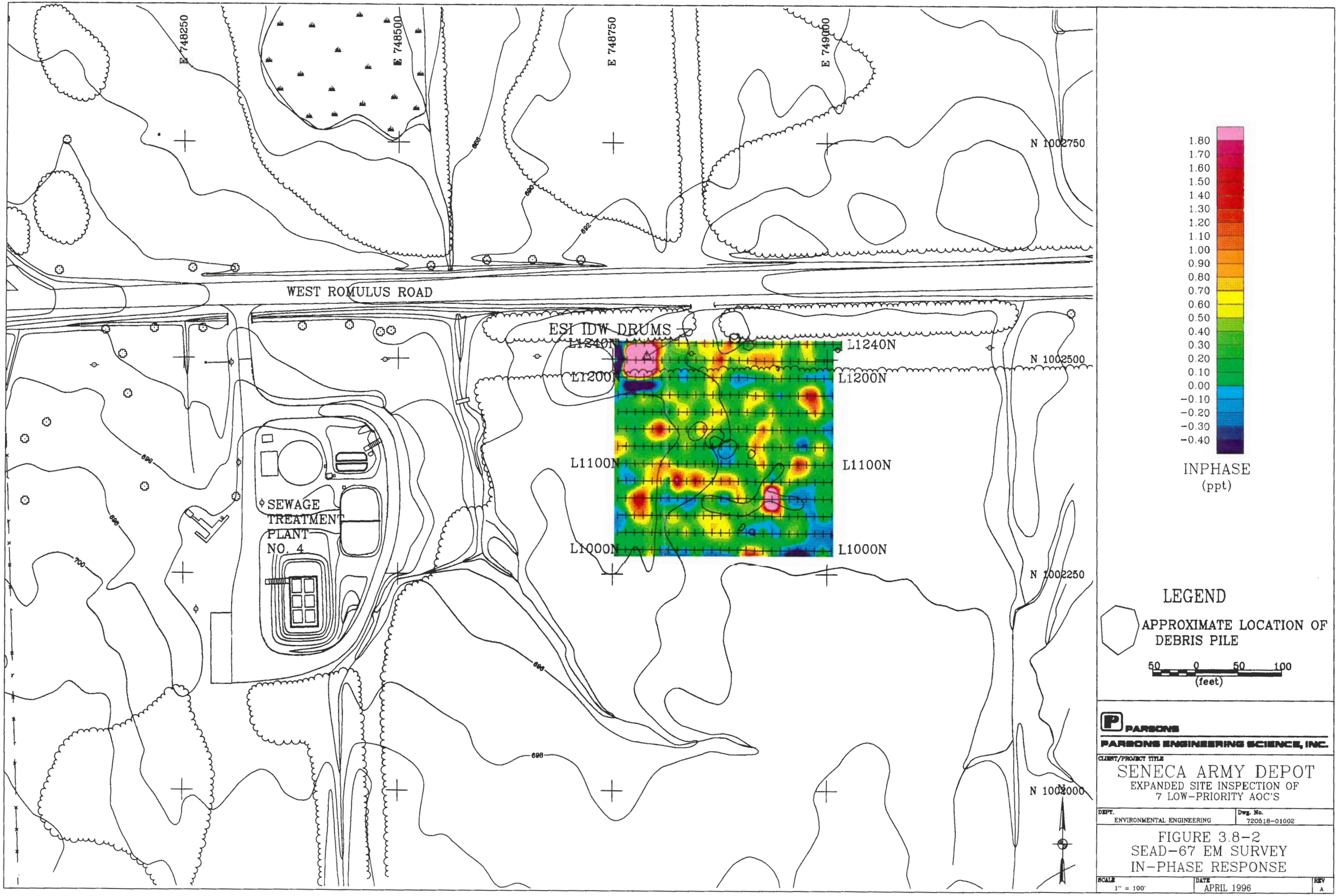
SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.8-1
SEAD-67 EM SURVEY
QUADRATURE RESPONSE

SCALE	DATE	REV
1" = 100'	APRIL 1996	A



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.8-2
SEAD-67 EM SURVEY
IN-PHASE RESPONSE

SCALE	DATE	REV
1" = 100'	APRIL 1996	A

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro Rhems per hour of radiation) were observed during the excavation.

3.8.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography. The general site slope is to the north, although there is little topographic relief on-site. A drainage ditch is located west of the site. Also, a topographically low area (wetland area) is located northwest of the site. It is believed that the ditch may intercept surface water run-off from the western section of the site including the wetland area. On-site surface water runoff may also drain into a drainage swale located north of the site, which runs parallel to West Romulus Road (Figure 1.1-21).

The groundwater flow direction in the till/weathered shale aquifer at SEAD-67 is to the north based on the groundwater elevations measured in the three monitoring wells on July 6, 1994 and July 25, 1994 (Table 3.8-2 and Figure 3.8-3). Recharge of water to the monitoring wells at SEAD-67 during groundwater sampling was good.

3.9 SEAD-70: FILL AREA ADJACENT TO BUILDING T-2110

3.9.1 Site Geology

Based on the results of the drilling program, till and calcareous shale are the two major types of geologic materials present on-site. The till lies stratigraphically above the shale. The depths of the soil borings at this site were up to 11.6 feet below ground surface. A very thin soil horizon was observed within 0.6 feet of the ground surface. The till generally consists of grey/brown silt, sand and clay with trace amounts of area shale fragments (up to 1-inch in diameter). Larger shale fragments (rip-up clasts) were observed near the till/weathered shale contact. Also, areas of oxidation were noted in the upper portion of the till strata.

TABLE 3.8-2
SEAD-67, MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-67

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)
MW67-1	698.53	5/12/94	3.93	694.60	7/7/94	5.41	693.12	7/6/94	5.2	693.33
								7/25/94	7.01	691.52
MW67-2	698.64	5/14/94	1.89	696.75	7/10/94	3.60	695.04	7/6/94	2.9	695.74
								7/25/94	4.81	693.83
MW67-3	696.72	5/12/94	3.7	693.02	7/8/94	4.77	691.95	7/6/94	4.49	692.23
								7/25/94	5.76	690.96

WEST ROMULUS ROAD

SEWAGE TREATMENT PLANT NO. 4

MW67-3
692.23

MW67-1
693.33

MW67-2
695.74

692
693
694
695
696
698
700

N 1002750
N 1002500
N 1002250
N 1002000

N

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- APPROXIMATE LOCATION OF DEBRIS PILE

MW67-1
693.33
MONITORING WELL WITH WATER TABLE ELEVATION

694
GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/25/94

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.8-3
SEAD-67
GROUNDWATER ELEVATION AND TOPOGRAPHY

SCALE	DATE	REV
1" = 100'	APRIL 1996	A

ACAD\SENECA\7LPSW\MAGADFIG\SD67GW.DWG

Competent, calcareous grey to dark grey shale was encountered at depths between approximately 8 and 10 feet below ground surface. The upper section of the competent shale (0 to 1.4 feet) is weathered.

3.9.2 Geophysics

3.9.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEAD 70 are shown in Table 3.9-1. The seismic refraction profiles detected 4 to 11 feet of unconsolidated overburden (1,200 to 2,750 ft./sec.) overlying bedrock (8,200 to 13,000 ft./sec.). In particular, the unconsolidated material included unsaturated overburden (1,200 to 1,300 ft./sec.) and compact unsaturated overburden (2,520 to 2,750 ft./sec.). Saturated overburden was not detected by the seismic survey. Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (<2 feet) overlying the bedrock surface would be undetectable.

Several of the seismic profiles were conducted on saturated ground. However, seismic velocities characteristic of saturated overburden were not detected. It is common in swampy areas to encounter a low-velocity near-surface layer. This may be attributed to the effects of entrapped gas in swamp deposits and the inability of the seismic method to accurately resolve layers substantially thinner than the wavelength of the seismic energy. In spite of these limitations, a review of Table 3.9-1 suggests that bedrock slopes to the west. Groundwater is also expected to flow to the west, following the slope of the bedrock surface.

3.9.2.2 EM-31 Survey

The results of the apparent ground conductivity survey as SEAD 70 are shown in Figure 3.9-1. A zone of elevated apparent ground conductivity was revealed over the fill area. In general, the southern and eastern boundaries of this elevated conductivity area corresponded with the surface expression of the fill boundaries. However, the northern boundary of the conductivity anomaly extends approximately 50 feet further north than the visible boundary of the fill area. An area of chaotic response, in the southern portion of the fill area, was caused by spools of constantine wire, barbed wire and other miscellaneous metallic objects being stored at SEAD 70. Two localized anomalies, each characterized by low conductivity values, were detected beyond the extent of the fill area. The anomaly near the northeastern corner of the fill area was due to steel reinforced concrete debris visible along the fill edge.

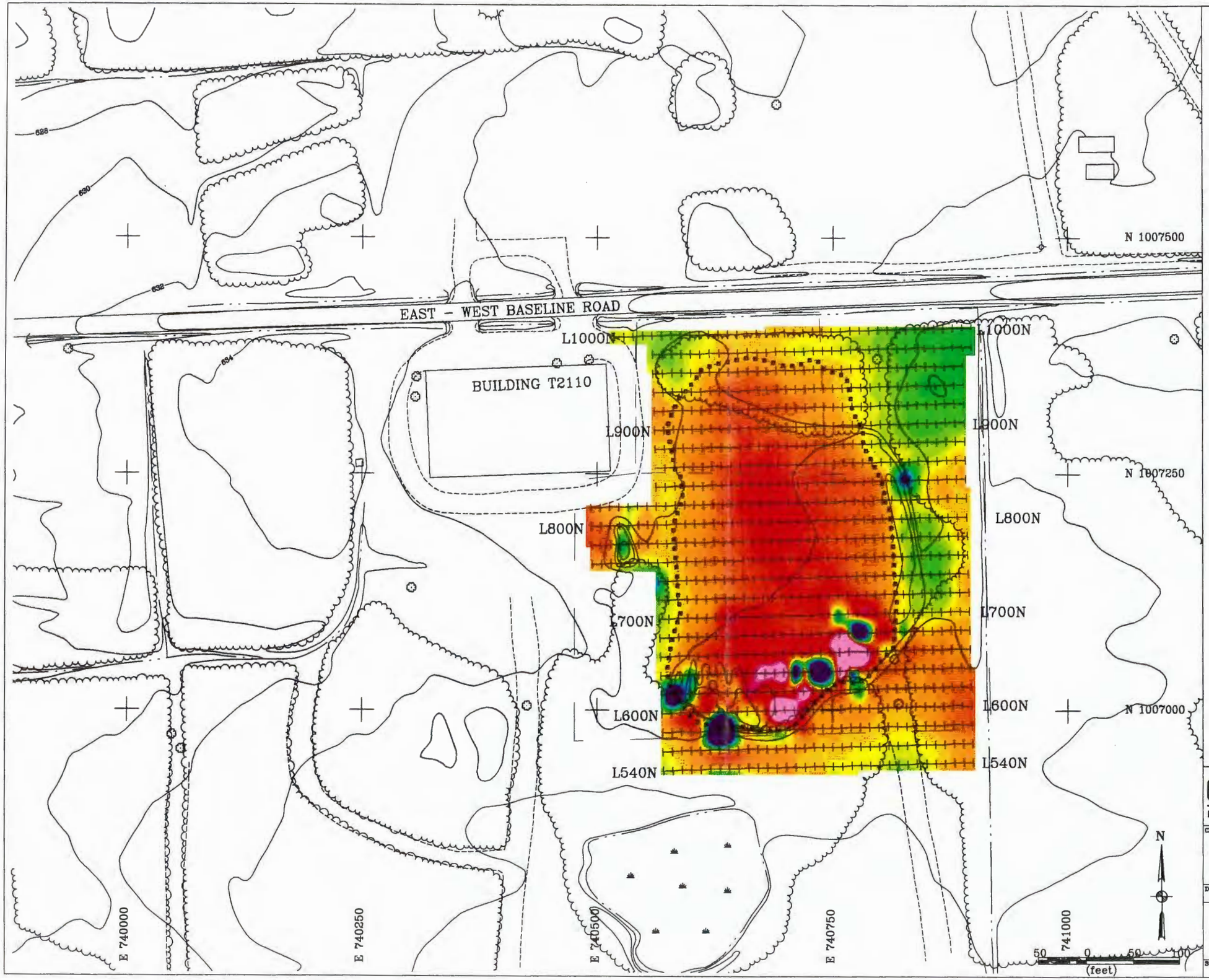
TABLE 3.9-1
SEAD 70

Expanded Site Inspection
Results of Seismic Refraction Survey

Profile	Distance[1]	Ground Elevation[2]	Water Table		Bedrock	
			Depth	Elev[2].	Depth	Elev[2].
P1	-5 57.5 120	98.1 98.7 100.0			7.0 5.8 7.9	91.1 92.9 92.1
P2	-2.5 28.75 60.0	98.2 98.3 99.0			5.3 6.4 4.5	92.9 91.9 94.5
P3	-2.5 28.75 60.0	102.2 102.0 101.9			8.3 8.1 7.1	93.9 93.9 94.8
P4	-2.5 28.75	97.6 97.7			5.8 4.4	91.8 93.3

1. All distances are in feet along the axis of each seismic profile and were measured from geophone #1 of each profile.

2. All elevations are relative to an arbitrary datum established at geophone #24 of the SEAD-70 seismic profile P2.



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN

NOTE:
EXTENT OF LANDFILL IS DEFINED BY THE EM SURVEY RESULTS.

CONDUCTIVITY (mS/m)

23.2 22.8 22.4 22.0 21.6 21.2 20.8 20.4 20.0 19.6 19.2 18.8 18.4 18.0 17.6 17.2 16.8 16.4 16.0 15.8 15.4 15.0 14.8 14.6 13.8 13.4 13.0 12.8 12.2 11.8 11.4 11.0 10.6 10.2 9.8 9.4 9.0 8.6 8.2 7.8

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.9-1
SEAD-70 EM SURVEY, QUADRATURE RESPONSE

SCALE	DATE	REV
1" = 100'	APRIL 1996	B

The second anomaly, located near the west-central boundary of the fill area, could not be associated to any cultural effects, however, it was situated in or around a 7 foot high pile covered with grass and vegetation.

Figure 3.9-2 shows the in-phase response of the EM-31 survey conducted at SEAD 70. This data shows a generally featureless response over the entire grid except in the three areas where conductivity anomalies were detected. One anomaly of moderate intensity, located in the northwestern portion of the grid, was associated with cultural effects.

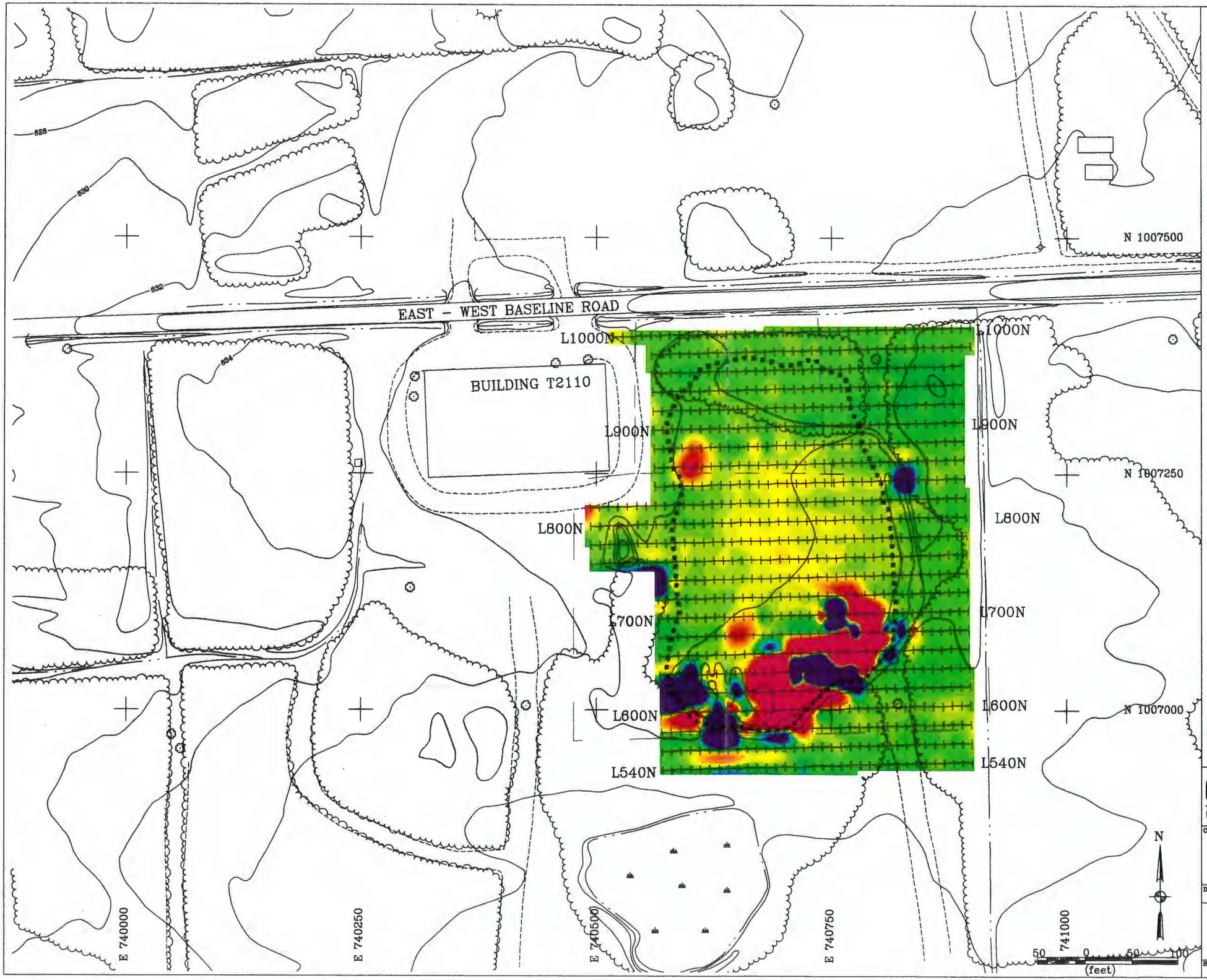
3.9.2.3 GPR Survey

The GPR survey conducted at SEAD-70 revealed a homogeneous layer of fill approximately 2 feet thick throughout the fill area. Several irregular hyperbolic reflections were observed within the fill layer indicating the presence of large boulders. No anomalies were detected which could be associated to buried metallic objects. Data quality was degraded in certain areas due to standing water in the wetlands around the eastern and northern boundaries of the fill area.

3.9.2.4 Test Pitting Program

A total of three test pits were excavated in SEAD 70 to characterize the sources of the geophysical anomalies and to characterize the nature of the fill material. All three test pits were excavated within the fill area defined by the elevated apparent ground conductivity values measured by the EM-31 survey. The test pit logs are presented in Appendix B.

A fill layer, comprised of large limestone boulders (typically 1 to 2.5 feet in diameter),light brown silt, and fine gravel, was revealed in each of the three test pits (TP70-1, TP70-2, and TP70-3). TP70-1 and TP70-2 had been localized over GPR anomalies exhibiting hyperbolic reflections. The source of these anomalies was presumably associated to the large limestone boulders. The base of the fill layer of each test pit was denoted by an interval of dark gray silt, approximately one foot in thickness, which was characterized by decaying vegetation. No metallic objects were found in any of the three test pits excavations.



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN

NOTE:
EXTENT OF LANDFILL IS DEFINED BY THE EM SURVEY RESULTS.

IN-PHASE
(ppt)

0.86
0.78
0.71
0.63
0.56
0.48
0.41
0.34
0.26
0.19
0.12
0.04
-0.03
-0.11
-0.18
-0.26
-0.33
-0.40
-0.47
-0.55
-0.62
-0.69
-0.77
-0.84
-0.92
-0.99
-1.06
-1.14
-1.21
-1.28
-1.36
-1.43
-1.51
-1.58
-1.65
-1.73
-1.80

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.9-2
SEAD-70 EM SURVEY,
IN-PHASE RESPONSE

SCALE	DATE	REV
1" = 100'	APRIL 1996	B

The excavated material was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro Rhems per hour of radiation) were observed during the excavation.

3.9.3 Site Hydrology and Hydrogeology

Surface water flow from precipitation events is controlled by local topography. No sustained surface water bodies are present on-site. There is a topographic low along the eastern boundary of the SEAD-70; therefore, surface water accumulates in this portion of the site. Surface water which accumulates in the wetlands area flows into a drainage swale which runs along the eastern boundary of the site. This drainage swale flows off-site to the north and drains into a drainage ditch which runs along East-West Base Line Road.

The groundwater flow direction in the till/weathered shale aquifer on the site is to the northwest based on the groundwater elevations measured in the four monitoring wells on July 6, 1994 and July 26, 1994 (Table 3.9-2 and Figure 3.9-3). Recharge of water to the monitoring wells during groundwater sampling was generally good.

3.10 SEAD-71: RUMORED PAINT AND SOLVENT BURIAL PIT

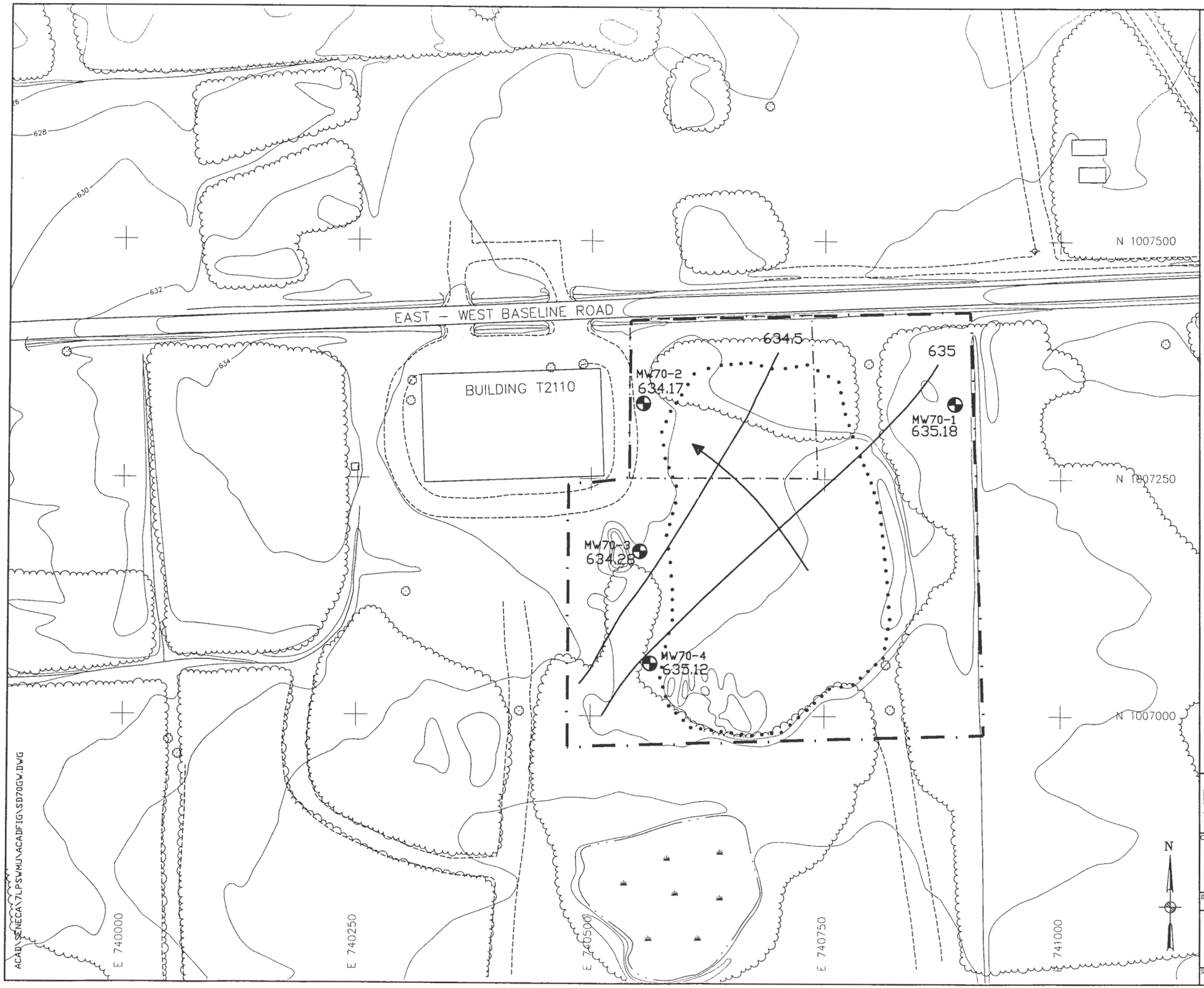
3.10.1 Site Geology

Based on the results of the drilling program, till and calcareous shale are the two major types of geologic materials present on-site. The till lies stratigraphically above the shale. Two monitoring wells (MW71-1 and MW71-2) were installed within the fenced storage compound area of the site, which is paved. The asphalt at these two soil boring locations was observed to be 0.25 to 0.4 feet thick. The depths of the soil borings at SEAD-71 were up to 9.4 feet below ground surface.

TABLE 3.9-2
SEAD-70, MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-70

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)
MW70-1	638.07	5/17/94	2.51	635.56	7/7/94	2.98	635.09	7/6/94	2.89	635.18
								7/26/94	5.45	632.62
MW70-2	637.39	5/17/94	2.51	634.88	7/7/94	3.40	633.99	7/6/94	3.22	634.17
								7/26/94	5.5	631.89
MW70-3	637.61	5/17/94	3.07	634.54	7/8/94	3.58	634.03	7/6/94	3.33	634.28
								7/26/94	5.64	631.97
MW70-4	637.86	5/18/94	2.22	635.64	7/8/94	2.91	634.95	7/6/94	2.74	635.12
								7/26/94	5.2	632.66



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN

MW70-1
635.18
MONITORING WELL WITH WATER TABLE ELEVATION

635
GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/06/94

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.9-3
SEAD 70
GOUNDWATER ELEVATION AND TOPOGRAPHY

SCALE	DATE	REV
1" = 100'	APRIL 1996	A

Within the fenced storage compound are of SEAD-71, the till generally consists of olive grey clay with little silt, very fine sand, and shale fragments (up to 1 inch in diameter). In the southern section of the site, the till consists of light brown silt with little clay and trace amounts of shale fragments (up to 1 inch in diameter). Large shale fragments (rip-up clasts) were observed at or near the till/weathered shale contact at all soil boring locations.

A layer of weathered shale, measuring between 0.5 and 1.8 feet in thickness, was observed overlying the competent bedrock. Competent, calcareous grey shale was encountered at depths between 5.2 and 9.4 feet below ground surface.

3.10.2 Geophysics

3.10.2.1 Seismic Survey

The results of the seismic refraction survey conducted at SEAD-71 are shown in Table 3.10-1. The seismic refraction profiles detected 6 to 9 feet of unconsolidated overburden (1,125 to 1,500 ft./sec.) overlying bedrock (12,800 to 16,200 ft./sec.). Saturated overburden was not detected by the seismic survey. Due to inherent limitations of the seismic refraction method, a thin layer of saturated overburden (<2 feet) overlying the bedrock surface would be undetectable.

The elevations of the bedrock surface tabulated in Table 3.10-1 indicate that the bedrock slopes to the west, generally following the surface topography. Groundwater flow is also expected to be to the west, following the slope of the bedrock.

3.10.2.2 EM-31 Survey

Figures 3.10-1 and 3.10-2 show the results of the apparent ground conductivity survey and the in-phase response of the EM-31 survey in the western portion of SEAD 71. Interferences from many cultural effects along the perimeter of the surveyed area complicated the interpretation of the data. A review of the EM-31 data from SEAD 71 revealed one area, in the south central portion of the grid, where both the apparent conductivity and the in-phase response decreased noticeably. One other area of increased apparent ground conductivity measurements was detected along the west-central portion of the grid, however, an associated in-phase response was not observed.

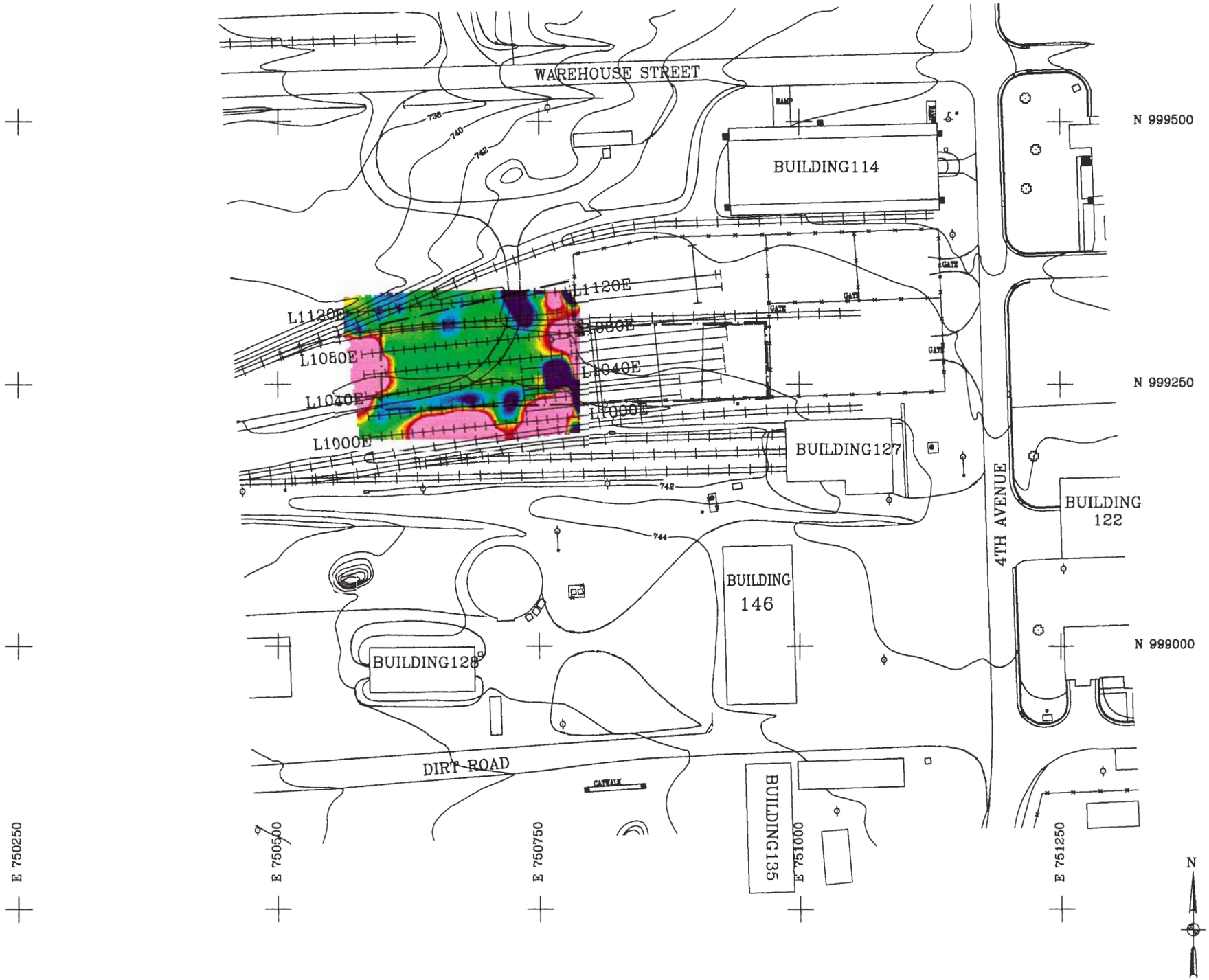
TABLE 3.10-1
SEAD 71

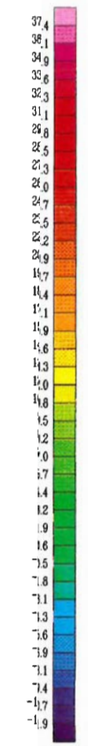
Expanded Site Inspection
Results of Seismic Refraction Survey

Profile	Distance[1]	Ground Elevation[2]	Water Table		Bedrock	
			Depth	Elev[2].	Depth	Elev[2].
P1	2.5 57.5 112.5	106.1 106.7 107.9			6.9 6.7 7.1	99.2 100.0 100.8
P2	2.5 57.5 112.5	105.2 107.2 109.2			7.7 8.1 9.4	97.5 99.1 99.8
P3	2.5 57.5 112.5	109.2 109.1 109.0			9.0 8.3 7.5	100.2 100.8 101.5
P4	2.5 57.5 112.5	108.3 108.8 109.2			8.3 7.0 6.0	100.0 101.8 103.2

1. All distances are in feet along the axis of each seismic profile and were measured from geophone #1 of each profile.

2. All elevations are relative to an arbitrary datum established at geophone #1 of the SEAD-5 seismic profile P1.





LEGEND

AOC EXTENT FROM 15 SWMU WORK PLAN

APPROXIMATE AOC EXTENTS

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

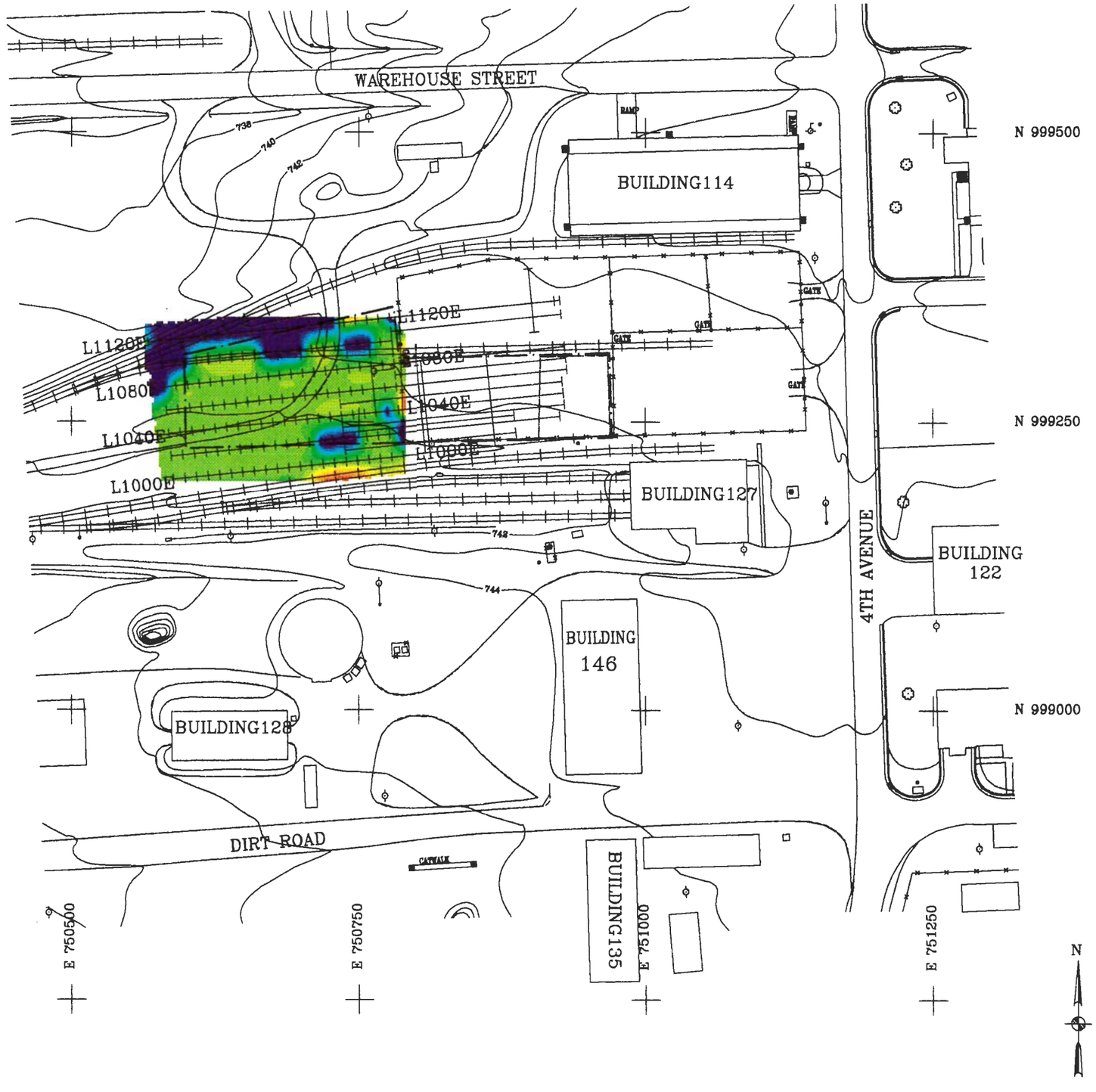
SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.10-1
SEAD-71 EM SURVEY, QUADRATURE RESPONSE

SCALE	DATE	REV
1" = 100'	12/09/94	A



94.14
91.21
88.29
85.36
82.43
79.51
76.58
73.65
70.73
67.80
64.87
61.95
59.02
56.09
53.17
50.24
47.31
44.39
41.46
38.53
35.60
32.68
29.75
26.82
23.90
20.97
18.04
15.12
12.19
9.26
6.34
3.41
0.48
-2.43
-5.36
-8.29
-11.21
-14.14
-17.07
-19.99

IN-PHASE
(ppt)

LEGEND

AOC EXTENT FROM 15 SWMU WORK PLAN

APPROXIMATE AOC EXTENTS

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.10-2
SEAD-71 EM SURVEY, IN-PHASE RESPONSE

SCALE	DATE	REV
1" = 100'	12/09/94	A

3.10.2.3 GPR Survey

A GPR survey was conducted in both areas of concern at SEAD-71. Within the storage compound, the GPR records were acquired along the spaces in between stored equipment and supplies. The data from these surveys revealed an underground utility line or conduit running northwest - southeast across the northeastern corner of the storage compound. One area of anomalous subsurface reflections, typical of reflections from metallic objects, was detected in the south-central portion of the storage compound.

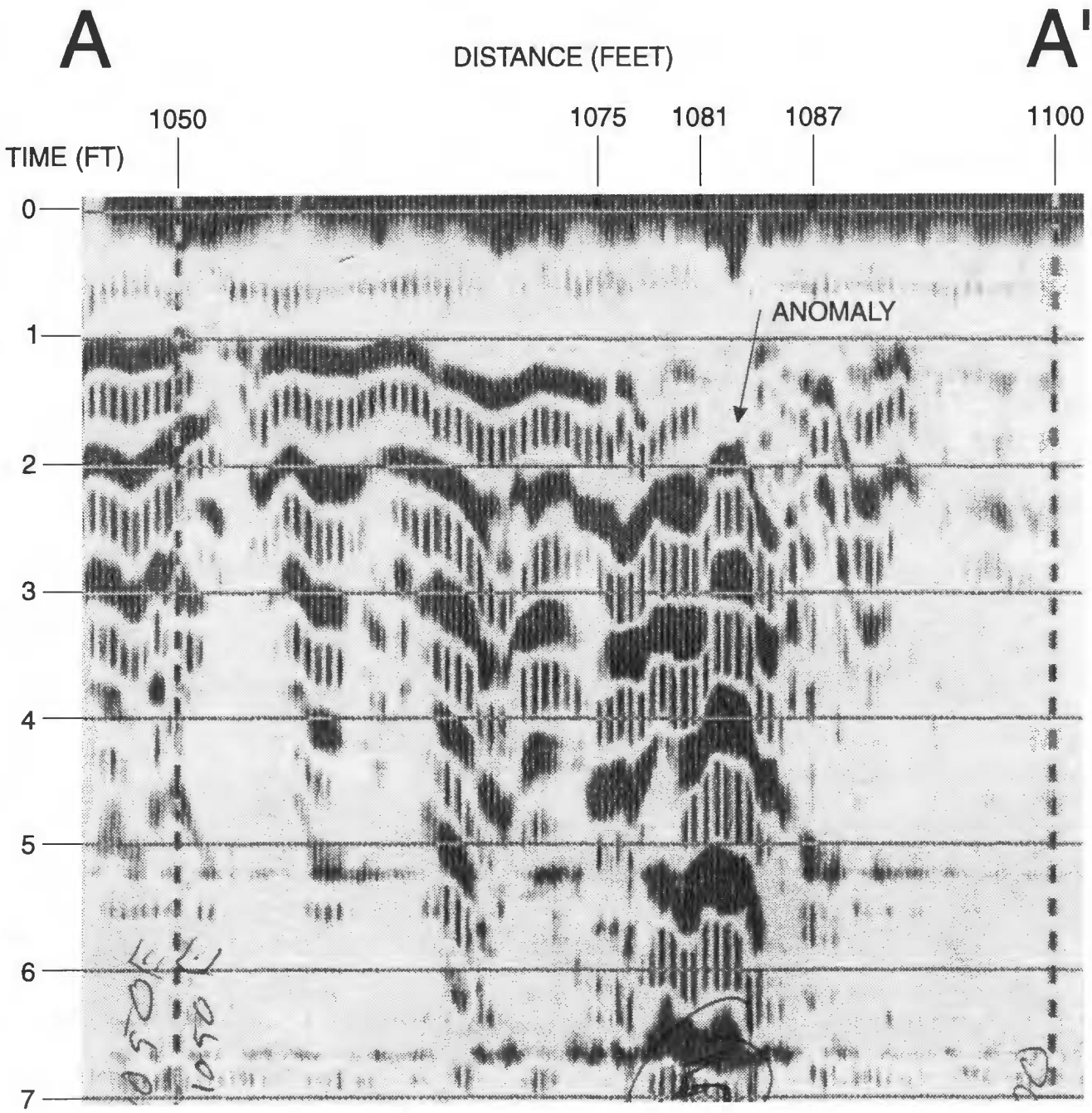
The GPR survey conducted in the area west of the storage compound revealed five localized anomalies and three zones with multiple anomalies. All were characterized by strong reflections originating from depths of 1 to 2 feet below grade and all were located in the central region of the area investigated. One zone of multiple anomalies coincided with the conductivity and in-phase anomalies located in the south central portion of the EM-31 grid. A GPR profile over this zone is shown on Figure 3.10-3.

3.10.2.4 Test Pitting Program

Two test pits were excavated in SEAD-71 to characterize the source of the geophysical anomalies. One test pit (TP71-2) was located within the fenced storage compound and one test pit (TP71-1) was situated in the area immediately west of the fenced storage compound. The test pit logs are presented in Appendix B.

The source of the EM-31 and the GPR anomalies at the TP71-1 location was identified as construction debris composed of chain link fencing, sheet metal, asphalt, and a crushed, yellow, twenty gallon drum. This debris was situated in the 0.75 to 1.3 of the ground surface. A 0.75 foot thick layer of fine angular black debris (resembling creosote or soot in appearance) was observed immediately below the construction debris layer. A weathered shale layer, encountered at a depth of 5.5 feet, limited any further advancement of the excavation.

Test pit TP71-2 was centered over a GPR anomaly located in the storage compound area. This location was situated along the southern boundary of the compacted roadstone of the storage compound. A dark gray to black, possibly stained, fine shale gravel layer was revealed in from 0.25 foot to 1.0 foot below ground surface. The source of the GPR anomaly was not identified at this test pit location. Changes in the electrical properties of the soils within a



PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOCs

DEPT.	DWG NO.
ENVIRONMENTAL ENGINEERING	720518-02000

FIGURE 3.10-3
SEAD-71, GPR PROFILE A-A'

SCALE	DATE
	NOVEMBER 1994

R:\GRAPHICS\SENECA\RADAR\FIG3-10-3.CDR

layer can sometimes give rise to spurious radar wave reflections resembling GPR signatures observed over metallic objects.

The material removed from the test pit was continuously screened for organic vapors and radioactivity with an OVM-580B and a Victoreen-190, respectively. No readings above background levels (0 ppm of organic vapors and 10-15 micro Rhems per hour of radiation) were observed during the excavation.

3.10.3 Site Hydrology and Hydrogeology

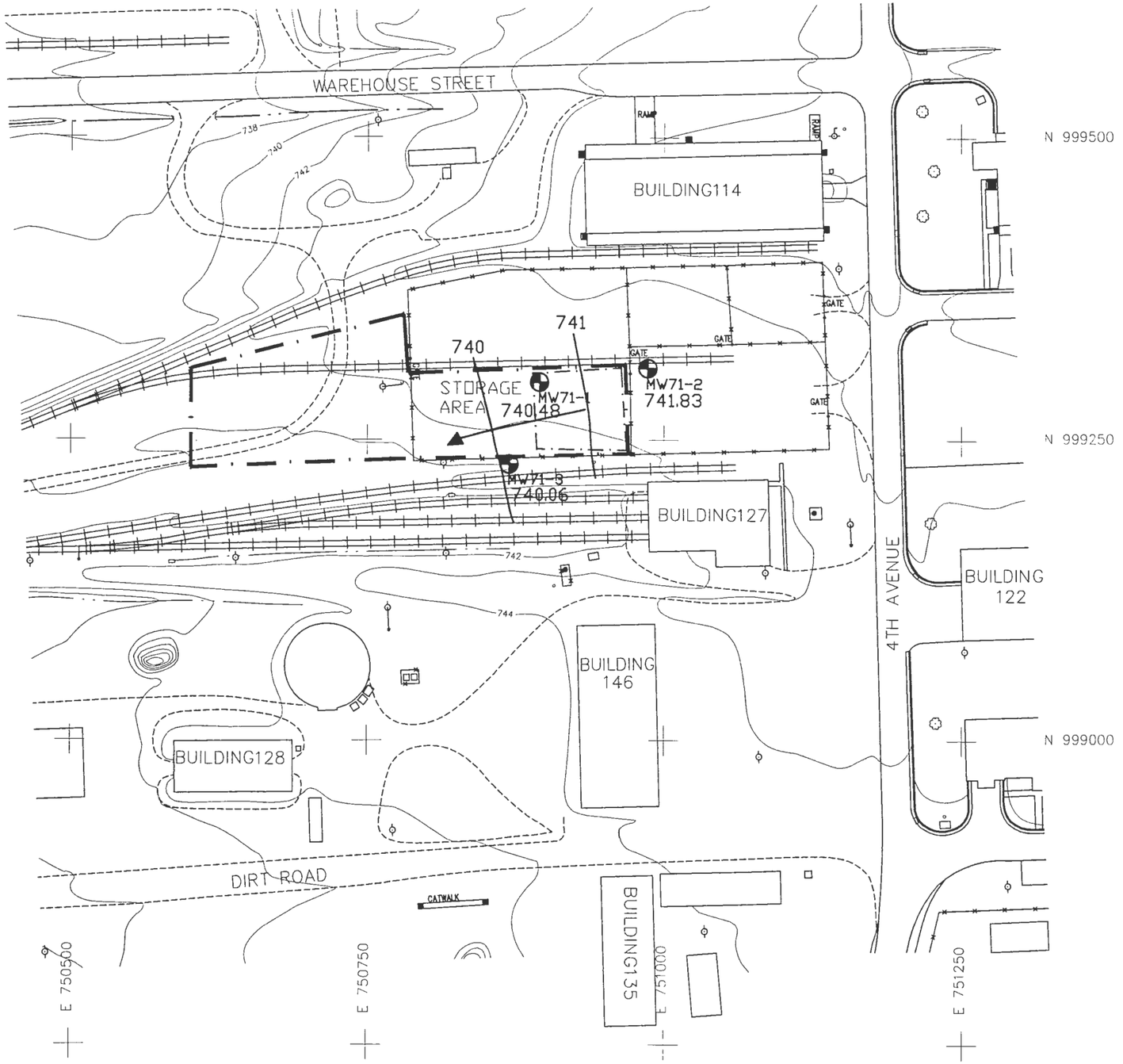
Surface water flow from precipitation events is controlled by local topography, although there is little topographic relief on the site. There are no sustained surface water bodies on-site. In the fenced storage compound area, the asphalt provides an impermeable surface which results in increased amount of surface water runoff on the site. Based on topographic relief, surface water flow is to the west-northwest. Along the southern boundary of the site, surface water flows toward the SEDA railroad tracks (to the south), which are topographically lower than the site..

The groundwater flow direction in the till/weathered shale aquifer on the site is to the west-southwest based on the groundwater elevations measured in the three monitoring wells on July 6, 1994 and July 26, 1994 (Table 3.10-2 and Figure 3.10-4). Recharge of water to the monitoring wells during groundwater sampling was generally poor. The upgradient monitoring well, MW71-2, was not sampled due to no recharge of water after the purging the monitoring well.

TABLE 3.10-2
SEAD-71, MONITORING WELL WATER LEVEL SUMMARY

SENECA ARMY DEPOT
SEAD-71

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)
MW71-1	747.06	3/16/94	4.48	742.58	3/29/94	5.15	741.91	7/6/94 7/26/94	6.58 5.73	740.48 741.33
MW71-2	747.29	4/5/94	4.85	631.97	7/10/94	5.46	741.83	7/6/94 7/26/94	5.46 4.94	741.83 742.35
MW71-3	745.94	4/5/94	6.43	631.97	7/7/94	5.95	739.99	7/6/94 7/26/94	5.88 6.09	740.06 739.85



ACAD\SENECA\7LPSWMU\ACADFIG\SD71GW.DWG

N

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN

MW71-1
740.48 MONITORING WELL WITH WATER TABLE ELEVATION

740 GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 3.10-4

SEAD-71

GROUNDWATER ELEVATION AND TOPOGRAPHY

SCALE	DATE	REV
1" = 100'	APRIL 1996	A

4.0 NATURE AND EXTENT OF CONTAMINATION

This section discusses the nature and extent of contaminants at each site based on the chemical analysis results for each sample. To evaluate whether each media (soil, groundwater, surface water, and sediment) is being impacted, the chemical analysis data were compared to available New York State and Federal standards, guidelines, and criteria. Only those state standards which are more stringent than federal requirements were used as criteria.

The criteria for soils are listed in the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) titled "Determination of Soil Cleanup Objectives and Cleanup Levels" (HWR-94-4046) issued in January 1994. This document, which contains the criteria for soil clean-up levels, has not been promulgated and the criteria are guidelines only. NYSDEC took into account the Contract Required Quantitation Limits (CRQLs) when they developed the guideline concentrations for the TAGM.

The TAGM guidelines used in this report have not been corrected for site total organic carbon content. The guidelines presented in this report assumes a soil organic carbon content of 1 percent.

For the metals, the criteria used in this report were the greater of two values: the listed TAGM guideline or the SEDA background concentration. Site background values were calculated as the 95th UCL (Upper Confidence Level) of the mean for background concentrations of metals in the soil located at SEDA. The data for the site background concentrations were compiled from the background samples collected at the Ash Landfill site, the OB Grounds site, the 10 AOCs investigated in the previous ESI, and the 15 AOCs investigated for this ESI. Table 1.1-3 lists the 95th UCL of the mean for the metals analyzed in this investigation. The TAGM guidelines were used for the following metals: arsenic, barium, cadmium, cobalt, copper, mercury, selenium, and vanadium. The SEDA background soil concentrations were used for the following metals: aluminum, antimony, beryllium, calcium, chromium, iron, lead, magnesium, manganese, nickel, potassium, silver, sodium, thallium, and zinc.

In addition to guidelines for specific compounds, the TAGM also lists soil cleanup objectives for groups of compounds and SVOs that do not have a specific guideline:

	Maximum Concentration
Total VOCs	10 ppm
Total SVOs	500 ppm
Individual SVOs	50 ppm
Total Pesticides	10 ppm

The groundwater criteria which were applied to this ESI study were the NYSDEC Class GA Standards and Guidelines and the Federal Primary and Secondary Drinking Water Maximum Contaminant Levels (MCLs) (Regulations 40 CFR 141.61-62 and 40 CFR 143.3). Because New York State has promulgated the Class GA standards, they are legally enforceable.

Surface water criteria were the most stringent criteria from the following guidelines:

- NYSDEC Water Quality Regulations for Surface Water and Groundwaters (6NYCRR Parts 700-705); and
- USEPA Water Quality Criteria Summary and Updates. These include the freshwater acute and chronic criteria.

All three criteria, including NYSDEC surface water, EPA freshwater acute, and EPA freshwater chronic, were listed in the surface water data tables in this section.

Some NYSDEC and USEPA criteria are based on the hardness of the surface water. The average water hardness for the SEDA site (217 mg/L) was calculated using data from two upstream surface water samples: 232 mg/L at SW-801 from the Ash Landfill remedial investigation and 201 mg/L at SW-196 from the OB Grounds remedial investigation. Hardness was used to calculate NYSDEC criteria for the following metals: cadmium, chromium, copper, lead, nickel, silver, and zinc. Hardness was used to calculate EPA acute and chronic criteria for the following metals: cadmium, chromium, copper, lead, nickel, silver, and zinc. EPA acute and chronic criteria for pentachlorophenol were based on the pH of each surface water sample.

Sediment criteria were guidance values from the NYSDEC Bureau of Environmental Protection, Division of Fish and Wildlife. The most stringent of the sediment criteria for wildlife, human health, or for aquatic life were used as the criteria. All of these values were listed in the sediment data tables in this section. For metals, the criteria were the more stringent of the criteria for aquatic life or the Limit of Tolerance (LOT) values (listed in the

same document as the criteria), which are defined as concentrations which would be detrimental to the majority of species, potentially eliminating most.

The data tables included in this section list only those constituents which were detected in the samples from that AOC. The complete data tables, which include all the constituents that were analyzed, are included in Appendix E.

4.1 SEAD-60

4.1.1 Introduction

A total of 9 subsurface soil samples were collected at SEAD-60 in the immediate vicinity of the oil-stained soil. To assess the potential impact from surface water runoff, 3 surface water and sediment samples were collected in drainage ditches north of the site that are suspected to receive surface water runoff from the site; one of these three sample locations (SWSD60-1) is an upstream sample. Three monitoring wells were also sampled as part of this investigation. The following sections describe the nature and extent of contamination identified at SEAD-60. The sample locations are shown in Figure 2.3-1.

4.1.2 Soil

The analytical results for the 9 subsurface soil samples collected as part of the investigation of SEAD-60 are presented in Table 4.1-1. The following sections describe the nature and extent of contamination in SEAD-60 soils.

4.1.2.1 Volatile Organic Compounds

Nine volatile organic compounds were detected in the 9 soil samples collected. All were found at low concentrations, well below their respective TAGM values. The maximum detected concentration was 170 μg/kg of acetone in the surface soil sample SB60-2-00. Some of the volatile organic compounds detected, including toluene, ethylbenzene, and tetrachloroethane, can be found in fuel oils. While the surface soil sample from boring SB60-2-00 clearly contained the greatest number of volatile organics, low concentrations of toluene and tetrachloroethane (up to 3 μg/kg) were also detected in deeper samples from this boring.

TABLE 4.1-1

SENECA ARMY DEPOT ACTIVITY
SEAD-60 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-60 0-0.2 05/27/94 SB60-1-00 222473 44410	SOIL SEAD-60 0-2 02/28/94 SB60-1.01 212883 42510	SOIL SEAD-60 2-4 02/28/94 SB60-1.02 212884 42510	SOIL SEAD-60 0-0.2 06/07/94 SB60-2-00 223339 44410
VOLATILE ORGANICS									
Methylene Chloride	ug/Kg	54	56%	100	0	12 U	11 U	11 U	27 J
Acetone	ug/Kg	170	11%	200	0	12 U	11 U	11 U	170 J
Carbon Disulfide	ug/Kg	2	22%	2700	0	12 U	11 U	11 U	1 J
2-Butanone	ug/Kg	26	11%	300	0	12 U	11 U	11 U	26 J
2-Hexanone	ug/Kg	1	11%	NA	NA	12 U	11 U	1 J	11 UJ
Tetrachloroethene	ug/Kg	3	11%	1400	0	12 U	11 U	11 U	11 UJ
Toluene	ug/Kg	13	33%	1500	0	12 U	11 U	11 U	13 J
Ethylbenzene	ug/Kg	4	11%	5500	0	12 U	11 U	11 U	4 J
Xylene (total)	ug/Kg	9	11%	1200	0	12 U	11 U	11 U	9 J
SEMIVOLATILE ORGANICS									
Naphthalene	ug/Kg	38	11%	13000	0	38 J	370 U	370 U	18000 U
2-Methylnaphthalene	ug/Kg	1100	11%	36400	0	390 U	370 U	370 U	1100 J
Acenaphthene	ug/Kg	1400	33%	50000*	0	59 J	370 U	370 U	1400 J
Dibenzofuran	ug/Kg	29	11%	6200	0	29 J	370 U	370 U	18000 U
Fluorene	ug/Kg	1300	22%	50000*	0	48 J	370 U	370 U	1300 J
Phenanthrene	ug/Kg	8900	44%	50000*	0	570 J	25 J	370 U	8900 J
Anthracene	ug/Kg	2000	22%	50000*	0	98 J	370 U	370 U	2000 J
Carbazole	ug/Kg	79	11%	50000*	0	79 J	370 U	370 U	18000 U
Di-n-butylphthalate	ug/Kg	1500	33%	8100	0	390 U	370 U	370 U	1500 J
Fluoranthene	ug/Kg	14000	67%	50000*	0	1100 J	33 J	370 U	14000 J
Pyrene	ug/Kg	27000	78%	50000*	0	700 J	31 J	37 J	27000 J
Benzo(a)anthracene	ug/Kg	340	11%	224	1	340 J	370 U	370 U	18000 U
Chrysene	ug/Kg	17000	44%	400	2	400	370 U	370 U	17000 J
bis(2-Ethylhexyl)phthalate	ug/Kg	380	44%	50000*	0	54 J	370 U	380 J	18000 U
Benzo(b)fluoranthene	ug/Kg	16000	33%	1100	2	730 J	370 U	370 U	16000 J
Benzo(k)fluoranthene	ug/Kg	190	11%	1100	0	190 J	370 U	370 U	18000 U
Benzo(a)pyrene	ug/Kg	350	11%	61	1	350 J	370 U	370 U	18000 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1100	33%	3200	0	220 J	370 U	370 U	18000 U
Dibenz(a,h)anthracene	ug/Kg	1100	33%	14	3	110 J	370 U	370 U	18000 U
Benzo(g,h,i)perylene	ug/Kg	1600	33%	50000*	0	220 J	370 U	370 U	18000 U

TABLE 4.1-1

SENECA ARMY DEPOT ACTIVITY
SEAD-60 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-60 0-0.2 05/27/94 SB60-1-00 222473 44410	SOIL SEAD-60 0-2 02/28/94 SB60-1.01 212883 42510	SOIL SEAD-60 2-4 02/28/94 SB60-1.02 212884 42510	SOIL SEAD-60 0-0.2 06/07/94 SB60-2-00 223339 44410
PESTICIDES/PCB									
alpha-BHC	ug/Kg	5	11%	110	0	4 UJ	1.9 U	1.9 U	5 J
Aldrin	ug/Kg	16	11%	41	0	4 UJ	1.9 U	1.9 U	16 J
Endosulfan I	ug/Kg	34	33%	900	0	3.2 J	1.9 U	1.9 U	34 J
4,4'-DDE	ug/Kg	110	44%	2100	0	110 J	2.7 J	3.7 U	31 J
4,4'-DDD	ug/Kg	100	22%	2900	0	7.8 UJ	3.7 U	3.7 U	55 J
4,4'-DDT	ug/Kg	130	22%	2100	0	84 J	3.7 U	3.7 U	130 J
Endrin ketone	ug/Kg	14	11%	NA	NA	7.8 UJ	3.7 U	3.7 U	14 J
alpha-Chlordane	ug/Kg	27	22%	540	0	4 UJ	1.9 U	1.9 U	27 J
gamma-Chlordane	ug/Kg	10	11%	540	0	4 UJ	1.9 U	1.9 U	10 J
Aroclor-1242	ug/Kg	970	11%	1000/10000(a)	0	78 UJ	37 U	37 U	970 J
Aroclor-1248	ug/Kg	2100	11%	1000/10000(a)	1	78 UJ	37 U	37 U	2100 J
Aroclor-1260	ug/Kg	4400	22%	1000/10000(a)	1	78 UJ	37 U	37 U	4400 J
METALS									
Aluminum	mg/Kg	14100	100%	14593	0	10800	8440	13300	9420
Antimony	mg/Kg	1.8	78%	3.59	0	0.28 J	0.43 J	0.36 J	1.8 J
Arsenic	mg/Kg	8.1	100%	7.5	1	5.3	4.1 J	6.2 J	8.1
Barium	mg/Kg	679	100%	300	2	77.6	98.3	85.8	679
Beryllium	mg/Kg	0.67	100%	.73	0	0.47 J	0.43 J	0.67 J	0.42 J
Cadmium	mg/Kg	2	100%	1	2	0.58 J	0.36 J	0.27 J	2
Calcium	mg/Kg	102000	100%	101904	1	65800	75100	64000	56200
Chromium	mg/Kg	23.3	100%	22	2	18.3	14.2	19.4	18.8
Cobalt	mg/Kg	13.1	100%	30	0	9.6	8.3 J	10.8	9.5 J
Copper	mg/Kg	190	100%	25	3	24.9	21.3	21.7	190
Iron	mg/Kg	32100	100%	26627	1	22800	18900	23900	22800
Lead	mg/Kg	66.7	100%	21.9	3	17.1	47.5 J	12.6 J	66.7
Magnesium	mg/Kg	25400	100%	12222	5	13300	11300	17200	12200
Manganese	mg/Kg	536	100%	669	0	422	333	431	317
Mercury	mg/Kg	0.08	89%	0.1	0	0.06 J	0.08 J	0.03 J	0.03 J
Nickel	mg/Kg	44.3	100%	34	1	30.9	23.5	29.1	29.5
Potassium	mg/Kg	1920	100%	1762	7	1920 J	1470	1820	1870 J
Selenium	mg/Kg	1.5	33%	2	0	0.43 U	0.32 U	0.31 U	1.5 J
Sodium	mg/Kg	140	100%	104	8	105 J	75 J	129 J	127 J
Vanadium	mg/Kg	26.2	100%	150	0	18.6	14.8	21.9	21.2
Zinc	mg/Kg	569	100%	83	5	85	58.6	101	569
OTHER ANALYSES									
Total Petroleum Hydrocarbons	mg/Kg	218000	89%	NA	NA	87 J	29 U	87 J	218000
Total Solids	%W/W					85.4	88.4	87.7	90.1

TABLE 4.1-1

SENECA ARMY DEPOT ACTIVITY
SEAD-60 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-60 2-4 06/08/94 SB60-2-02 223513 44694	SOIL SEAD-60 6-8 06/07/94 SB60-2-04 223340 44665	SOIL SEAD-60 0-0.2 06/08/94 SB60-3.00 223499 44665	SOIL SEAD-60 4-6 06/08/94 SB60-3.03 223500 44665	SOIL SEAD-60 6-8 06/08/94 SB60-3.04 223501 44665
VOLATILE ORGANICS										
Methylene Chloride	ug/Kg	54	56%	100	0	11 U	3 J	21	54	1 J
Acetone	ug/Kg	170	11%	200	0	11 U	11 U R	14 U	11 U	11 U
Carbon Disulfide	ug/Kg	2	22%	2700	0	11 U	11 U R	14 U	11 U	2 J
2-Butanone	ug/Kg	26	11%	300	0	11 U	11 U R	14 U	11 U	11 U
2-Hexanone	ug/Kg	1	11%	NA	NA	11 U	11 U R	14 U	11 U	11 U
Tetrachloroethene	ug/Kg	3	11%	1400	0	11 U	3 J	14 U	11 U	11 U
Toluene	ug/Kg	13	33%	1500	0	2 J	2 J	14 U	11 U	11 U
Ethylbenzene	ug/Kg	4	11%	5500	0	11 U	11 U R	14 U	11 U	11 U
Xylene (total)	ug/Kg	9	11%	1200	0	11 U	11 U R	14 U	11 U	11 U
SEMIVOLATILE ORGANICS										
Naphthalene	ug/Kg	38	11%	13000	0	360 U	350 U	2200 U	350 U	350 U
2-Methylnaphthalene	ug/Kg	1100	11%	36400	0	360 U	350 U	2200 U	350 U	350 U
Acenaphthene	ug/Kg	1400	33%	50000*	0	360 U	32 J	2200 U	350 U	350 U
Dibenzofuran	ug/Kg	29	11%	6200	0	360 U	350 U	2200 U	350 U	350 U
Fluorene	ug/Kg	1300	22%	50000*	0	360 U	350 U	2200 U	350 U	350 U
Phenanthrene	ug/Kg	8900	44%	50000*	0	360 U	350 U	680 J	350 U	350 U
Anthracene	ug/Kg	2000	22%	50000*	0	360 U	350 U	2200 U	350 U	350 U
Carbazole	ug/Kg	79	11%	50000*	0	360 U	350 U	2200 U	350 U	350 U
Di-n-butylphthalate	ug/Kg	1500	33%	8100	0	360 U	350 U	2200 U	81 J	94 J
Fluoranthene	ug/Kg	14000	67%	50000*	0	27 J	29 J	1300 J	350 U	350 U
Pyrene	ug/Kg	27000	78%	50000*	0	27 J	62 J	2000 J	350 U	350 U
Benzo(a)anthracene	ug/Kg	340	11%	224	1	360 U	350 U	2200 U	350 U	350 U
Chrysene	ug/Kg	17000	44%	400	2	18 J	350 U	1100 J	350 U	350 U
bis(2-Ethylhexyl)phthalate	ug/Kg	380	44%	50000*	0	360 U	43 J	2200 U	350 U	160 J
Benzo(b)fluoranthene	ug/Kg	16000	33%	1100	2	360 U	350 U	1500 J	350 U	350 U
Benzo(k)fluoranthene	ug/Kg	190	11%	1100	0	360 U	350 U	2200 UJ	350 U	350 U
Benzo(a)pyrene	ug/Kg	350	11%	61	1	360 U	350 U	2200 U	350 U	350 U
Indeno(1,2,3-cd)pyrene	ug/Kg	1100	33%	3200	0	360 U	46 J	1100 J	350 U	350 U
Dibenz(a,h)anthracene	ug/Kg	1100	33%	14	3	360 U	27 J	1100 J	350 U	350 U
Benzo(g,h,i)perylene	ug/Kg	1600	33%	50000*	0	360 U	43 J	1600 J	350 U	350 U

TABLE 4.1-1

SENECA ARMY DEPOT ACTIVITY
SEAD-60 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-60 2-4 06/08/94 SB60-2-02 223513 44694	SOIL SEAD-60 6-8 06/07/94 SB60-2-04 223340 44665	SOIL SEAD-60 0-0.2 06/08/94 SB60-3.00 223499 44665	SOIL SEAD-60 4-6 06/08/94 SB60-3.03 223500 44665	SOIL SEAD-60 6-8 06/08/94 SB60-3.04 223501 44665
PESTICIDES/PCB										
alpha-BHC	ug/Kg	5	11%	110	0	1.8 U	1.8 U	2.9 UJ	1.8 U	1.8 U
Aldrin	ug/Kg	16	11%	41	0	1.8 U	1.8 U	2.9 UJ	1.8 U	1.8 U
Endosulfan I	ug/Kg	34	33%	900	0	1.8 U	1.8 U	6.3 J	1.8 U	1.8 U
4,4'-DDE	ug/Kg	110	44%	2100	0	3.6 U	3.5 U	28 J	3.5 U	3.5 U
4,4'-DDD	ug/Kg	100	22%	2900	0	3.6 U	3.5 U	100 J	3.5 U	3.5 U
4,4'-DDT	ug/Kg	130	22%	2100	0	3.6 U	3.5 U	5.6 UJ	3.5 U	3.5 U
Endrin ketone	ug/Kg	14	11%	NA	NA	3.6 U	3.5 U	5.6 UJ	3.5 U	3.5 U
alpha-Chlordane	ug/Kg	27	22%	540	0	1.8 U	1.8 U	3 J	1.8 U	1.8 U
gamma-Chlordane	ug/Kg	10	11%	540	0	1.8 U	1.8 U	2.9 UJ	1.8 U	1.8 U
Aroclor-1242	ug/Kg	970	11%	1000/10000(a)	0	36 U	35 U	56 UJ	35 U	35 U
Aroclor-1248	ug/Kg	2100	11%	1000/10000(a)	1	36 U	35 U	56 UJ	35 U	35 U
Aroclor-1260	ug/Kg	4400	22%	1000/10000(a)	1	36 U	35 U	220 J	35 U	35 U
METALS										
Aluminum	mg/Kg	14100	100%	14593	0	6850 J	8320	14100	6980	13200
Antimony	mg/Kg	1.8	78%	3.59	0	0.29 J	0.22 UJ	0.49 J	0.26 J	0.18 UJ
Arsenic	mg/Kg	8.1	100%	7.5	1	4.6	3.8	7	4	5.6
Barium	mg/Kg	679	100%	300	2	71.7 J	90.1	416	64	50.1
Beryllium	mg/Kg	0.67	100%	.73	0	0.26 J	0.38 J	0.66 J	0.35 J	0.63 J
Cadmium	mg/Kg	2	100%	1	2	0.32 J	0.33 J	1.5 J	0.35 J	0.72
Calcium	mg/Kg	102000	100%	101904	1	90900 J	72300 J	23700 J	102000 J	50600 J
Chromium	mg/Kg	23.3	100%	22	2	12 J	14.1	23.3	12	22.7
Cobalt	mg/Kg	13.1	100%	30	0	8.1 J	7.9 J	13.1 J	8.2	12.7
Copper	mg/Kg	190	100%	25	3	16.6 J	20.5	74.1	19.8	30.6
Iron	mg/Kg	32100	100%	26627	1	15600 J	17700	25700	15500	32100
Lead	mg/Kg	66.7	100%	21.9	3	7.2	9.5	50.6	8.2	15.3
Magnesium	mg/Kg	25400	100%	12222	5	25400 J	19000	8570	18000	11400
Manganese	mg/Kg	536	100%	669	0	536 J	368	443	417	378
Mercury	mg/Kg	0.08	89%	0.1	0	0.03 J	0.07 J	0.02 U	0.02 J	0.01 J
Nickel	mg/Kg	44.3	100%	34	1	23.5 J	23.6	31.3	22.9	44.3
Potassium	mg/Kg	1920	100%	1762	7	1860	1820 J	1820 J	1690 J	1920 J
Selenium	mg/Kg	1.5	33%	2	0	0.54 U	0.47 U	1.2 J	0.43 U	0.65 J
Sodium	mg/Kg	140	100%	104	8	119 J	119 J	118 J	113 J	140 J
Vanadium	mg/Kg	26.2	100%	150	0	13.7 J	14.5	26.2	12.9	19.3
Zinc	mg/Kg	569	100%	83	5	43.7 J	64.4	314	56.3	266
OTHER ANALYSES										
Total Petroleum Hydrocarbons	mg/Kg	218000	89%	NA	NA	283	332	50900	57	34
Total Solids	%W/W					91.8	94.2	59.1	93.1	93.8

The volatile organic, carbon disulfide, was found in only two samples at concentrations of up to 2 μg/kg.

4.1.2.2 Semivolatile Organic Compounds

A total of 20 semivolatile organic compounds were found at varying concentrations in the soil samples collected at SEAD-60. Most were detected in only the surface soils (0 to 0.2 feet) at each of the three boring locations. All three of the surface soil samples have reported concentrations of SVOCs that exceed a TAGM value for one or more of the following compounds: benxo(a)anthracene, chrysene, benxo(b)fluoranthene, benzo(a)pyrene, dibenz(a,b)anthracene. The highest concentrations were found in the surface sample from boring SB60-2-00, located at the spill area near the southwest corner of Building 609; at this location 27,000 μg/kg of pyrene, 17,000 μg/kg of chrysene, 16,000 of benzo(b)fluoranthene and 14,000 μg/kg of acenaphthene were detected. The highest SVOC concentration measured in the surface samples from the other two borings was 2,000 μg/kg of pyrene (measured in sample SB60-3.00). Concentrations of semivolatile compounds were low in the subsurface soil samples with only one result, dibenz(a,h)anthracene, exceeding its TAGM value in sample SB60-2-04 (collected at 6 to 8 feet in the boring). Generally, SB60-2-00 was impacted by the highest concentrations and the greatest number of semivolatile organic compounds, followed by SB60-3.00, the topographically downgradient boring. The total PAH concentrations in the surface soils and sediments are shown in Figure 4.1-1.

4.1.2.3 Pesticides and PCBs

Twelve pesticide and PCB compounds were detected in the 9 soil samples collected. The distribution of pesticides and PCBs is similar to that found for the semivolatile organic compounds. The surface soil samples contain the highest concentrations and the greatest number of individual compounds. TAGM exceedences were noted for only two PCBs (Aroclor 1248 and Aroclor 1260) in surface soil sample SB60-2-00. This sample is the most significantly impacted and contains every pesticide and PCB compound that was detected on-site. Subsurface soil samples were generally free of pesticides and PCBs, with only one sample (SB60-1.01) containing a low concentration (2.7 μg/kg) of 4,4'-DDE.

4.1.2.4 Metals

A variety of samples were found to contain metals at concentrations that exceed the

44 U
1153
SWSD60-3

149
1046
SWSD60-2

40 U
580 U
SWSD60-1

50900
10380

218000
88700

87
5202

MW60-2
741.29

MW60-3
741.72

MW60-1
744.44

SB60-3
SB60-2
SB60-1

OIL SPILL AREA

BLDG. 609

BLDG. 612

BRADY ROAD

741
742
743
744
746
740
738
736
734

N 986750
N 986500
N 986250

E 751000
E 751250
E 751500
E 751750
E 752000

N

R:\SENECA\7LPSWMU\ACADFIG\SD60SOIL.DWG

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

149 / 1046 — TPH (mg/Kg) / TOTAL PAHs (g/Kg) μ

SB60-3 — SOIL BORING

SWSD60-1 — SURFACE WATER/ SEDIMENT SAMPLE

MW60-1 / 744.44 — MONITORING WELL WITH WATER TABLE ELEVATION

744 — GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/06/94

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 4.1-1

SEAD-60 TPH AND TOTAL PAHs
IN SURFACE SOILS AND SEDIMENTS

SCALE	DATE	REV
1" = 100'	APRIL 1996	A

associated TAGM or site background values. Of the 21 metals reported, 13 were found in one or more samples at concentrations above the TAGM values. Several metals were found in two to three samples above the TAGM values including barium, cadmium, chromium, and lead. Metals found in a large number of the samples (five to eight) above the TAGM values include magnesium, potassium, sodium, and zinc. The largest number of TAGM exceedances (eight) occurred in surface soil samples SB60-2 (located in the oil-stained area) and SB60-3 (located 30 feet topographically downgradient of the oil-stained area).

Maximum concentrations for most of the metals (arsenic, barium, cadmium, calcium, chromium, iron, lead, nickel, potassium, and sodium) exceeded the TAGM values by approximately one to two times. However, maximum concentrations of copper and zinc exceeded their respective TAGM values by a factor of seven.

4.1.2.5 Total Petroleum Hydrocarbons

Total petroleum hydrocarbons (TPH) were detected in nearly all of the soil samples. The two highest concentrations detected were 218,000 mg/kg in surface soil sample SB60-2.00 and 50,900 mg/kg in surface soil sample SB60-3.00. The remaining samples contained TPH concentrations that were equal to or less than 332 mg/kg. As observed in SVOC results, the highest concentration was found in the surface soil sample from SB60-2 and the second highest concentration was found in the downgradient surface soil sample at SB60-3. The TPH concentrations in surface soils and sediments are shown in Figure 4.1-1

4.1.3 Groundwater

Three monitoring wells were sampled as part of the investigation of SEAD-60. The summary of the chemical analyses are presented in Table 4.1-2. The following sections describe the nature and extent of groundwater contamination identified at SEAD-60.

4.1.3.1 Volatile Organic Compounds

Two volatile organic compounds (acetone and benzene) were detected in two of the groundwater samples collected at SEAD-60. Monitoring well MW60-1, the background well, contained 48 μg/L of acetone and 1 μg/L of benzene. The concentration of benzene detected in MW60-1 exceeded the state criteria value of 0.7 μg/L but did not exceed the federal criteria of 5 μg/L. Only acetone (77 μg/L) was detected in MW60-2.

TABLE 4.1-2

SENECA ARMY DEPOT
SEAD-60 ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NUMBER ABOVE CRITERIA	WATER SEAD-60 07/07/94 MW60-1 226301 45257	WATER SEAD-60 07/07/94 MW60-2 226302 45257	WATER SEAD-60 03/29/94 MW60-3 215838 43179
VOLATILE ORGANICS								
Acetone	ug/L	77	67%	NA	NA	48	77 J	10 U
Benzene	ug/L	1	33%	0.7	1	1 J	10 U	10 U
PESTICIDES/PCB								
beta-BHC	ug/L	0.049	33%	5	0	0.051 U	0.051 U	0.049 J
METALS								
Aluminum	ug/L	376	100%	NA	NA	348	58 J	376
Barium	ug/L	88.7	100%	1000	0	88.7 J	45 J	34 J
Calcium	ug/L	113000	100%	NA	NA	95100	112000	113000
Chromium	ug/L	0.56	67%	50	0	0.56 J	0.4 U	0.51 J
Cobalt	ug/L	0.72	33%	NA	NA	0.5 U	0.5 U	0.72 J
Copper	ug/L	0.99	33%	200	0	0.5 U	0.5 U	0.99 J
Iron	ug/L	1440	100%	300	3	1290	1340	1440
Magnesium	ug/L	55100	100%	NA	NA	31100	55100	52600
Manganese	ug/L	377	100%	300	1	377	125	166
Mercury	ug/L	0.05	67%	2	0	0.05 J	0.05 J	0.03 U
Nickel	ug/L	1.6	33%	NA	NA	0.7 U	0.7 U	1.6 J
Potassium	ug/L	8760	100%	NA	NA	8760	4530 J	4510 J
Sodium	ug/L	59400	100%	20000	1	59400	12300	11400
Thallium	ug/L	1.8	33%	NA	NA	1.9 U	1.9 U	1.8 J
Vanadium	ug/L	1.5	67%	NA	NA	1 J	0.5 U	1.5 J
Zinc	ug/L	6.9	100%	300	0	6.9 J	3.2 J	4.8 J
OTHER ANALYSES								
Total Petroleum Hydrocarbons	mg/L	2.2	66%	NA	NA	2.2	1.22	0.4 U
pH	Standard Units					7.4	7.3	7.6
Conductivity	umhos/cm					1010	700	615
Temperature	°C					11.7	11.5	8.2
Turbidity	NTU					104	8.6	5.8

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.

(1.22 mg/L). TPH concentrations in MW60-2 may be attributed to the release of oil at Building 604 based on the groundwater elevations and topography at the site, however, the elevated TPH concentration in the background well can not be explained at this time. There is no NYSDEC Class GA nor federal criteria value for TPH. TPH concentrations in MW60-3 were below 0.4 μg/L, the detection limit for the analysis. The TPH concentrations in groundwater are shown in Figure 4.1-2.

4.1.4 Surface Water

Three surface water samples were collected as part of the SEAD-60 investigation. The summary results of the chemical analyses are presented in Table 4.1-3. The following sections describe the nature and extent of surface water contamination identified at SEAD-60.

4.1.4.1 Volatile Organic Compounds

No volatile organic compounds were found in the three surface water samples collected at SEAD-60.

4.1.4.2 Semivolatile Organic Compounds

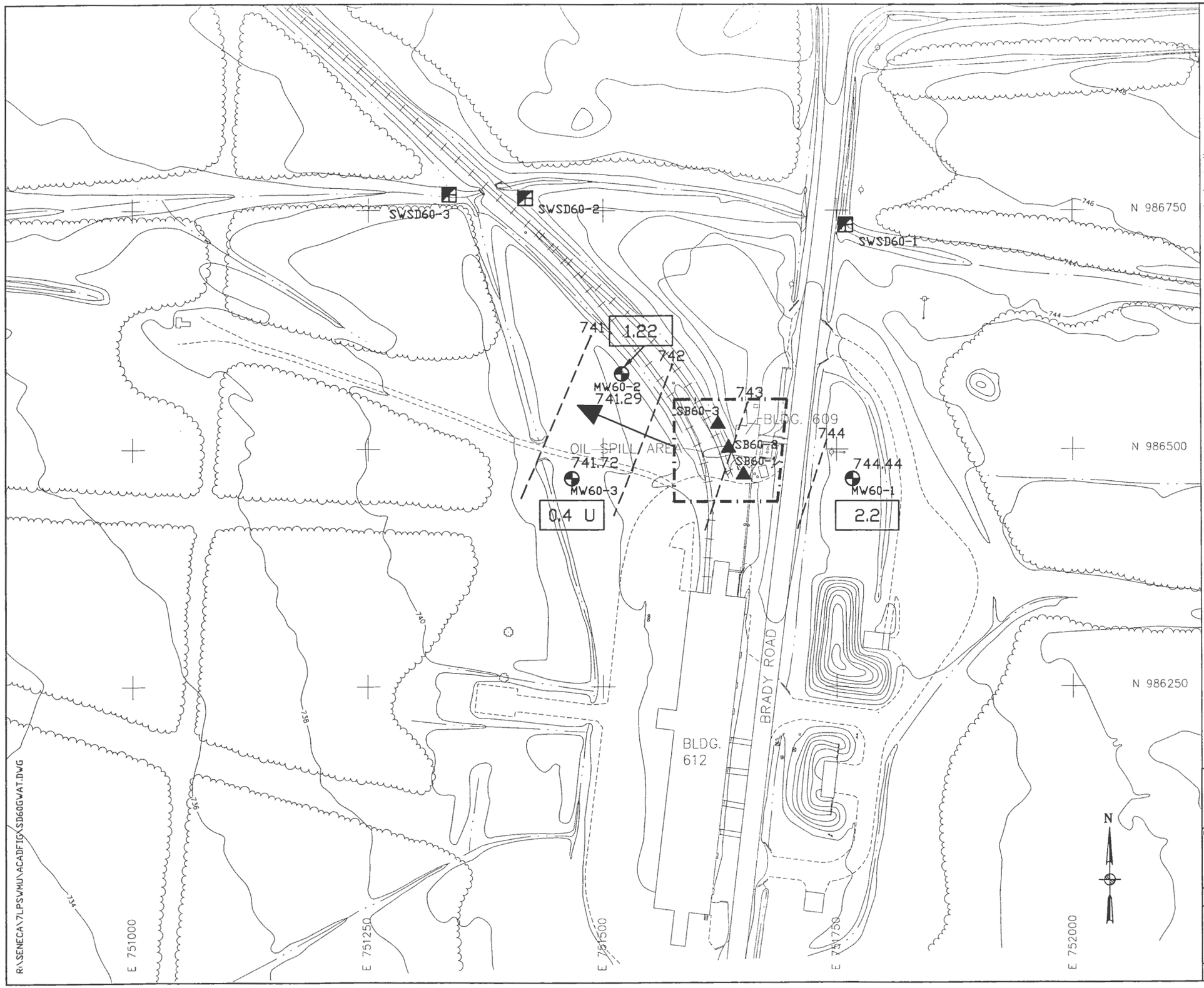
No semi-volatile organic compounds were found in the three surface water samples collected at SEAD-60.

4.1.4.3 Pesticides and PCBs

No pesticide or PCB compounds were found in the surface water samples collected at SEAD-60.

4.1.4.4 Metals

Three metals (aluminum, iron and zinc) were found at concentrations above the associated criteria values of 87 μg/L, 300 μg/L and 5.32 μg/L, respectively. The exceedances for aluminum (259 μg/L) and iron (453 μg/L) were both found in SW60-2. The exceedance for zinc (9.6 μg/L) was found in SW60-3.



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- 1.22 TPH (mg/L)
- SB60-3 SOIL BORING
- SWSD60-1 SURFACE WATER/ SEDIMENT SAMPLE
- MW60-1 / 744.44 MONITORING WELL WITH WATER TABLE ELEVATION
- 744 GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/06/94

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 4.1-2
SEAD-60
TPH IN GROUNDWATER

SCALE	DATE	REV
1" = 100'	APRIL 1996	A

TABLE 4.1-3

SENECA ARMY DEPOT
SEAD-60 ENVIRONMENTAL SITE INSPECTION
SURFACE WATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C (a,c)	NUMBER ABOVE CRITERIA	WATER SEAD-60 04/27/94 SW60-1 219531 43626	WATER SEAD-60 04/20/94 SW60-2 218496 43626	WATER SEAD-60 04/20/94 SW60-3 218497 43626
METALS								
Aluminum	ug/L	259	100%	NA	NA	35.7 J	259	93.5 J
Arsenic	ug/L	1.6	33%	190	0	1.5 U	1.6 J	1.5 U
Barium	ug/L	49.4	100%	NA	NA	28.7 J	49.4 J	22.4 J
Calcium	ug/L	89000	100%	NA	NA	42300	89000	42200
Chromium	ug/L	0.68	67%	390	0	0.56 J	0.68 J	0.4 U
Copper	ug/L	2	100%	23	0	1.7 J	2 J	1.1 J
Iron	ug/L	453	100%	300	1	78 J	453	121
Magnesium	ug/L	22000	100%	NA	NA	8260	22000	8390
Manganese	ug/L	28.5	100%	NA	NA	12.5 J	28.5	4.5 J
Nickel	ug/L	1.8	100%	172	0	0.98 J	1.8 J	0.83 J
Potassium	ug/L	1430	100%	NA	NA	1060 J	1430 J	649 J
Sodium	ug/L	53800	100%	NA	NA	2030 J	53800	2340 J
Vanadium	ug/L	0.85	33%	14	0	0.7 U	0.85 J	0.69 U
Zinc	ug/L	9.6	100%	160	0	3 J	3.4 J	9.6 J
OTHER ANALYSES								
pH	Standard Units					8.4	8.7	9.1
Conductivity	umhos/cm					232	675	180
Temperature	°C					23.3	16	10
Turbidity	NTU					2.2	5.7	2.4

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class C surface water.
b) Hardness dependent values assume a hardness of 217 mg/L.
c) 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.

4.1.4.5 Total Petroleum Hydrocarbons

No total petroleum hydrocarbons were found in the surface water samples collected at SEAD-60.

4.1.5 Sediment

A total of three sediment samples were collected as part of the investigation at SEAD-60. The summary chemical analyses are presented in Table 4.1-4. The sediment samples were collected in the same locations as the surface water samples discussed above. The following sections describe the nature and extent of sediment contamination identified at SEAD-60.

4.1.5.1 Volatile Organic Compounds

Only one volatile organic compound was detected in the sediment samples. Chloroform was detected at 3 μg/kg in sample SD60-2.

4.1.5.2 Semivolatile Organic Compounds

A total of eleven SVOCs were identified in the three sediment samples collected at SEAD-60. The SVOCs detected were all PAHs, some of which were found at concentrations above their respective NYSDEC criteria values. Generally, the types and concentrations of PAHs, as well as the number of NYSDEC criteria exceedances (six), in samples SD60-2 and SD60-3 were the same.

4.1.5.3 Pesticides and PCBs

Four pesticide compounds were detected in sediment sample SD60-3 which is located at the end of a drainage ditch that originates behind Building 612, an ammunition breakdown area. Three of the four compounds exceeded their respective NYSDEC criteria values. The three pesticides that exceeded the criteria values (endosulfan I, 4,4'-DDE, and 4,4'-DDT) were found at concentrations of 2.1 μg/kg, 5.4 μg/kg and 3.4 μg/kg, respectively.

TABLE 4.1-4

SENECA ARMY DEPOT
SEAD-60 ENVIRONMENTAL SITE INSPECTION
SEDIMENT ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT CHRONIC CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a)	LOWEST EFFECT LEVEL (a)(b)	SEVERE EFFECT LEVEL (a)(b)	NUMBER ABOVE CRITERIA	SOIL SEAD-60 0-0.2 04/27/94 SD60-1 219550 43663	SOIL SEAD-60 0-0.2 04/20/94 SD60-2 218490 43663	SOIL SEAD-60 0-0.2 04/20/94 SD60-3 218491 43663
VOLATILE ORGANICS												
Chloroform	ug/Kg	3	33%	NA	NA	NA		NA	NA	16 U	3 J	16 U
SEMIVOLATILE ORGANICS												
Phenanthrene	ug/Kg	70	67%	1200	NA	NA			0	580 U	63 J	70 J
Fluoranthene	ug/Kg	200	67%	10200	NA	NA			0	580 U	160 J	200 J
Pyrene	ug/Kg	250	67%	NA	NA	NA			NA	580 U	190 J	250 J
Benzo(a)anthracene	ug/Kg	68	67%	NA	13	NA			2	580 U	56 J	68 J
Chrysene	ug/Kg	160	67%	NA	13	NA			2	580 U	130 J	160 J
bis(2-Ethylhexyl)phthalate	ug/Kg	1100	100%	1995	NA	NA			0	110 J	1100	75 J
Benzo(b)fluoranthene	ug/Kg	120	67%	NA	13	NA			2	580 U	120 J	120 J
Benzo(k)fluoranthene	ug/Kg	97	67%	NA	13	NA			2	580 U	87 J	97 J
Benzo(a)pyrene	ug/Kg	79	67%	NA	13	NA			2	580 U	79 J	64 J
Indeno(1,2,3-cd)pyrene	ug/Kg	68	67%	NA	13	NA			2	580 U	68 J	57 J
Benzo(g,h,i)perylene	ug/Kg	93	67%	NA	NA	NA			NA	580 U	93 J	67 J
PESTICIDES/PCB												
Endosulfan I	ug/Kg	2.1	33%	0.3	NA	NA			1	3 U	3.3 U	2.1 J
4,4'-DDE	ug/Kg	5.4	33%	NA	0.1	10			1	5.8 U	6.5 U	5.4 J
4,4'-DDT	ug/Kg	3.4	33%	10	0.1	10			1	5.8 U	6.5 U	3.4 J
alpha-Chlordane	ug/Kg	1.9	33%	NA	NA	NA			NA	3 U	3.3 U	1.9 J
METALS												
Aluminum	mg/Kg	12700	100%				NA	NA	NA	12700	10700	5470
Arsenic	mg/Kg	4.8	100%				6	33	0	4.8	3.6	3.7
Barium	mg/Kg	97.6	100%				NA	NA	NA	97.6	80.3	46.5 J
Beryllium	mg/Kg	0.62	100%				NA	NA	NA	0.62 J	0.54 J	0.35 J
Cadmium	mg/Kg	0.44	100%				.6	9	0	0.34 J	0.44 J	0.25 J
Calcium	mg/Kg	227000	100%				NA	NA	NA	3760	21300	227000
Chromium	mg/Kg	19.5	100%				26	110	0	19.5	17.5	9
Cobalt	mg/Kg	9.6	100%				NA	NA	NA	9.6 J	8.2 J	6.7 J
Copper	mg/Kg	21.1	100%				16	110	1	14.2	21.1	12.5
Iron	mg/Kg	25000	100%				2%	4%	2	25000	22000	12700
Lead	mg/Kg	24.6	100%				31	110	0	13.9	24.6	9.1
Magnesium	mg/Kg	8380	100%				NA	NA	NA	4370	7490	8380
Manganese	mg/Kg	509	100%				460	1100	2	467 J	282 J	509 J
Mercury	mg/Kg	0.03	33%				.15	1.3	0	0.05 J R	0.04 J R	0.03 J
Nickel	mg/Kg	27.2	100%				16	50	3	27.2	26.7	16.2
Potassium	mg/Kg	1610	100%				NA	NA	NA	1610	1190 J	988 J
Sodium	mg/Kg	134	67%				NA	NA	NA	45 U	134 J	91 J
Thallium	mg/Kg	0.55	33%				NA	NA	NA	0.45 U	0.55 J	0.46 U
Vanadium	mg/Kg	23.9	100%				NA	NA	NA	23.9	19.2	11.1 J
Zinc	mg/Kg	101	100%				120	270	0	93.5	88.1	101
Cyanide	mg/Kg	3.3	33%				NA	NA	NA	0.83 U	0.94 U	3.3
OTHER ANALYSES												
Total Petroleum Hydrocarbons	mg/Kg	149	33%							40 U	149	44 U
Total Solids	%W/W									56.8	50.7	60.5

NOTES:
a) NYSDEC Sediment Criteria - 1994
b) A sediment is considered contaminated if either criteria is exceeded
c) 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) 2%=20,000 mg/Kg; 4%=40,000 mg/Kg

4.1.5.4 Metals

A number of metals were detected in the three sediment samples collected at SEAD-60. Of these, copper, iron, manganese, nickel, and zinc were found at concentrations in excess of the NYSDEC sediment criteria. All three samples contained metals above the criteria values. Copper (at 21.1 mg/kg) and iron (at 25,000 mg/kg and 22,000 mg/kg) exceeded their criteria values only in samples SD60-2 and SD60-1. Manganese (a maximum of 509 mg/kg) exceeded its criteria value in samples SD60-1, SD60-3. Nickel (a maximum of 27.2 mg/kg) exceeded its criteria value in samples SD60-1, SD60-2 and SD60-3. Zinc exceeded the criteria value in all three samples with a maximum concentration of 101 mg/kg in SD60-3.

4.1.5.5 Total Petroleum Hydrocarbons

Petroleum hydrocarbons were detected in only one sample (SD60-2) at a concentration of 149 mg/kg. This sample location was in a drainage ditch approximately 340 feet downgradient of the oil spill area and receives direct run-off from the site. This concentration of TPH (149 mg/kg) is orders of magnitude less than those concentrations found in and near the oil spill area.

4.1.6 Tentatively Identified Compounds

Tentatively Identified Semivolatile Organic Compounds (TICs) were found at total concentrations greater than 50 mg/Kg in soil boring samples SB60-2-00, SB60-2-20 and SB60-3-00. Soil boring sample SB50-2.00 was collected in the oil stained area, at a depth of 0 to 2 feet below grade. The total TIC concentrations reported in the sample was 1080 mg/Kg. Soil boring SB60-2-20 was the duplicate sample of SB60-2-00. SB60-2-20 reported a total TIC concentration of 1124 mg/kg. Soil sample SB60-3-00 was collected in proximity to soil sample SB60-2-00, also in an oil stained area. It was collected from 0 to 2 feet below grade, and had a reported total TIC concentration of 226.9 mg/kg. The occurrence of elevated TIC concentrations in these samples correlated to the elevated concentrations of NYSDEC CLP TCL SVOCs found in the same samples.

The total VOC TIC concentrations were below 10 mg/kg in all of the samples collected at SEAD-60.

4.2 SEAD-62

4.2.1 Introduction

A total of three subsurface soil samples were collected from three test pits at SEAD-62. A total of three groundwater samples were also collected as part of the investigation. The following sections describe the nature and extent of contamination identified at SEAD-62. The sample locations are shown in Figure 2.4-2.

4.2.2 Soil

The analytical results for the three subsurface soil samples collected from the test pits are presented in Table 4.2-1. The following sections describe the nature and extent of contamination in SEAD-62 soils.

4.2.2.1 Volatile Organic Compounds

No volatile organic compounds were detected in the soil samples collected at SEAD-62.

4.2.2.2 Semivolatile Organic Compounds

A total of 2 semivolatile organic compounds, characterized as PAHs, were found in one of the soil samples (TP62-1) collected at SEAD-62. Neither of these exceeded their respective TAGM values.

4.2.2.3 Pesticides and PCBs

No pesticide or PCB compounds were found in the soil samples collected at SEAD-62.

4.2.2.4 Herbicides

Two herbicides were found in two soil samples collected at SEAD-62. The compound 2,4,5-T was detected in samples TP62-1-1 and TP62-2-1 located in the central portion of the site. Dicamba was detected in only TP62-3-1. None of these concentrations were above their respective TAGM values.

TABLE 4.2-1

SENECA ARMY DEPOT
SEAD-62 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-62 0-0.5 06/12/94 TP62-1-1 224086 44748	SOIL SEAD-62 3 06/12/94 TP62-2-1 224088 44748	SOIL SEAD-62 2 06/12/94 TP62-3-1 224089 44748
HERBICIDES								
2,4,5-T	ug/Kg	10	67%	1900	0	10 J	5.6 U	6.3 J
Dicamba	ug/Kg	9.3	33%	NA	NA	7.3 U	5.6 U	9.3 J
SEMIVOLATILE ORGANICS								
Fluoranthene	ug/Kg	46	33%	50000*	0	46 J	370 U	410 U
Pyrene	ug/Kg	47	33%	50000*	0	47 J	370 U	410 U
METALS								
Aluminum	mg/Kg	16100	100%	14593	2	14800	11000	16100
Antimony	mg/Kg	0.21	33%	3.59	0	0.35 UJ	0.21 J	0.2 UJ
Arsenic	mg/Kg	8.4	100%	7.5	1	4.9	5.3	8.4
Barium	mg/Kg	202	100%	300	0	147	85.4	202
Beryllium	mg/Kg	0.74	100%	.73	1	0.74 J	0.56 J	0.72 J
Cadmium	mg/Kg	0.68	100%	1	0	0.43 J	0.56 J	0.68 J
Calcium	mg/Kg	67900	100%	101904	0	10900	67900	17400
Chromium	mg/Kg	28.8	100%	22	2	28.8 J	17.3 J	23.6 J
Cobalt	mg/Kg	12.6	100%	30	0	9.4 J	12.6	12.6
Copper	mg/Kg	28.7	100%	25	1	22.8	22	28.7
Iron	mg/Kg	30300	100%	26627	2	27500	23200	30300
Magnesium	mg/Kg	20500	100%	12222	1	4530	20500	5340
Manganese	mg/Kg	778	100%	669	1	323	495	778
Mercury	mg/Kg	0.11	100%	0.1	1	0.1 J	0.03 J	0.11
Nickel	mg/Kg	29.6	100%	34	0	26.2	29.6	26.5
Potassium	mg/Kg	2970	100%	1762	2	1630 J	2210 J	2970 J
Selenium	mg/Kg	1.3	67%	2	0	1.3 J	0.37 U	0.99
Sodium	mg/Kg	164	100%	104	1	37.8 J	88.8 J	164 J
Vanadium	mg/Kg	33.1	100%	150	0	25.3	20.3	33.1
Zinc	mg/Kg	218	100%	83	2	218	67.5	172
OTHER ANALYSES								
Total Solids	%W/W					68.5	89.5	79.6

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.

4.2.2.5 Metals

The soil samples collected at SEAD-62 were found to contain various metals at concentrations that exceed the associated TAGM or site background values. Of the 22 metals reported, 12 of these (aluminum, arsenic, beryllium, chromium, copper, iron, magnesium, manganese, mercury, potassium, sodium, and zinc) were found in one or more samples at concentrations above their associated TAGM values, however, the exceedances were within the same order of magnitude as the TAGM value.

4.2.3 Groundwater

Three monitoring wells were installed as part of the investigation at SEAD-62. The summary analytical results are presented in Table 4.2-2. The following sections describe the nature and extent of the groundwater contamination identified at SEAD-62.

4.2.3.1 Volatile Organic Compounds

Benzene was the only volatile organic compound found in the groundwater samples collected at SEAD-62. The volatile organic compound was detected in both MW62-2 and MW62-3 at a concentration of 2 μg/L, which exceeded the NY AWQS Class GA standard 0.7 μg/L; the detected concentration was less than half the Federal Primary Drinking Water MCL of 5 μg/L.

4.2.3.2 Semivolatile Organic Compounds

No semi-volatile organic compound were detected in the three groundwater samples collected at SEAD-62.

4.2.3.3 Pesticides and PCBs

No pesticides or PCBs were found in the three groundwater samples collected at SEAD-62.

4.2.3.4 Herbicides

The herbicide 2,4,5-T was found at a concentration of 0.12 μg/L in the groundwater sample from MW62-2. This concentration is not above the NY AWQS Class GA criteria value of 5 μg/L. There is no Federal Primary or Secondary Drinking Water MCL for 2,4,5-T.

TABLE 4.2-2

SENECA ARMY DEPOT
SEAD-62 ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NUMBER ABOVE CRITERIA	WATER SEAD-62 07/21/94 MW62-1 227728 45448	WATER SEAD-62 07/21/94 MW62-2 227729 45448	WATER SEAD-62 07/20/94 MW62-3 227611 45448
VOLATILE ORGANICS								
Benzene	ug/L	2	67%	0.7	2	10 U	2 J	2 J
HERBICIDES								
2,4,5-T	ug/L	0.12	33%	5	0	0.11 U	0.12	0.11 U
METALS								
Aluminum	ug/L	499	100%	NA	NA	499	430	173 J
Barium	ug/L	68.1	100%	1000	0	68.1 J	66 J	64.8 J
Calcium	ug/L	104000	100%	NA	NA	91700	85600	104000
Chromium	ug/L	1.4	67%	50	0	1.4 J	1.2 J	0.4 U
Cobalt	ug/L	2.5	100%	NA	NA	2.5 J	1.1 J	0.56 J
Copper	ug/L	0.54	33%	200	0	0.54 J	0.5 U	0.5 U
Iron	ug/L	1160	100%	300	3	797 J	870 J	1160 J
Magnesium	ug/L	58200	100%	NA	NA	58200	44200	33100
Manganese	ug/L	271	100%	300	0	271	134	86.5
Mercury	ug/L	0.05	100%	2	0	0.05 J	0.05 J	0.05 J
Nickel	ug/L	3.9	67%	NA	NA	3.9 J	2.3 J	0.69 U
Potassium	ug/L	7470	100%	NA	NA	7470 J	6240 J	3150 J
Sodium	ug/L	18100	100%	20000	0	18100	8750	5820
Thallium	ug/L	2.4	33%	NA	NA	1.9 U	2.4 J	1.9 U
Vanadium	ug/L	1.8	100%	NA	NA	1.8 J	1.5 J	0.85 J
Zinc	ug/L	6.2	100%	300	0	4.2 J	6.2 J	3 J
OTHER ANALYSES								
pH	Standard Units					7.8	7.3	7.2
Conductivity	umhos/cm					750	655	525
Temperature	°C					20.3	19.1	14
Turbidity	NTU					86	28	31

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.

4.2.3.5 Metals

Four metal compounds (aluminum, iron, manganese and thallium) in three wells exceeded Federal Primary and Secondary Drinking Water MCLs at SEAD-62. One sample from MW62-3 contained 173 μg/L aluminum and was within the Secondary Drinking Water Standard MCL range of 50 μg/L to 200 μg/L for aluminum. Two samples from MW62-1 (499 μg/L) and MW62-2 (430 μg/L) and MW62-2 (430 ug/L) exceeded the criteria range for aluminum.

Iron was detected at concentrations between 797 μg/L and 1,160 μg/L in all three groundwater samples, which exceeded both the state and federal criteria values of 300 μg/L.

Manganese results did not exceed state standards but every result did exceed the Federal Secondary Drinking Water criteria of 50 μg/L, with concentrations from 86.5 μg/L to 271 μg/L. Thallium results from one well, MW62-2 (2.4 μg/L), exceeded the Federal Primary Drinking Water Standard of 2 μg/L.

4.2.4 Tentatively Identified Compounds

The total concentrations of Tentatively Identified Compounds (TICs) was below 50 mg/kg in all of the samples analyzed for semivolatiles at SEAD-62. The total concentration of TICs were below 10 mg/kg in all of the samples analyzed for VOCs.

4.3 SEAD-63

4.3.1 Introduction

A total of 12 subsurface soil samples were collected from test pits at SEAD-63. To assess the potential impact from surface water runoff, four surface water and sediment samples were collected in drainage ditches which were suspected to receive surface water runoff from the site. Three monitoring wells were also sampled as part of this investigation. The following sections describe the nature and extent of contamination identified at SEAD-63. The sample locations are shown in Figure 2.5-2.

The media investigated at SEAD-63 was analyzed for chemical and radiochemical parameters. The results of the radiochemical analyses were reported in concentrations of radionuclides per gram of soil or sediment and in concentrations of radionuclides per liter of water. In

TABLE 4.1-2

SENECA ARMY DEPOT
SEAD-60 ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NUMBER ABOVE CRITERIA	WATER SEAD-60 07/07/94 MW60-1 226301 45257	WATER SEAD-60 07/07/94 MW60-2 226302 45257	WATER SEAD-60 03/29/94 MW60-3 215838 43179
VOLATILE ORGANICS								
Acetone	ug/L	77	67%	NA	NA	48	77 J	10 U
Benzene	ug/L	1	33%	0.7	1	1 J	10 U	10 U
PESTICIDES/PCB								
beta-BHC	ug/L	0.049	33%	5	0	0.051 U	0.051 U	0.049 J
METALS								
Aluminum	ug/L	376	100%	NA	NA	348	58 J	376
Barium	ug/L	88.7	100%	1000	0	88.7 J	45 J	34 J
Calcium	ug/L	113000	100%	NA	NA	95100	112000	113000
Chromium	ug/L	0.56	67%	50	0	0.56 J	0.4 U	0.51 J
Cobalt	ug/L	0.72	33%	NA	NA	0.5 U	0.5 U	0.72 J
Copper	ug/L	0.99	33%	200	0	0.5 U	0.5 U	0.99 J
Iron	ug/L	1440	100%	300	3	1290	1340	1440
Magnesium	ug/L	55100	100%	NA	NA	31100	55100	52600
Manganese	ug/L	377	100%	300	1	377	125	166
Mercury	ug/L	0.05	67%	2	0	0.05 J	0.05 J	0.03 U
Nickel	ug/L	1.6	33%	NA	NA	0.7 U	0.7 U	1.6 J
Potassium	ug/L	8760	100%	NA	NA	8760	4530 J	4510 J
Sodium	ug/L	59400	100%	20000	1	59400	12300	11400
Thallium	ug/L	1.8	33%	NA	NA	1.9 U	1.9 U	1.8 J
Vanadium	ug/L	1.5	67%	NA	NA	1 J	0.5 U	1.5 J
Zinc	ug/L	6.9	100%	300	0	6.9 J	3.2 J	4.8 J
OTHER ANALYSES								
Total Petroleum Hydrocarbons	mg/L	2.2	66%	NA	NA	2.2	1.22	0.4 U
pH	Standard Units					7.4	7.3	7.6
Conductivity	umhos/cm					1010	700	615
Temperature	°C					11.7	11.5	8.2
Turbidity	NTU					104	8.6	5.8

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.

order to compare the radiochemical soil analysis results to a New York State TAGM value and the proposed 10 CFR 834 criteria for radionuclides in soils (each expressed as a dose, in millirems, per year), a computer model was utilized to calculate the radiation dose due to the exposure of the radionuclides detected at SEAD-63. This model considered nine exposure pathways to a residential population occupying SEAD-63. To provide a conservative dose calculation, the contaminated zone was defined as the entire extent of SEAD-63 and was assumed to have a vertical thickness of 2 meters. This zone of contamination was modeled to have a uniform concentration of six principal radionuclides throughout the zone of contamination. The principal radionuclides identified at SEAD-63 and utilized in the dose calculation model were lead-210, radium-226, radium-228, thorium-228, uranium-235 and uranium-238. At each sample location, these principal radionuclides were assumed to be in secular equilibrium with their associated radionuclides. Therefore, if no concentration was reported for a given principal radionuclide, the highest reported concentration of an associated radionuclide from that decay chain was used as the beginning concentration of the principal radionuclide for that chain. The same residential scenario was utilized in calculating the dose from the radionuclides detected in the surface sediments. However, the zone of contamination was considered to be only the area of the drainage swale along North South Base Line Road (the full length of the swale and 1 meter to either side) with a vertical contamination extent of 0.3 meters.

Exposure doses from gross beta radiation in groundwater and surface water samples were calculated to provide comparisons to proposed MCL and federal health advisory exposure values. A single pathway model was utilized to calculate the annual dose from the concentrations of beta radiation reported for the groundwater and surface water samples. Water ingestion was the pathway considered, and a total daily water consumption of 2 liters per day was assumed (this value took into consideration the consumption of tap water as well as water present as oxidation in foods). The two radionuclides utilized in the dose calculations were Ra-226 and K-40. Ra-226 is a bone surface seeker (approximately 85 percent of Ra-226 is present in the skeleton) and, therefore, the dose calculations involving Ra-226 only considered dose to bone. Potassium is maintained throughout the body at a relatively constant level. Therefore, the dose due to K-40 was calculated for a whole body exposure.

A description of the dose models utilized, as well as model constraints and model input data, is presented in appendix H.

4.3.2 Soil

The analytical results for the 12 subsurface soil samples collected as part of the investigation of SEAD-63 are presented in Table 4.3-1. The following sections describe the nature and extent of contamination in SEAD-63 soils.

4.3.2.1 Volatile Organic Compounds

Five volatile organic compounds were detected in two of the 12 soil samples collected. All were found at low concentrations and were below their respective TAGM values. The volatiles detected were acetone, 2-butanone, benzene, toluene, and xylenes (total). All five volatiles were detected in the sample from TP63-8 and only the latter three were detected in the sample from TP63-9. Clearly, TP63-8 and TP63-9 are most noticeably impacted by volatile organic compounds.

4.3.2.2 Semivolatile Organic Compounds

A total of 12 semivolatile organic compounds were found at varying concentrations mostly in two soil samples (TP63-8 and TP63-9) collected at SEAD-63. The compound dibenz(a,h)anthracene was found at a concentration above the TAGM value of 14 μg/kg, but only in one sample, TP63-9. TP63-9 contained all but one semivolatile organic compound found at the site, while TP63-8 contained five. All other test pits contained only the compound bis(2)-ethylhexyl)phthalate, with the exception of TP63-1, which instead contained di-n-butylphthalate. Again, TP63-8 and TP63-9 are the most noticeably impacted by semivolatile organic compounds.

4.3.2.3 Pesticides and PCBs

Three pesticide compounds were detected in three of the 12 soil samples collected. The pesticides detected were 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT. All three of these pesticides were detected in TP63-4 at concentrations of 4.4 μg/kg, 2 μg/kg, and 3.3 μg/kg, respectively. Only 4,4'-DDE was detected in samples TP63-11 and TP63-12, both concentrations of which were below that found in the sample from TP63-4. No PCBs were detected in any of the samples.

TABLE 4.3-1

SENECA ARMY DEPOT ACTIVITY
SEAD-63 RI/FS PROJECT SCOPING PLAN
ESI SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-63 3 06/25/94 TP63-1 225583 45058	SOIL SEAD-63 2 06/26/94 TP63-2 225561 45062	SOIL SEAD-63 6.5 06/26/94 TP63-3 225562 45062	SOIL SEAD-63 3 06/26/94 TP63-4 225563 45062	SOIL SEAD-63 2 06/26/94 TP63-5 225564 45062	SOIL SEAD-63 3 06/27/94 TP63-6 225565 45062
VOLATILE ORGANICS											
Acetone	ug/Kg	160	8%	200	0	13 U	12 U	25 U	11 U	12 U	11 U
2-Butanone	ug/Kg	46	8%	300	0	13 U	12 U	13 U	11 U	12 U	11 U
Benzene	ug/Kg	4	17%	60	0	13 U	12 U	13 U	11 U	12 U	11 U
Toluene	ug/Kg	23	17%	1500	0	13 U	12 U	13 U	11 U	12 U	11 U
Xylene (total)	ug/Kg	14	17%	1200	0	13 U	12 U	13 U	11 U	12 U	11 U
SEMIVOLATILE ORGANICS											
Phenanthrene	ug/Kg	31	8%	50000*	0	420 U	390 U	1800 U	1000 U	410 U	380 U
Di-n-butylphthalate	ug/Kg	87	8%	8100	0	87 J	390 U	1800 U	1000 U	410 U	380 U
Fluoranthene	ug/Kg	63	17%	50000*	0	420 U	390 U	1800 U	1000 U	410 U	380 U
Benzo(a)anthracene	ug/Kg	30	8%	224	0	420 U	390 U	1800 U	1000 U	410 U	380 U
Chrysene	ug/Kg	31	17%	400	0	420 U	390 U	1800 U	1000 U	410 U	380 U
bis(2-Ethylhexyl)phthalate	ug/Kg	1800	92%	50000*	0	420 U	290 J	230 J	590 J	1800 J	200 J
Benzo(b)fluoranthene	ug/Kg	38	17%	1100	0	420 U	390 U	1800 U	1000 U	410 U	380 U
Benzo(k)fluoranthene	ug/Kg	43	17%	1100	0	420 U	390 U	1800 U	1000 U	410 U	380 U
Benzo(a)pyrene	ug/Kg	45	17%	61	0	420 U	390 U	1800 U	1000 U	410 U	380 U
Indeno(1,2,3-cd)pyrene	ug/Kg	37	8%	3200	0	420 U	390 U	1800 U	1000 U	410 U	380 U
Dibenz(a,h)anthracene	ug/Kg	28	8%	14	1	420 U	390 U	1800 U	1000 U	410 U	380 U
Benzo(g,h,i)perylene	ug/Kg	31	8%	50000*	0	420 U	390 U	1800 U	1000 U	410 U	380 U
PESTICIDES/PCB											
4,4'-DDE	ug/Kg	4.4	25%	2100	0	4.2 UJ	3.9 UJ	4.5 UJ	4.4 J	4.1 UJ	3.8 UJ
4,4'-DDD	ug/Kg	2	8%	2900	0	4.2 UJ	3.9 UJ	4.5 UJ	2 J	4.1 UJ	3.8 UJ
4,4'-DDT	ug/Kg	3.3	8%	2100	0	4.2 UJ	3.9 UJ	4.5 UJ	3.3 J	4.1 UJ	3.8 UJ
METALS											
Aluminum	mg/Kg	18000	100%	14593	7	16800	14800 J	16500 J	12300 J	15300 J	13200 J
Antimony	mg/Kg	0.29	17%	3.59	0	0.25 UJ	0.26 UJ	0.32 UJ	0.18 UJ	0.27 UJ	0.22 UJ
Arsenic	mg/Kg	6.1	100%	7.5	0	6.1 J	5.4	4.5	4	4.9	4.5
Barium	mg/Kg	115	100%	300	0	88.9	65.3 J	115 J	63.2 J	75.4 J	75.9 J
Beryllium	mg/Kg	0.8	100%	.73	3	0.71 J	0.74 J	0.8 J	0.53 J	0.69 J	0.64 J
Cadmium	mg/Kg	24	100%	1	4	0.47 J	0.26 J	3.6	24	0.52 J	0.55 J
Calcium	mg/Kg	41500	100%	101904	0	6810	3830 J	15500 J	28400 J	40500 J	41500 J
Chromium	mg/Kg	43.5	100%	22	9	26.8	22.9 J	31.8 J	43.5 J	23.2 J	22.1 J
Cobalt	mg/Kg	14.4	100%	30	0	14.3	11.6	13.7	13.5	12.4	13.7
Copper	mg/Kg	49.6	100%	25	11	32	27.1 J	33.5 J	49.6 J	35.1 J	37.4 J
Iron	mg/Kg	34300	100%	26627	9	34300	30100 J	31200 J	28000 J	28100 J	28000 J
Lead	mg/Kg	38.3	100%	21.9	7	27.4	18.5	24.9	38.3	22.3	20.7
Magnesium	mg/Kg	9400	100%	12222	0	6010	4530 J	6790 J	9400 J	8310 J	9180 J
Manganese	mg/Kg	728	100%	669	1	484	278 J	728 J	396 J	403 J	438 J
Mercury	mg/Kg	0.49	92%	0.1	1	0.06 J R	0.05 J	0.49	0.03 J	0.06 J	0.03 J
Nickel	mg/Kg	48.4	100%	34	8	41.8	31.5 J	38.7 J	44.2 J	42 J	45.7 J
Potassium	mg/Kg	2160	100%	1762	4	2160 J	1180 J	1850 J	1250 J	2150 J	1670 J
Selenium	mg/Kg	1.6	100%	2	0	0.89 J	1.5	1.6	0.91	1.5	0.95
Sodium	mg/Kg	138	83%	104	5	115 J	50.6 J	88.4 J	124 J	138 J	132 J
Thallium	mg/Kg	0.51	42%	0.28	5	0.51 J	0.38 U	0.47 U	0.45 J	0.3 J	0.36 J
Vanadium	mg/Kg	28.4	100%	150	0	28.2	25.2 J	27.2 J	16.8 J	22.4 J	19.3 J
Zinc	mg/Kg	131	100%	83	6	91.3 J	74.8 J	108 J	100 J	88.9 J	82.4 J
OTHER ANALYSES											
Total Solids	%W/W					79.4	83.7	73.4	92.4	81.2	87.4

TABLE 4.3-1

SENECA ARMY DEPOT ACTIVITY
SEAD-63 RI/FS PROJECT SCOPING PLAN
ESI SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-63 1.5 06/27/94 TP63-7 225566 45062	SOIL SEAD-63 1.5 06/27/94 TP63-8 225596 45062	SOIL SEAD-63 2.5 06/27/94 TP63-9 225597 45062	SOIL SEAD-63 1.5 06/28/94 TP63-10 225803 45062	SOIL SEAD-63 3 06/28/94 TP63-11 225804 45062	SOIL SEAD-63 5 06/28/94 TP63-12 225805 45062
VOLATILE ORGANICS											
Acetone	ug/Kg	160	8%	200	0	12 U	12 U	160	12 U	11 U	12 U
2-Butanone	ug/Kg	46	8%	300	0	12 U	12 U	46	12 U	11 U	12 U
Benzene	ug/Kg	4	17%	60	0	12 U	2 J	4 J	12 U	11 U	12 U
Toluene	ug/Kg	23	17%	1500	0	12 U	6 J	23	12 U	11 U	12 U
Xylene (total)	ug/Kg	14	17%	1200	0	12 U	14	11 J	12 U	11 U	12 U
SEMIVOLATILE ORGANICS											
Phenanthrene	ug/Kg	31	8%	50000*	0	380 U	390 U	31 J	410 U	370 U	390 U
Di-n-butylphthalate	ug/Kg	87	8%	8100	0	380 U	390 U	400 U	410 U	370 U	390 U
Fluoranthene	ug/Kg	63	17%	50000*	0	380 U	38 J	63 J	410 U	370 U	390 U
Benzo(a)anthracene	ug/Kg	30	8%	224	0	380 U	390 U	30 J	410 U	370 U	390 U
Chrysene	ug/Kg	31	17%	400	0	380 U	23 J	31 J	410 U	370 U	390 U
bis(2-Ethylhexyl)phthalate	ug/Kg	1800	92%	50000*	0	80 J	71 J	41 J	67 J	240 J	360 J
Benzo(b)fluoranthene	ug/Kg	38	17%	1100	0	380 U	21 J	38 J	410 U	370 U	390 U
Benzo(k)fluoranthene	ug/Kg	43	17%	1100	0	380 U	21 J	43 J	410 U	370 U	390 U
Benzo(a)pyrene	ug/Kg	45	17%	61	0	380 U	24 J	45 J	410 U	370 U	390 U
Indeno(1,2,3-cd)pyrene	ug/Kg	37	8%	3200	0	380 U	390 U	37 J	410 U	370 U	390 U
Dibenz(a,h)anthracene	ug/Kg	28	8%	14	1	380 U	390 U	28 J	410 U	370 U	390 U
Benzo(g,h,i)perylene	ug/Kg	31	8%	50000*	0	380 U	390 U	31 J	410 U	370 U	390 U
PESTICIDES/PCB											
4,4'-DDE	ug/Kg	4.4	25%	2100	0	3.8 UJ	3.9 UJ	4 UJ	4.1 U	1.8 J	2.5 J
4,4'-DDD	ug/Kg	2	8%	2900	0	3.8 UJ	3.9 UJ	4 UJ	4.1 U	3.7 U	3.9 U
4,4'-DDT	ug/Kg	3.3	8%	2100	0	3.8 UJ	3.9 UJ	4 UJ	4.1 U	3.7 U	3.9 U
METALS											
Aluminum	mg/Kg	18000	100%	14593	7	11700 J	16500 J	13800 J	18000 J	13200 J	15200 J
Antimony	mg/Kg	0.29	17%	3.59	0	0.23 J	0.3 UJ	0.3 UJ	0.31 UJ	0.23 UJ	0.29 J
Arsenic	mg/Kg	6.1	100%	7.5	0	4.2	5.2	3.6	5.3	4.3	4.6
Barium	mg/Kg	115	100%	300	0	45.8 J	59.5 J	87 J	72.4 J	60 J	71.1 J
Beryllium	mg/Kg	0.8	100%	.73	3	0.54 J	0.64 J	0.66 J	0.71 J	0.62 J	0.75 J
Cadmium	mg/Kg	24	100%	1	4	0.56 J	0.24 J	0.35 J	0.39 J	4.2	4.9
Calcium	mg/Kg	41500	100%	101904	0	39800 J	5440 J	7410 J	14200 J	27500 J	26000 J
Chromium	mg/Kg	43.5	100%	22	9	19.1 J	21.5 J	19 J	24.6 J	25.4 J	40.3 J
Cobalt	mg/Kg	14.4	100%	30	0	10.7	9.7 J	10 J	12.7	12.4	14.4
Copper	mg/Kg	49.6	100%	25	11	35.3 J	20.2 J	28.3 J	27.3 J	32.9 J	39.1 J
Iron	mg/Kg	34300	100%	26627	9	25000 J	25000 J	22700 J	28500 J	28100 J	30600 J
Lead	mg/Kg	38.3	100%	21.9	7	15.6	15.5	22.3	17.1	24.8	33.4
Magnesium	mg/Kg	9400	100%	12222	0	8160 J	4400 J	4450 J	5520 J	7970 J	8020 J
Manganese	mg/Kg	728	100%	669	1	359 J	350 J	497 J	452 J	458 J	449 J
Mercury	mg/Kg	0.49	92%	0.1	1	0.04 J	0.06 J	0.07 J	0.05 J	0.04 J	0.05 J
Nickel	mg/Kg	48.4	100%	34	8	39.1 J	23.9 J	26.8 J	33.5 J	41.3 J	48.4 J
Potassium	mg/Kg	2160	100%	1762	4	1310 J	1530 J	1670 J	2000 J	1460 J	1700 J
Selenium	mg/Kg	1.6	100%	2	0	0.74	1.3	1.3	1.1 J	1.1	1.1
Sodium	mg/Kg	138	83%	104	5	124 J	50.6 J	45.4 U	46.7 U	84.8 J	58.8 J
Thallium	mg/Kg	0.51	42%	0.28	5	0.29 J	0.44 U	0.44 U	0.45 U	0.33 U	0.32 U
Vanadium	mg/Kg	28.4	100%	150	0	16.8 J	27.6 J	23.1 J	28.4 J	18.7 J	21.1 J
Zinc	mg/Kg	131	100%	83	6	95.7 J	68.6 J	79 J	63.4 J	76.3 J	131 J
OTHER ANALYSES											
Total Solids	%W/W					85.8	85.2	81.9	79.6	90.2	83.7

NOTES:
a) The TAGM value for PCBs is 1000ug/Kg for surface soils and 10,000 ug/Kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) 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.

4.3.2.4 Metals

A variety of samples were found to contain metals at concentrations that exceeded the associated TAGM or site background values. Of the 22 metals reported, 13 were found in one or more samples at concentrations above the TAGM values. Of the metals that exceeded the TAGM, most were within one to two times the TAGM value.

However, the concentration of cadmium in sample TP63-4 (24 mg/kg) is noteworthy because it is 24 times the TAGM value of 1 mg/kg. Other elevated concentrations of cadmium that exceeded the TAGM value were found at TP63-3, TP63-11 and TP63-12, however, these were three to five times the TAGM.

Also, the concentration of mercury in sample TP63-3 (0.49 mg/kg) is approximately five times the TAGM of 0.1 mg/kg. The concentrations of cadmium in soil are shown in Figure 4.3-1.

4.3.2.5 Radioactivity

The gamma spectral analyses of the soil samples from SEAD-63 (Table 4.3-2) showed various concentrations of principal and associated radionuclides from the uranium, thorium, and actinium decay series. The principal radionuclides radium-226, lead-210, and uranium-235 were detected in the gamma spectral analyses. The presence of the principal radionuclides radium-228, thorium-228, and uranium-238 was inferred by the detection of one or more of their associated radionuclides. The doses calculated from the radionuclide concentrations in each of the 12 test pit locations exceeded the New York state TAGM value of 87 mrem/year. The dose from the six principal radionuclides ranged from 114 mrem/year at the TP63-3 location to 160 mrem/year at the TP63-9 location. In all instances, the concentrations of Ra-226 in the soils contributed between 91 and 94 percent of the total annual dose. Although the presence of Ra-226 was the primary contributor to the elevated annual doses calculated, the soil concentrations of Ra-226 (1.4 to 2 picoCuries (pCi)/g), as well as the soil concentrations of Pb-210 (2 to 2.7 pCi/g), Th-228 (1.27 to 2 pCi/g), U-235 (.09 to .48 pCi/g), and U-238 (0.66 to 1.5 pCi/g) were roughly equivalent to the average concentrations of these radionuclides (0.9 pCi/g of Pb-210 and 0.7 pCi/g of Ra-226, Th-228, U-235, and U-238) in the soils of the continental United States (excluding Alaska). Gross alpha and beta radiation also were detected in all 12 test pit samples. The concentrations of both alpha and beta radiation in these samples showed no appreciable variance in the reported values. The concentrations of gross alpha and gross beta radiation in all media are shown in Figure 4.3-2.

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- APPROXIMATE EXTENT OF OPERATIONS PAD (FROM SEDA SITE MAPS)

- 4.9 — CADMIUM (mg/Kg)
- MONITORING WELL
- TEST PIT
- SURFACE WATER/SEDIMENT
- MW63-1 / 634.56 — MONITORING WELL WITH WATER TABLE ELEVATION
- 634 — ESTIMATED GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/06/94

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 4.3-1
SEAD-63
CADMIUM IN SUBSURFACE SOILS

SCALE	DATE	REV
1" = 100'	APRIL 1996	A

TABLE 4.3-2

SENECA ARMY DEPOT ACTIVITY
SEAD-63 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

					MEDIA	SOIL		SOIL		SOIL		SOIL		SOIL	
					SWMU	SEAD-63		SEAD-63		SEAD-63		SEAD-63		SEAD-63	
					DEPTH (FT)	3		2		6.5		3		2	
					DATE SAMPLED	6/25/94		6/26/94		6/26/94		6/26/94		6/26/94	
					ES ID	TP63-1		TP63-2		TP63-3		TP63-4		TP63-5	
					LAB ID	225672		225673		225674		225675		225676	
RADIONUCLIDE ANALYSIS GAMMA SPECTRAL	FREQUENCY OF DETECTION	TAGM	DOE PROPOSED 10 CFR 834	UMTRCA 40 CFR 192	NUMBER ABOVE CRITERIA	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year
Pb-210	100%	NA	NA	NA	NA	2.2	4.4	2.2	4.4	2	4	2.2	4.4	2.5	5
Ra-226	100%	NA	NA	6.3pCi/g ¦ 16.3pCi/g	0	1.9	141	1.6	119	1.4	104	1.6	119	1.8	133
Ra-228	100%	NA	NA	NA	NA	1.6	2.5	1.4	2.3	1.6	2.5	1.7	2.65	1.39	2.17
Th-228	100%	NA	NA	NA	NA	1.6	0.48	1.7	0.5	1.3	0.39	1.4	0.41	1.5	0.44
U-235	100%	NA	NA	NA	NA	0.14	1.08	0.09	0.7	0.3	2.3	0.23	1.7	0.16	1.2
U-238	100%	NA	NA	NA	NA	0.71	0.9	1.24	1.6	0.66	0.81	1.2	1.5	1.5	1.9
Total Dose		87mrem/yr.	177 mrem/yr	NA	12		150.36		128.5		114		129.66		143.71
GROSS ALPHA	100%	NA	NA	NA	NA	21		20		20		14		15	
GROSS BETA	100%	NA	NA	NA	NA	43		34		28		42		34	

TABLE 4.3-2

SENECA ARMY DEPOT ACTIVITY
SEAD-63 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

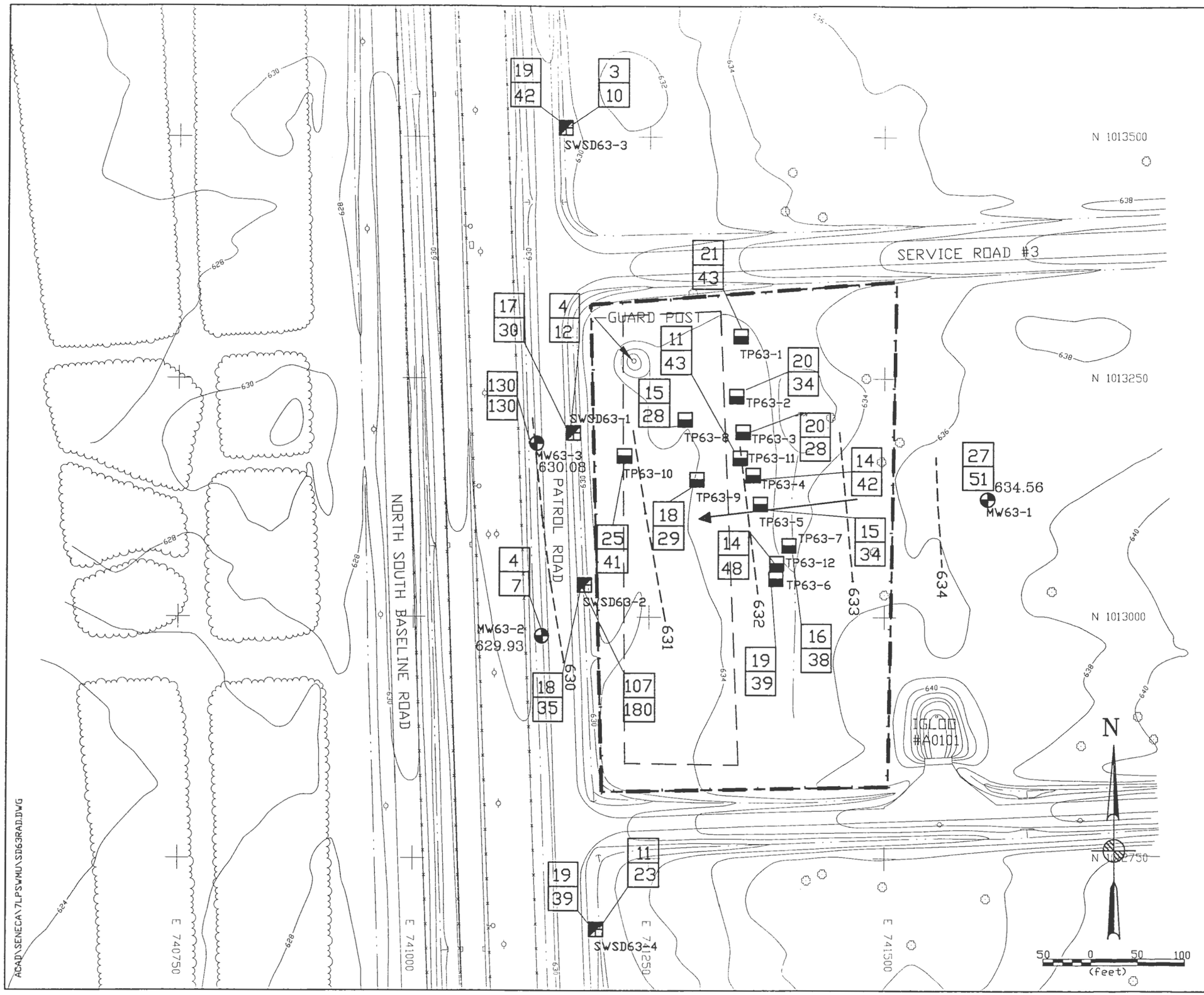
					MEDIA	SOIL		SOIL		SOIL		SOIL		SOIL	
					SWMU	SEAD-63		SEAD-63		SEAD-63		SEAD-63		SEAD-63	
					DEPTH (FT)	3		1.5		1.5		1.5		2.5	
					DATE SAMPLED	6/27/94		6/27/94		6/27/94		6/27/94		6/27/94	
					ES ID	TP63-6		TP63-7		TP63-57		TP63-8		TP63-9	
					LAB ID	225677		225678		225680 TP63-7DUP		225682		225683	
RADIONUCLIDE ANALYSIS GAMMA SPECTRAL	FREQUENCY OF DETECTION	TAGM	DOE PROPOSED 10 CFR 834	UMTRCA 40 CFR 192	NUMBER ABOVE CRITERIA	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year
Pb-210	100%	NA	NA	NA	NA	2	4	2.4	4.8	1.9	3.8	1.9	3.8	2.4	4.8
Ra-226	100%	NA	NA	6.3pCi/g | 16.3pCi/g	0	1.7	126	1.7	127	1.9	140	1.9	140	2	150
Ra-228	100%	NA	NA	NA	NA	1.8	2.8	2.3	3.6	1.6	2.5	1.6	2.5	1.33	2.06
Th-228	100%	NA	NA	NA	NA	1.4	0.5	1.7	0.5	1.4	0.41	1.5	0.45	1.35	0.4
U-235	100%	NA	NA	NA	NA	0.15	1.6	0.24	1.8	0.37	2.58	0.48	3.6	0.11	0.81
U-238	100%	NA	NA	NA	NA	0.7	0.88	1.37	1.7	0.88	1.1	0.74	0.92	1.32	1.6
Total Dose		87mrem/yr.	177 mrem/yr	NA	12		135.78		139.4		150.39		151.27		159.67
GROSS ALPHA	100%	NA	NA	NA	NA	19		16		20		15		18	
GROSS BETA	100%	NA	NA	NA	NA	39		38		31		28		29	

TABLE 4.3-2

SENECA ARMY DEPOT ACTIVITY
SEAD-63 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

					MEDIA	SOIL		SOIL		SOIL		SOIL	
					SWMU	SEAD-63		SEAD-63		SEAD-63		SEAD-63	
					DEPTH (FT)	1.5		3		3		5	
					DATE SAMPLED	6/28/94		6/28/94		6/28/94		6/28/94	
					ES ID	TP63-10		TP63-11		TP63-511		TP63-12	
					LAB ID	225821		225822		225825		225824	
										TP63-11DUP			
RADIONUCLIDE ANALYSIS	FREQUENCY OF		DOE PROPOSED	UMTRCA	NUMBER ABOVE	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year
GAMMA SPECTRAL	DETECTION	TAGM	10 CFR 834	40 CFR 192	CRITERIA								
Pb-210	100%	NA	NA	NA	NA	2.7	5.4	2.6	5.2	2.6	5.2	2.6	5.2
Ra-226	100%	NA	NA	6.3pCi/g | 16.3pCi/g	0	1.4	104	1.9	140	1.8	134	1.6	120
Ra-228	100%	NA	NA	NA	NA	1.3	2.02	1.5	2.35	1.7	2.65	1.5	2.35
Th-228	100%	NA	NA	NA	NA	1.27	0.38	1.9	0.56	2	0.6	1.6	0.48
U-235	100%	NA	NA	NA	NA	0.13	0.99	0.14	1.05	0.14	1.05	0.2	1.5
U-238	100%	NA	NA	NA	NA	1.36	1.7	0.69	0.87	1.5	1.8	0.73	0.9
Total Dose		87mrem/yr.	177 mrem/yr	NA	12		114.49		150.03		145.3		130.43
GROSS ALPHA	100%	NA	NA	NA	NA	25		11		15		14	
GROSS BETA	100%	NA	NA	NA	NA	41		43		46		48	

NOTES
1. The backround dose calculation was calculated as the mean of the doses calculated from the SEAD-12A background soil samples. The SEAD-12A soil radiochemical results are presented in the Eight Moderately Low Priority AOC ESI report. All dose calculations are based on a residential total dose model using the concentrations of the principal radionuclides detected in the soil samples.
2. NYSDEC TAGM calculated as the background dose + 10mrem/year.
3. The dose limit in 10 CFR 834 (proposed) is 100 mrem/year, excluding annual radiation doses from natural background and medical sources
4. UMTRCA regulation limits the concentration of Ra-226 in soils to (1) background plus 5pCi/g, averaged over the first 15 cm of soil below the surface , and (2) background plus 15pCi/g, averaged over any 15 cm thick layers of soil more than 15 cm below the surface. This regulation is used as an ARAR at some NPL sites.



LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

- APPROXIMATE AOC EXTENT
- APPROXIMATE EXTENT OF OPERATIONS PAD (FROM SEDA SITE MAPS)
- MONITORING WELL
- TEST PIT
- SURFACE WATER/SEDIMENT
- MW63-1 / 634.56 — MONITORING WELL WITH WATER TABLE ELEVATION
- 634 — ESTIMATED GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/06/94

- 12 GROSS ALPHA (pCi/L or pCi/g)
- 37 GROSS BETA (pCi/L or pCi/g)

NOTE: The values of gross alpha and gross beta radiation in surface water from a given sample location appear above the values reported for gross alpha and beta radiation in the sediment sample from the same location.

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA army DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 4.3-2
SEAD-63 GROSS ALPHA AND GROSS BETA RADIATION IN ALL MEDIA

SCALE	DATE	REV
1" = 100'	APRIL 1998	A

4.3.3 Groundwater

Three monitoring wells were sampled as part of the investigation of SEAD-63. The summary of chemical analyses are presented in Table 4.3-3. The following sections describe the nature and extent of groundwater contamination identified at SEAD-63.

4.3.3.1 Volatile Organic Compounds

No volatile organic compounds were detected in the groundwater samples collected at SEAD-63.

4.3.3.2 Semivolatile Organic Compounds

Only one semivolatile organic compound (phenol) was detected in one of the three groundwater samples collected at SEAD-63. The phenol concentration of 2 μg/L is above the TAGM value of 1 μg/L.

4.3.3.3 Pesticides and PCBs

No pesticides or PCBs were detected in the groundwater samples collected at SEAD-63.

4.3.3.4 Metals

Numerous metals were detected in the groundwater samples. Three metals, aluminum, iron and manganese, were found in all three groundwater samples at concentrations above their appropriate state and/or federal criteria value. Aluminum concentrations were between 376 μg/L and 747 μg/L and all concentrations exceeded the maximum Federal Secondary Drinking Water MCL of 200 μg/L. Iron was found in the monitoring wells at concentrations between 603 μg/L and 1260 μg/L, which exceeded the state and federal criteria value of 300 μg/L. Manganese was found in the monitoring wells at concentrations between 408 μg/L and 1070 μg/L, which exceeded both the Federal Secondary Drinking Water MCL of 50 μg/L and the NY AWQS standard of 300 μg/L.

TABLE 4.3-3

SENECA ARMY DEPOT
SEAD-63 ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NUMBER ABOVE CRITERIA	FEDERAL DRINKING WATER MCL (h)	NUMBER ABOVE CRITERIA	WATER SEAD-63 07/11/94 MW63-1 226665 45282	WATER SEAD-63 07/11/94 MW63-2 226666 45282	WATER SEAD-63 07/11/94 MW63-3 226667 45282
SEMIVOLATILE ORGANICS										
Phenol	ug/L	2	33%	1	1	NA	NA	11 UJ	11 U	2 J
METALS										
Aluminum	ug/L	747	100%	NA	NA	50-200 *	3	747	376	743
Barium	ug/L	83	100%	1000	0	2000	0	72.6 J	71.2 J	83 J
Calcium	ug/L	295000	100%	NA	NA	NA	NA	89400	132000	295000
Chromium	ug/L	1.1	100%	50	0	100	0	1.1 J	0.91 J	1.1 J
Cobalt	ug/L	6.2	100%	NA	NA	NA	NA	6.2 J	2.4 J	6.2 J
Copper	ug/L	2.6	100%	200	0	1000 *	0	2.1 J	1.4 J	2.6 J
Iron	ug/L	1260	100%	300	3	300 *	3	1260	603	1020
Lead	ug/L	1.1	33%	25	0	15 **	0	1.1 J	0.89 U	0.9 U
Magnesium	ug/L	54600	100%	NA	NA	NA	NA	16400	20000	54600
Manganese	ug/L	1070	100%	300	3	50 *	3	548	1070	408
Nickel	ug/L	10.6	100%	NA	NA	100	0	9.7 J	4.3 J	10.6 J
Potassium	ug/L	5340	100%	NA	NA	NA	NA	3870 J	2360 J	5340
Sodium	ug/L	146000	100%	20000	0	NA	NA	5710	5860	146000
Vanadium	ug/L	1.5	100%	NA	NA	NA	NA	1.5 J	0.81 J	1.5 J
Zinc	ug/L	11.6	100%	300	0	5000 *	0	7.1 J	6.2 J	11.6 J
OTHER ANALYSES										
pH	Standard Units							7.3	7.3	6.8
Conductivity	umhos/cm							445	650	2100
Temperature	°C							15.2	17.6	18.4
Turbidity	NTU							115	60	68

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)
i) ** the value is an action level, reported in Drinking Water Regulations and Health Advisories, USEPA, May 1994

4.3.3.5 Radioactivity

No radionuclides from the uranium, thorium or actinium series were detected in the six water samples (3 groundwater and 3 rinsate samples) submitted for gamma spectral analysis (Table 4.3-4). Gamma radiation from K-40 was detected only in the three rinsate samples. Gross alpha radiation was detected at various concentrations in all six water samples. Exceedance of the radiological criteria for gross alpha radiation (15 pCi/L) was detected in the groundwater from MW63-1 (27 pCi/L) and MW63-3 (130 pCi/L). Gross beta radiation was also detected in all 6 water samples submitted for radiolochemical analysis. The calculated annual dose from the concentrations of gross beta radiation in the MW63-1 (51 mrem/yr) and MW63-3 (130 mrem/yr) groundwater samples and in the SB64D-3R (25 mrem/yr) rinsate sample exceeded the proposed MCL and the federal health advisory values (each being 4 mrem/year).

4.3.4 Surface Water

Four surface water samples were collected as part of the SEAD-63 investigation. The summary results of the chemical analyses are presented in Table 4.3-5. The following sections describe the nature and extent of surface water contamination identified at SEAD-63.

4.3.4.1 Volatile Organic Compounds

No volatile organic compounds were found in the four surface water samples collected at SEAD-63.

4.3.4.2 Semivolatile Organic Compounds

Eleven semi-volatile organic compounds were found in the three surface water samples collected at SEAD-63. Most of the semivolatiles were found in samples SW63-1 and SW63-3, each of which contained four and seven, respectively, types of compounds, none of which were common to both samples, except for bis(2-ethylhexyl)phthalate. The criteria value for bis(2-theylhexyl)phthalate (0.6 μg/L) was exceeded in samples SW63-3 (68 μg/L) and SW63-1 (1J μg/L). Individual concentrations of other semivolatiles in these two samples were all equal to or less than 1 μg/L. Phenol was detected in SW63-2 and SW63-4 at a concentration of 0.8 μg/L, however this is well below the criteria value. Pentachlorophenol was detected in sample SW63-1 at a concentration of 1J μ/L which exceeded its criteria value of 0.4 μg/L.

TABLE 4.3-4

SENECA ARMY DEPOT ACTIVITY
SEAD-63 ENVIRONMENTAL SITE INSPECTION
GROUNDWATER RADIOACTIVITY ANALYSIS RESULTS

						MEDIA	WATER		WATER		WATER	
						SWMU	SEAD-63		SEAD-12A		SEAD-12A	
						DATE SAMPLED	7/11/94		7/20/94		7/20/94	
						ES ID	MW63-1		MW63-2		MW63-3	
						LAB ID	226695		226696		226697	
RADIONUCLIDE ANALYSIS	REQUENCY OF	NY AWQS	PROPOSED	FEDERAL HEALTH	10 CFR 20 Appendix B	NUMBER ABOVE	pCi/L	mrem/year	pCi/L	mrem/year	pCi/L	mrem/year
GAMMA SPECTRAL	DETECTION	CLASS GA	MCLs	ADVISORY	Table 2	CRITERIA						
K-40	50%	NA	NA	NA	4,000 pCi/L	0	ND		ND		ND	
GROSS ALPHA	100%	15 pCi/L	15 pCi/L	15 pCi/L	NA	1	27		4		130	
GROSS BETA	100%	1000 pCi/L	4 mrem/year	4 mrem/year	NA	0	51	4.0E-02	7	4.1E-05	130	0.2

NOTES:
1. Background gross beta radiation was 39 pCi/L as measured from the background monitoring well MW12A-1. MW12A-1 was investigated as part of the Eight Moderately Low Priority AOC ESI. This radiation was assumed to have originated from the decay of naturally occurring K-40.
2. It was assumed that all beta radiation above 39 pCi/L was due to the decay of Ra-226 daughter products which were considered to be in secular equilibrium with Ra-226.
3. Dose calculations from Ra-226 daughters considered only those concentrations of beta radiation which were above 39pCi/L.
4. For the purpose of dose calculations from Ra-226 daughters, the initial concentration of Ra-226 ingested was equal to one quarter (25%) of the reported gross beta radiation (above 39 pCi/L). This factor takes into account the equilibrium beta radiation from the four Ra-226 daughters which produce 99.96% of the total beta radiation in the Ra-226+D decay series.
5. Dose calculations for concentrations of gross beta radiation under 39 pCi/L were based upon a whole body exposure of K-40. The annual dose calculations assumed a daily groundwater consumption of 2L per day.

TABLE 4.3-5

SENECA ARMY DEPOT ACTIVITY
SEAD-63 EXPANDED SITE INVESTIGATION
ESI SURFACE WATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C (a)	NUMBER ABOVE CRITERIA	WATER SEAD-63 06/14/94 SW63-1 224159 44745	WATER SEAD-63 06/12/94 SW63-2 224080 44745	WATER SEAD-63 06/14/94 SW63-3 224160 44745	WATER SEAD-63 06/13/94 SW63-4 224081 44745
SEMIVOLATILE ORGANICS									
Phenol	ug/L	0.8	50%	5	0	10 U	0.8 J	10 U	0.8 J
Pentachlorophenol	ug/L	1	25%	.4	1	1 J	27 U	25 U	27 U
Fluoranthene	ug/L	0.7	25%	NA	NA	0.7 J	11 U	10 U	11 U
Pyrene	ug/L	0.5	25%	NA	NA	0.5 J	11 U	10 U	11 U
bis(2-Ethylhexyl)phthalate	ug/L	68	50%	.6	2	1 J	11 U	68	11 U
Benzo(b)fluoranthene	ug/L	0.9	25%	NA	NA	10 U	11 U	0.9 J	11 U
Benzo(k)fluoranthene	ug/L	1	25%	NA	NA	10 U	11 U	1 J	11 U
Benzo(a)pyrene	ug/L	1	25%	NA	NA	10 U	11 U	1 J	11 U
Indeno(1,2,3-cd)pyrene	ug/L	0.9	25%	NA	NA	10 U	11 U	0.9 J	11 U
Dibenz(a,h)anthracene	ug/L	0.8	25%	NA	NA	10 U	11 U	0.8 J	11 U
Benzo(g,h,i)perylene	ug/L	0.8	25%	NA	NA	10 U	11 U	0.8 J	11 U
METALS									
Aluminum	ug/L	3630	100%	NA	NA	111 J	3630	235	332
Arsenic	ug/L	3.8	25%	190	0	2 U	3.8 J	2 U	2 U
Barium	ug/L	91.4	100%	NA	NA	27.9 J	91.4 J	26.4 J	43.1 J
Cadmium	ug/L	0.78	25%	2	0	0.2 U	0.78 J	0.2 U	0.2 U
Calcium	ug/L	220000	100%	NA	NA	89100	220000	75300	122000
Chromium	ug/L	5.6	100%	390	0	0.88 J	5.6 J	1 J	0.68 J
Cobalt	ug/L	7.2	75%	NA	NA	1.2 J	7.2 J	0.5 U	0.99 J
Copper	ug/L	7.9	100%	23	0	4.8 J	7.9 J	5.8 J	2.8 J
Iron	ug/L	9050	100%	300	2	148	9050	282	856
Lead	ug/L	20	25%	8.6	1	0.9 U	20	0.9 U	0.9 U
Magnesium	ug/L	33700	100%	NA	NA	12900	33700	9640	18700
Manganese	ug/L	2300	100%	NA	NA	101	2300	7.3 J	1200
Mercury	ug/L	0.1	75%	NA	NA	0.03 U	0.04 J	0.1 J	0.03 J
Nickel	ug/L	18.8	100%	172	0	2.5 J	18.8 J	2.3 J	2 J
Potassium	ug/L	7910	100%	NA	NA	3420 J	7910	4200 J	1660 J
Silver	ug/L	0.89	50%	.1	2	0.89 J	0.5 U	0.53 J	0.5 U
Sodium	ug/L	59300	100%	NA	NA	59300	30700	55100	25400
Thallium	ug/L	1.9	25%	8	0	1.9 J	1.9 U	1.9 U	1.9 U
Vanadium	ug/L	8.9	100%	14	0	1.6 J	8.9 J	1.4 J	1.1 J
Zinc	ug/L	99	100%	160	0	2.5 J	99	2.2 J	12.2 J
OTHER ANALYSES									
pH	Standard Units				0	7.2	7.4	8	7.2
Conductivity	umhos/cm					800	100	700	650
Temperature	°C					27.5	26	28	19
Turbidity	NTU					6	212	8.8	33

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class C surface water.
b) Hardness dependent values assume a hardness of 217 mg/L.
c) 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) Acute and chronic pentachlorophenol criteria are pH-dependent. The calculated criteria for these samples were within this range.

4.3.4.3 Pesticides and PCBs

No pesticide or PCB compounds were found in the four surface water samples collected at SEAD-63.

4.3.4.4 Metals

Numerous metals were detected in the surface water samples collected at the site. One inorganic element (iron) was found at concentrations above its associated criteria value in two samples (SW63-2 and SW63-4). The two exceedances occur in the two most turbid surface water samples. Silver was found at concentrations that exceeded its criteria value of 0.1 μg/L in surface water samples SW63-1 (0.89J μg/L) and SW63-3 (0.53J μg/L). Lead was detected at a concentration of 20 μg/L in sample SW63-2. The criteria value for lead in NYS Class C surface waters is 8.6 μg/L.

4.3.4.5 Radioactivity

No gamma emitting transuranic radionuclides were detected in the four surface water samples submitted for radiological analysis (Table 4.3-6). Gamma radiation from K-40 was detected in all of the surface water samples in concentrations ranging from 21 pCi/L (SW63-4) to 210 pCi/L (SW63-2). K-40 is a naturally occurring radionuclide and comprises 0.012 percent of all naturally occurring potassium. Gross alpha and gross beta radiation also were detected in all four surface water samples. An exceedance of both alpha and beta radiation was detected only in SW63-2 (107 pCi/L and 188 mrem/yr, respectively). The gross beta radiation in SW63-4 (6.8 m rem/yr) also exceeded the proposed MCL and the Federal Health advisory values.

4.3.5 Sediment

A total of four sediment samples were collected as part of the investigation at SEAD-63. The summary chemical analyses are presented in Table 4.3-7. The sediment samples were collected in the same locations as the surface water samples discussed above. The following sections describe the nature and extent of sediment contamination identified at SEAD-63.

TABLE 4.3-6

SENECA ARMY DEPOT ACTIVITY
SEAD-63 RI/FS PROJECT SCOPING PLAN
ESI SURFACE WATER RADIOACTIVITY ANALYSIS RESULTS

			MEDIA	WATER		WATER		WATER		WATER	
			SWMU	SEAD-63		SEAD-63		SEAD-63		SEAD-63	
			DATE SAMPLED	6/14/94		6/12/94		6/14/94		6/13/94	
			ES ID	SW63-1		SW63-2		SW63-3		SW63-4	
			LAB ID	224321		224314		224322		224315	
RADIONUCLIDE ANALYSIS	FREQUENCY OF DETECTION		NUMBER ABOVE CRITERIA	pCi/L	mrem/year	pCi/L	mrem/year	pCi/L	mrem/year	pCi/L	mrem/year
GAMMA SPECTRAL											
K-40	100%	No criteria governing the concentrations of radionuclides could be determined for	NA	50		210		72		21	
GROSS ALPHA	100%	New York state class D surface waters.	NA	4		107		3		11	
GROSS BETA	100%		NA	12	3.6	180	375.3	10	3.0	23	6.8

NOTES:

1. Background gross beta radiation was 30 pCi/L as measured from the background monitoring well MW12A-1. This radiation was assumed to have originated from the decay of naturally occurring K-40.
2. It was assumed that all beta radiation above 30 pCi/L was due to the decay of Ra-226 daughter products which were considered to be in secular equilibrium with Ra-226.
3. Dose calculations from Ra-226 daughters considered only those concentrations of beta radiation which were above 30pCi/L
4. For the purpose of dose calculations from Ra-226 daughters, the initial concentration of Ra-226 ingested was equal to one quarter (25%) of the reported gross beta radiation (above 30 pCi/L). This factor takes into account the equilibrium beta radiation from the four Ra-226 daughters which produce 99.96% of the total beta radiation in the Ra-226+D decay series.
5. Dose calculations for concentrations of gross beta radiation under 30 pCi/L were based upon a whole body exposure of K-40. The annual dose calculations assumed a daily surface water consumption of 2L per day.

TABLE 4.3-7

SENECA ARMY DEPOT ACTIVITY
SEAD-63 EXPANDED SITE INSPECTION
ESI SEDIMENT ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT CHRONIC CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a)	LOWEST EFFECT LEVEL (a)(b)	SEVERE EFFECT LEVEL (a)(b)	NUMBER ABOVE CRITERIA	SOIL SEAD-63 0-0.2 06/13/94 SD63-1 224082 44748	SOIL SEAD-63 0-0.2 06/12/94 SD63-2 224083 44748	SOIL SEAD-63 0-0.2 06/13/94 SD63-3 224084 44748	SOIL SEAD-63 0-0.2 06/13/94 SD63-4 224085 44748
VOLATILE ORGANICS													
Acetone	ug/Kg	150	25%	NA	NA	NA			NA	15 U	23 UJ	12 UJ	150 J
2-Butanone	ug/Kg	35	50%	NA	NA	NA			NA	15 U	8 J	12 UJ	35 J
Toluene	ug/Kg	14	25%	NA	NA	NA			NA	15 U	18 UJ	12 UJ	14 J
SEMIVOLATILE ORGANICS													
Phenanthrene	ug/Kg	270	100%	1200	NA	NA			0	49 J	120 J	50 J	270 J
Anthracene	ug/Kg	46	25%	NA	13	NA			1	480 U	700 UJ	390 U	46 J
Carbazole	ug/Kg	34	25%	NA	NA	NA			0	480 U	700 UJ	390 U	34 J
Fluoranthene	ug/Kg	720	100%	10200	NA	NA			0	110 J	240 J	100 J	720 J
Pyrene	ug/Kg	600	100%	NA	NA	NA			NA	100 J	220 J	110 J	600 J
Benzo(a)anthracene	ug/Kg	350	100%	NA	13	NA			4	69 J	140 J	70 J	350 J
Chrysene	ug/Kg	540	100%	NA	13	NA			4	110 J	200 J	110 J	540 J
bis(2-Ethylhexyl)phthalate	ug/Kg	25	25%	1995	NA	NA			0	25 J	700 UJ	390 U	720 UJ
Di-n-octylphthalate	ug/Kg	19	25%	NA	NA	NA			NA	480 U	700 UJ	19 J	720 UJ
Benzo(b)fluoranthene	ug/Kg	860	100%	NA	13	NA			4	130 J	380 J	110 J	860 J
Benzo(k)fluoranthene	ug/Kg	470	100%	NA	13	NA			4	89 J	180 J	66 J	470 J
Benzo(a)pyrene	ug/Kg	540	100%	NA	13	NA			4	73 J	170 J	79 J	540 J
Indeno(1,2,3-cd)pyrene	ug/Kg	320	100%	NA	13	NA			4	46 J	83 J	42 J	320 J
Dibenz(a,h)anthracene	ug/Kg	140	25%	NA	NA	NA			NA	480 U	700 UJ	390 U	140 J
Benzo(g,h,i)perylene	ug/Kg	230	100%	NA	NA	NA			NA	38 J	71 J	37 J	230 J
PESTICIDES/PCB													
Endosulfan I	ug/Kg	7.5	50%	0.3	NA	NA			2	2.5 UJ	7.5 J	4.6 J	3.7 UJ
4,4'-DDE	ug/Kg	9.2	50%	NA	0.1	10			2	4.9 UJ	6 J	3.9 UJ	9.2 J
4,4'-DDD	ug/Kg	3.9	25%	NA	0.1	10			1	4.9 UJ	7 UJ	3.9 UJ	3.9 J
Endosulfan sulfate	ug/Kg	5.2	25%	NA	NA	NA			NA	4.9 UJ	7 UJ	3.9 UJ	5.2 J
4,4'-DDT	ug/Kg	4.3	25%	10	.1	10			1	4.9 UJ	7 UJ	3.9 UJ	4.3 J
Endrin ketone	ug/Kg	9.4	25%	NA	NA	NA			NA	4.9 UJ	7 UJ	3.9 UJ	9.4 J
METALS													
Aluminum	mg/Kg	11700	100%				NA	NA	NA	7590	11700 J	11100	11000 J
Arsenic	mg/Kg	4.3	100%				6	33	0	4.1	3.7 J	4.3	2.4 J
Barium	mg/Kg	90.6	100%				NA	NA	NA	36.3 J	63.5 J	37.2	90.6 J
Beryllium	mg/Kg	0.59	100%				NA	NA	NA	0.44 J	0.59 J	0.52 J	0.54 J
Cadmium	mg/Kg	0.83	100%				.6	9	2	0.6 J	0.83 J	0.38 J	0.68 J
Calcium	mg/Kg	101000	100%				NA	NA	NA	101000	89800 J	31500	34100 J
Chromium	mg/Kg	20.3	100%				26	110	0	13.8 J	19.1 J	20.3 J	18.2 J
Cobalt	mg/Kg	11.9	100%				NA	NA	NA	10.6 J	11.9 J	11.2	10.5 J
Copper	mg/Kg	35.6	100%				16	110	4	25.2	35.6 J	32.7	30.7 J
Iron	mg/Kg	26500	100%				2%	4%	1	17100	19200 J	26500	18700 J
Magnesium	mg/Kg	15000	100%				NA	NA	NA	15000	13900 J	6210	8590 J
Manganese	mg/Kg	801	100%				460	1100	2	449	653 J	260	801 J
Mercury	mg/Kg	0.12	100%				.15	1.3	0	0.04 J	0.06 J	0.03 J	0.12 J
Nickel	mg/Kg	44.2	100%				16	50	4	29.8	35 J	44.2	32.8 J
Potassium	mg/Kg	2570	100%				NA	NA	NA	1370 J	2570 J	1340 J	1670 J
Selenium	mg/Kg	1.1	50%				NA	NA	NA	0.62 U	0.68 UJ	1.1	0.97 J
Sodium	mg/Kg	197	100%				NA	NA	NA	121 J	194 J	197 J	119 J
Vanadium	mg/Kg	27.5	100%				NA	NA	NA	19.9	27.5 J	19.1	21.2 J
Zinc	mg/Kg	325	100%				120	270	2	105	133 J	68	325 J
OTHER ANALYSES													
Total Solids	%W/W									68.1	46.7	85.1	46.2

NOTES:
a) NYSDEC Sediment Criteria - 1994
b) A sediment is considered contaminated if either criteria is exceeded
c) 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) 2%=20,000 mg/Kg; 4%=40,000 mg/Kg

4.3.5.1 Volatile Organic Compounds

Three volatile organic compounds were detected in two of the sediment samples, all at relatively low concentrations. Acetone, 2-Butanone and toluene were detected at concentrations of 150 μg/kg, 35 μg/kg and 14 μg/kg in sample SD63-3. The compound 2-butanone was found in SD63-2 at a concentration of 8 μg/kg.

4.3.5.2 Semivolatile Organic Compounds

A total of 15 SVOCs were identified in the four sediment samples collected at SEAD-63. The SVOCs detected were all PAHs, some of which were found at concentrations above their respective NYSDEC criteria values. Generally, the types and concentrations of PAHs, as well as the number of NYSDEC criteria exceedances (seven) were the same in all of the samples. The maximum concentrations of the PAHs were all found in sample SD63-4, the highest individual concentration of which is 860 μg/kg for benzo(b)fluoranthene.

4.3.5.3 Pesticides and PCBs

Six pesticide compounds were detected in three of the sediment samples. Four of the six compounds exceeded their respective NYSDEC criteria values. The four pesticides that exceeded the criteria values were endosulfan, 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT and were found at maximum concentrations of 7.5 μg/kg, 9.2 μg/kg, 3.9 μg/kg and 4.3 μg/kg, respectively.

4.3.5.4 Metals

A number of metals were detected in the four sediment samples collected at SEAD-63. Of these, cadmium, copper, iron, manganese, mercury, nickel, and zinc were at concentrations in excess of the NYSDEC sediment criteria. All four samples contained metals above the criteria values. Mercury (at 0.12 mg/kg) and iron (at 26,500 mg/kg) slightly exceeded their respective criteria values of 0.8 mg/kg, 0.11 mg/kg, and 24,000 mg/kg in two separate samples. The compounds cadmium, copper, manganese, nickel and zinc were found to exceed their respective criteria values in at least two of the samples; maximum concentrations of these compounds were 35.6 mg/kg, 801 mg/kg, 44.2 mg/kg, and 325 mg/kg.

4.3.5.5 Radioactivity

The gamma spectral analyses of the sediment samples from SEAD-63 (Table 4.3-8) showed various concentrations of principal and daughter radionuclides from six transuranic decay series: Lead 210, Radium 226, Radium 228, Thorium 228, Uranium 238 and Uranium 235. In the absence of specific sediment criteria, dose calculations were performed using the concentrations of these radionuclides in a residential exposure scenario. All calculated annual doses from the transuranic radionuclides in the sediment samples were below the proposed 10 CFR 834 value (100 mrem/year above background). Gross alpha and gross beta radiation also were detected in all four surface sediment samples. The concentrations of both alpha and beta radiation in these samples showed no appreciable variance in the reported values.

4.3.6 Tentatively Identified Compounds

The total concentrations of semivolatile organic TICs were below 50 mg/kg in all of the samples analyzed. The total concentrations of volatile organic TICs were below 10 mg/kg in all of the samples analyzed.

4.4 SEAD-64A

4.4.1 Introduction

A total of 12 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.

4.4.2 Soil

The analytical results for the 12 subsurface soil samples collected as part of the investigation of SEAD-64A are presented in Table 4.4-1. The following sections describe the nature and extent of contamination in SEAD-64A soils. The sample locations are shown in Figure 2.6-2.

4.4.2.1 Volatile Organic Compounds

Three volatile organic compounds were detected in two of the 12 soil samples collected.

TABLE 4.3-8

SENECA ARMY DEPOT ACTIVITY
SEAD-63 ENVIRONMENTAL SITE INSPECTION
SEDIMENT RADIOACTIVITY ANALYSIS RESULTS

				MEDIA	SOIL		SOIL		SOIL		SOIL	
				SWMU	SEAD-63		SEAD-63		SEAD-63		SEAD-63	
				DEPTH (FT)	0-0.2		0-0.2		0-0.2		0-0.2	
				DATE SAMPLED	6/13/94		6/12/94		6/13/94		6/13/94	
				ES ID	SD63-1		SD63-2		SD63-3		SD63-4	
				LAB ID	224313		224309		224310		224311	
RADIONUCLIDE ANALYSIS GAMMA SPECTRAL	FREQUENCY OF DETECTION	DOE PROPOSED 10 CFR 834	UMTRCA 40 CFR 192	NUMBER ABOVE CRITERIA	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year	pCi/g	mrem/year
Pb-210	100%	NA	NA	NA	4.9	6.9	3.9	5.5	3.5	4.9	3.9	5.5
Ra-226	100%	NA	6.3pCi/g | 16.3pCi/g	0	1.4	10.4	1.27	9.5	1.94	14.5	1.8	13.5
Ra-228	100%	NA	NA	NA	0.88	5.2	0.91	5.4	1.37	8	1.22	7.2
Th-228	100%	NA	NA	NA	1.5	5.5	1.33	4.9	1.6	5.9	1.9	0.7
U-235	100%	NA	NA	NA	0.12	0.06	0.27	0.14	0.18	0.09	0.26	0.13
U-238	100%	NA	NA	NA	0.82	0.16	0.48	0.009	0.98	0.18	0.52	0.09
Total Dose		177 mrem/yr	NA	0		28.22		25.449		33.57		27.12
GROSS ALPHA	100%	NA	NA	NA	17		18		19		19	
GROSS BETA	100%	NA	NA	NA	30		35		42		39	

NOTES
1. The backround dose calculation was calculated as the mean of the doses calculated from the SEAD-12A background soil samples. The SEAD-12A soil radiochemical results are presented in the Eight Moderately Low Priority AOC ESI report. All dose calculations are based on a residential total dose model using the concentrations of the principal radionuclides detected in the soil samples.
2. The dose limit in 10 CFR 834 (proposed) is 100 mrem/year, excluding annual radiation doses from natural background and medical sources
3. UMTRCA regulation limits the concentration of Ra-226 in soils to (1) background plus 5pCi/g, averaged over the first 15 cm of soil below the surface , and (2) background plus 15pCi/g, averaged over any 15 cm thick layers of soil more than 15 cm below the surface. This regulation is used as an ARAR at some NPL sites.

TABLE 4.4-1

SENECA ARMY DEPOT
SEAD-64A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-64 0-0.2 05/27/94 SB64A-1-00 222484 44410	SOIL SEAD-64 2-4 05/27/94 SB64A-1-02 222485 44410	SOIL SEAD-64 6-8 05/27/94 SB64A-1-04 222502 44410	SOIL SEAD-64 0-0.2 06/10/94 SB64A-2-00 223894 44725	SOIL SEAD-64 2-4 06/10/94 SB64A-2-02 223895 44725	SOIL SEAD-64 4-7 06/10/94 SB64A-2-03 223896 44725
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%	.73	4	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%	21.9	2	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 4.4-1

SENECA ARMY DEPOT
SEAD-64A ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-64 0-0.2 06/10/94 SB64A-3-00 223897 44725	SOIL SEAD-64 0-2 06/10/94 SB64A-3-01 223906 44748	SOIL SEAD-64 2-3 06/10/94 SB64A-3-02 223907 44748	SOIL SEAD-64 0-0.2 04/02/94 MW64A-1.00 216351 43257	SOIL SEAD-64 2-4 04/02/94 MW64A-1.02 216352 43257	SOIL SEAD-64 4-6 04/02/94 MW64A-1.03 216353 43257
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%	224	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%	44	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

They were found at concentrations of 1 to 2 μg/kg and were well below their respective TAGM values.

4.4.2.2 Semivolatile Organic Compounds

A total of 22 semivolatile organic compounds, primarily polynuclear aromatic hydrocarbons, were found at varying concentrations in the soil samples collected at SEAD-64A. They were detected in the landfill material from the three borings on the landfill. The concentrations were generally less than 5,000 μg/kg. The highest concentration was 15,000 μg/kg of phenanthrene in the 2- to 4-foot sample from SB64A-2. No polynuclear aromatic compounds were detected in the background samples from MW64A-1. TAGM exceedences 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 4.4-1.

4.4.2.3 Pesticides and PCBs

Eight pesticides were detected in the 12 soil samples at concentrations less than their TAGMs. They were primarily detected in the 0 to 0.2-foot soil samples taken from the surface of the landfill in the three soil borings. Five to seven of the eight pesticides were present in each of the surface soil samples at concentrations generally less than 10 μg/kg. The highest concentration was 33 μg/kg of Endosulfan I in surface soil sample SB64A-2-00. None were detected in the background soil samples from MW64A-1.

4.4.2.4 Metals

All but one of the samples were found to contain metals at concentrations that exceeded the associated TAGM. Of the 22 metals reported, 14 were found in one or more samples at concentrations above the TAGM values in the samples from the borings on the landfill and in the background samples. When the range of concentrations in the three background samples was compared to the soil samples from the borings on the landfill, only soil sample SB64A-2 had elevated metals concentrations. This sample had elevated concentrations for antimony, cadmium, copper, lead, mercury, and zinc.

E 750250
E 750500
E 750750
E 751000
7th STREET
AVE A
AVE B
OH325
GATE
740
748
750
754
758
760
8
△26A
N 992750
N 992500
N 992250
GATE
34534
2356
736
734
735
732
733
SB64A-1
MW64A-2
732.94
52110
71730
TP64A-1
TP64A-2
SB64A-2
750
280
MW64A-1
736.88
SB64A-3
11837
162
TP64A-3
MW64A-3
731.93
MW64A-1A
733.71
746
748
750
752
758
760
WE
7581
N

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

750	TOTAL PAHs (0–2")
280	TOTAL PAHs (0.2–4')

NOTE: All concentrations are reported in micrograms per Kilogram.

TEST PIT

MW64A-1
736.88
MONITORING WELL WITH WATER TABLE ELEVATION

732
GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES GENERAL DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/06/94

50 0 50 100
(feet)

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING
Dwg. No. 720518-01002

FIGURE 4.4-1
SEAD 64A TOTAL PAHs
IN SOILS FROM 0–2" AND 0.2–4'

SCALE 1" = 100'
DATE APRIL 1996
REV A

ACAD\SENECA7\LPSWMU\ACADFIG\SD64APAH.DWG

4.4.3 Groundwater

Groundwater from three monitoring wells was sampled as part of the investigation of SEAD-64A. The summary of chemical analyses are presented in Table 4.4-2. The following sections describe the nature and extent of groundwater contamination identified at SEAD-64A.

4.4.3.1 Volatile Organic Compounds

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

4.4.3.2 Semivolatile Organic Compounds

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

4.4.3.3 Pesticides and PCBs

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

4.4.3.4 Metals

Groundwater from MW64A-2, located hydraulically downgradient of the landfill, had metals concentrations 1.5 to 9 times larger 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.

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 was found in all three samples and exceeded the maximum Federal Secondary Drinking Water MCL (200 μg/L) with results ranging from 379 μg/L to 1710 μg/L. Iron was found in the background and downgradient monitoring 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

TABLE 4.4-2

SENECA ARMY DEPOT
SEAD-64A ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

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

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.

4.4.5 Tentatively Identified Compounds

Semivolatile Organic TICs were found at total concentrations greater than 50 mg/kg in one of the soil boring samples analyzed. Soil boring sample SB64A-2-02, collected 2 to 4 feet below grade had, a reported total TIC concentration of 61.2 mg/kg. The occurrence of elevated TIC concentrations in this sample correlates to the elevated concentrations of NYSDEC CLP TCL SVOCs in the same sample.

The total VOC TIC concentrations were below 10 mg/kg in all of the samples collected at SEAD-64A.

4.5 SEAD-64B

4.5.1 Introduction

A total of 12 subsurface soil samples were collected at SEAD-64B on and in the immediate vicinity of the landfill. Groundwater from three monitoring wells and three samples of surface water and sediment were also sampled as part of this investigation. The following sections describe the nature and extent of contamination identified at SEAD-64B. The sample locations are shown in Figure 2.7-2.

4.5.2 Soil

The analytical results for the 12 subsurface soil samples collected as part of the investigation of SEAD-64B are presented in Table 4.5-1. The following sections describe the nature and extent of contamination in SEAD-64B soils.

4.5.2.1 Volatile Organic Compounds

Four volatile organic compounds were detected in four of the 12 soil samples collected: methylene chloride, acetone, carbon disulfide, and 2-butanone, all at concentrations well below their respective TAGM values. They were detected at concentrations up to 7 μg/kg in three samples from the landfill. Acetone and 2-butanone were detected in the background surface soil sample at concentrations of 57 and 22 μg/kg, respectively.

TABLE 4.5-1

SENECA ARMY DEPOT
SEAD-64B ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-64 0-0.2 06/08/94 SB64B-1.00 223502 44665	SOIL SEAD-64 8-10 06/08/94 SB64B-1.05 223503 44665	SOIL SEAD-64 10-12 06/08/94 SB64B-1.06 223504 44665	SOIL SEAD-64 0-0.2 06/08/94 SB64B-2.00 223505 44665	SOIL SEAD-64 10-12 06/08/94 SB64B-2.06 223506 44665	SOIL SEAD-64 12-14 06/08/94 SB64B-2.07 223507 44665
VOLATILE ORGANICS											
Methylene Chloride	ug/Kg	1	8%	100	0	13 U	11 U	11 U	12 U	1 J	11 U
Acetone	ug/Kg	57	8%	200	0	13 U	11 U	7 J	12 U	11 U	11 U
Carbon Disulfide	ug/Kg	1	8%	2700	0	13 U	11 U	11 U	12 U	11 U	1 J
2-Butanone	ug/Kg	22	8%	300	0	13 U	11 U	11 U	12 U	11 U	11 U
SEMIVOLATILE ORGANICS											
Phenanthrene	ug/Kg	30	17%	50000*	0	400 U	370 U	350 U	400 U	370 U	350 U
Di-n-butylphthalate	ug/Kg	120	58%	8100	0	85 J	38 J	31 J	120 J	42 J	30 J
Fluoranthene	ug/Kg	46	42%	50000*	0	26 J	370 U	350 U	35 J	370 U	350 U
Pyrene	ug/Kg	64	25%	50000*	0	400 U	370 U	350 U	23 J	370 U	350 U
Benzo(a)anthracene	ug/Kg	38	17%	224	0	400 U	370 U	350 U	400 U	370 U	350 U
Chrysene	ug/Kg	40	25%	400	0	400 U	370 U	350 U	23 J	370 U	350 U
bis(2-Ethylhexyl)phthalate	ug/Kg	390	42%	50000*	0	400 U	110 J	350 U	96 J	390	350 U
Benzo(b)fluoranthene	ug/Kg	29	25%	1100	0	400 U	370 U	350 U	24 J	370 U	350 U
Benzo(k)fluoranthene	ug/Kg	36	25%	1100	0	400 U	370 U	350 U	23 J	370 U	350 U
Benzo(a)pyrene	ug/Kg	39	25%	61	0	400 U	370 U	350 U	22 J	370 U	350 U
Indeno(1,2,3-cd)pyrene	ug/Kg	29	8%	3200	0	400 U	370 U	350 U	400 U	370 U	350 U
Benzo(g,h,i)perylene	ug/Kg	110	17%	50000*	0	400 U	370 U	350 U	20 J	370 U	350 U
PESTICIDES/PCB											
Aldrin	ug/Kg	1.6	8%	41	0	2 U	1.9 U	1.8 U	2 U	1.9 U	1.8 U
Heptachlor epoxide	ug/Kg	1.4	8%	20	0	2 U	1.9 U	1.8 U	2 U	1.9 U	1.8 U
4,4'-DDE	ug/Kg	2.6	8%	2100	0	2.6 J	3.7 U	3.5 U	4 U	3.7 U	3.5 U
4,4'-DDT	ug/Kg	2.6	8%	2100	0	2.6 J	3.7 U	3.5 U	4 U	3.7 U	3.5 U
METALS											
Aluminum	mg/Kg	13400	100%	14593	0	10600	10600	9250	10400	10600	8730
Antimony	mg/Kg	0.3	25%	3.59	0	0.28 UJ	0.2 UJ	0.24 UJ	0.23 UJ	0.19 UJ	0.22 UJ
Arsenic	mg/Kg	5.8	100%	7.5	0	4.9	4.7	4.3	4.6	4	4.8
Barium	mg/Kg	105	100%	300	0	73.3	105	71	75.9	73.1	79.3
Beryllium	mg/Kg	0.56	100%	.73	0	0.49 J	0.5 J	0.43 J	0.49 J	0.49 J	0.43 J
Cadmium	mg/Kg	0.64	100%	1	0	0.41 J	0.51 J	0.46 J	0.5 J	0.42 J	0.46 J
Calcium	mg/Kg	90700	100%	101904	0	53400 J	90700 J	74700 J	54400 J	64100 J	64600 J
Chromium	mg/Kg	22.3	100%	22	1	15.9	17.1	15.9	15.4	16.6	15.2
Cobalt	mg/Kg	11.8	100%	30	0	8.9 J	9.7	9.2	8.7	10.4	11.8
Copper	mg/Kg	23.8	100%	25	0	21.5	23.2	21.1	20.6	23.8	23.3
Iron	mg/Kg	21700	100%	26627	0	19500	21700	20100	19400	19500	20600
Lead	mg/Kg	21.4	100%	21.9	0	15.9	10.6	10.7	17	9.5	11.1
Magnesium	mg/Kg	22100	100%	12222	10	14400	16500	20400	22100	16800	16500
Manganese	mg/Kg	492	100%	669	0	394	377	418	414	388	492
Mercury	mg/Kg	0.05	75%	0.1	0	0.03 J	0.02 J	0.01 J	0.04 J	0.02 U	0.02 J
Nickel	mg/Kg	32.4	100%	34	0	26.2	31	26.5	25.9	32.4	29.6
Potassium	mg/Kg	2320	100%	1762	7	2160 J	2090 J	1860 J	2000 J	2320 J	1700 J
Selenium	mg/Kg	0.99	42%	2	0	0.58 U	0.41 U	0.49 U	0.74 J	0.4 U	0.46 U
Sodium	mg/Kg	106	92%	104	1	51.9 J	106 J	94.4 J	65.7 J	93 J	103 J
Thallium	mg/Kg	0.42	17%	0.28	2	0.41 U	0.29 U	0.35 U	0.33 U	0.42 J	0.32 U
Vanadium	mg/Kg	23.3	100%	150	0	19.5	18.2	16.2	19	17.6	15.2
Zinc	mg/Kg	85.1	100%	83	1	72.4	73.7	71.8	70.7	60.4	85.1
OTHER ANALYSES											
Total Solids	%W/W					83.5	89.8	93.3	83.1	89.9	92.7

TABLE 4.5-1

SENECA ARMY DEPOT
SEAD-64B ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-64 0-0.2 06/08/94 SB64B-3.00 223508 44665	SOIL SEAD-64 8-10 06/08/94 SB64B-3.05 223509 44694	SOIL SEAD-64 14-16 06/08/94 SB64B-3.08 223510 44694	SOIL SEAD-64 0-0.2 05/13/94 MW64B-1-00 221238 44090	SOIL SEAD-64 4-6 05/13/94 MW64B-1-03 221239 44090	SOIL SEAD-64 6-8 05/13/94 MW64B-1-04 221240 44090
VOLATILE ORGANICS											
Methylene Chloride	ug/Kg	1	8%	100	0	12 U	11 U	11 U	15 U	11 U	11 U
Acetone	ug/Kg	57	8%	200	0	12 U	11 U	11 U	57	11 U	11 U
Carbon Disulfide	ug/Kg	1	8%	2700	0	12 U	11 U	11 U	15 U	11 U	11 U
2-Butanone	ug/Kg	22	8%	300	0	12 U	11 U	11 U	22	11 U	11 U
SEMIVOLATILE ORGANICS											
Phenanthrene	ug/Kg	30	17%	50000*	0	400 U	380 U	360 U	30 J	26 J	360 U
Di-n-butylphthalate	ug/Kg	120	58%	8100	0	41 J	380 U	360 U	520 U	360 U	360 U
Fluoranthene	ug/Kg	46	42%	50000*	0	25 J	380 U	360 U	28 J	46 J	360 U
Pyrene	ug/Kg	64	25%	50000*	0	400 U	380 U	360 U	36 J	64 J	360 U
Benzo(a)anthracene	ug/Kg	38	17%	224	0	400 U	380 U	360 U	38 J	36 J	360 U
Chrysene	ug/Kg	40	25%	400	0	400 U	380 U	360 U	40 J	34 J	360 U
bis(2-Ethylhexyl)phthalate	ug/Kg	390	42%	50000*	0	25 J	53 J	360 U	520 U	360 U	360 U
Benzo(b)fluoranthene	ug/Kg	29	25%	1100	0	400 U	380 U	360 U	28 J	29 J	360 U
Benzo(k)fluoranthene	ug/Kg	36	25%	1100	0	400 U	380 U	360 U	36 J	31 J	360 U
Benzo(a)pyrene	ug/Kg	39	25%	61	0	400 U	380 U	360 U	34 J	39 J	360 U
Indeno(1,2,3-cd)pyrene	ug/Kg	29	8%	3200	0	400 U	380 U	360 U	520 U	29 J	360 U
Benzo(g,h,i)perylene	ug/Kg	110	17%	50000*	0	400 U	380 U	360 U	520 U	110 J	360 U
PESTICIDES/PCB											
Aldrin	ug/Kg	1.6	8%	41	0	2 U	1.9 U	1.8 U	2.7 U	1.9 U	1.6 J
Heptachlor epoxide	ug/Kg	1.4	8%	20	0	2 U	1.9 U	1.8 U	1.4 J	1.9 U	1.9 U
4,4'-DDE	ug/Kg	2.6	8%	2100	0	4 U	3.7 U	3.6 U	5.2 U	3.6 U	3.6 U
4,4'-DDT	ug/Kg	2.6	8%	2100	0	4 U	3.7 U	3.6 U	5.2 U	3.6 U	3.6 U
METALS											
Aluminum	mg/Kg	13400	100%	14593	0	8800	10700 J	9140 J	13400	8870	7620
Antimony	mg/Kg	0.3	25%	3.59	0	0.26 UJ	0.27 J	0.25 J	0.3 J	0.15 UJ	0.15 UJ
Arsenic	mg/Kg	5.8	100%	7.5	0	5.8	4.9	4.4	5.5	4.3	5.5
Barium	mg/Kg	105	100%	300	0	58.4	72.5 J	64 J	75.5	70.8	76.7
Beryllium	mg/Kg	0.56	100%	.73	0	0.42 J	0.4 J	0.35 J	0.56 J	0.43 J	0.37 J
Cadmium	mg/Kg	0.64	100%	1	0	0.48 J	0.45 J	0.44 J	0.63 J	0.64 J	0.54 J
Calcium	mg/Kg	90700	100%	101904	0	54800 J	52300 J	81300 J	5530	70000	75900
Chromium	mg/Kg	22.3	100%	22	1	14.2	15.6 J	22.3 J	17.5	14.1	13.5
Cobalt	mg/Kg	11.8	100%	30	0	8.3 J	8.7 J	8.3 J	7.2 J	10	7.4 J
Copper	mg/Kg	23.8	100%	25	0	19.6	18.4 J	21.4 J	18.9	20.2	17.6
Iron	mg/Kg	21700	100%	26627	0	17100	21300 J	18200 J	20900	18400	17100
Lead	mg/Kg	21.4	100%	21.9	0	12.1	12.4	8.5	21.4	8.8	8.3
Magnesium	mg/Kg	22100	100%	12222	10	12200	13800 J	19100 J	3720	18900	21500
Manganese	mg/Kg	492	100%	669	0	354	336 J	391 J	207	434	389
Mercury	mg/Kg	0.05	75%	0.1	0	0.03 J	0.04 J R	0.02 J	0.05 J	0.02 J	0.01 U
Nickel	mg/Kg	32.4	100%	34	0	24	24.3 J	24 J	19.8	28.2	22.6
Potassium	mg/Kg	2320	100%	1762	7	1840 J	1560	2090	1700	1630	1650
Selenium	mg/Kg	0.99	42%	2	0	0.55 J	0.48 J	0.52 U	0.99 J	0.26 U	0.57 J
Sodium	mg/Kg	106	92%	104	1	65.8 J	72.6 J	93.4 J	35.9 U	96.8 J	79.6 J
Thallium	mg/Kg	0.42	17%	0.28	2	0.38 U	0.33 U	0.37 U	0.41 J	0.24 U	0.24 U
Vanadium	mg/Kg	23.3	100%	150	0	16.2	19.6 J	17.1 J	23.3	14.8	14.2
Zinc	mg/Kg	85.1	100%	83	1	78.8	64.3 J	64.9 J	72.2	59	45.6
OTHER ANALYSES											
Total Solids	%W/W					82.8	87.7	92.1	63.5	91.3	90.9

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.

4.5.2.2 Semivolatile Organic Compounds

Twelve semivolatile organic compounds, primarily polynuclear aromatic hydrocarbons, were detected in the soil samples at concentrations less than 100 μg/kg which are less than their respective TAGM values. Seven of the ten polynuclear aromatic hydrocarbons were detected in the surface soil at SB64B-2. Most to all of the ten polynuclear aromatic hydrocarbons were detected in soil samples at 0 to 0.2 feet and four to six feet in the background sampling location MW64B-1. Their concentrations were 26 to 110 μg/kg. The other two semivolatile compounds were phthalates, common laboratory contaminants.

4.5.2.3 Pesticides and PCBs

Four pesticides were detected in the three of the 12 soil samples at concentrations ranging from 1.4 to 2.6 μg/kg, which were much lower than their TAGMs. 4,4'-DDE and 4,4'-DDT were detected in the 0- to 0.2-foot surface soil sample from the landfill in boring SB64B-1, both at concentration of 2.6 μg/kg. Pesticides were also detected in two samples from the background location: 1.4 μg/kg heptachlor epoxide in the surface soil and 1.6 μg/kg aldrin at six to eight feet.

4.5.2.4 Metals

All of the samples were found to contain at least one metal at a concentration that exceeded the associated TAGM. Magnesium and potassium exceeded their respective TAGM in the greatest number of samples (potassium concentrations exceeded the TAGM value in 7 samples and magnesium concentrations exceeded the TAGM value in 10 samples). Thallium exceeded the TAGM in two samples. Chromium, sodium and zinc each exceeded the TAGM in one sample. In general, the metals concentrations in the landfill samples are at about the same concentration as in the background samples. One exception is potassium, which has a higher concentration in the landfill soil samples.

4.5.3 Groundwater

Three monitoring wells were sampled as part of the investigation of SEAD-64B. The summary of chemical analyses are presented in Table 4.5-2. The following sections describe the nature and extent of groundwater contamination identified at SEAD-64B.

TABLE 4.5-2

SENECA ARMY DEPOT
SEAD-64B ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NUMBER ABOVE CRITERIA	FEDERAL DRINKING WATER MCL (h)	NUMBER ABOVE CRITERIA	WATER SEAD-64 07/10/94 MW64B-1 226485 45282	WATER SEAD-64 07/10/94 MW64B-2 226486 45282	WATER SEAD-64 07/10/94 MW64B-3 226487 45282
METALS										
Aluminum	ug/L	1530	100%	NA	NA	50-200 *	3	198 J	51.9 J	1530
Arsenic	ug/L	2.2	33%	25	0	NA	NA	2 U	2 U	2.2 J
Barium	ug/L	124	100%	1000	0	2000	0	104 J	124 J	84.4 J
Calcium	ug/L	200000	100%	NA	NA	NA	NA	138000	131000	200000
Chromium	ug/L	3.1	67%	50	0	100	0	0.41 J	0.4 U	3.1 J
Cobalt	ug/L	4.4	100%	NA	NA	NA	NA	1.1 J	0.51 J	4.4 J
Copper	ug/L	3.1	100%	200	0	1000 *	0	1 J	0.56 J	3.1 J
Iron	ug/L	5090	100%	300	2	300 *	2	400	108	5090
Magnesium	ug/L	76000	100%	NA	NA	NA	NA	45600	39600	76000
Manganese	ug/L	559	100%	300	1	50 *	3	98.9	54	559
Nickel	ug/L	7	100%	NA	NA	100	0	1.4 J	0.74 J	7 J
Potassium	ug/L	4780	100%	NA	NA	NA	NA	4780 J	4570 J	4480 J
Selenium	ug/L	2.7	33%	10	0	50	0	2.7 U	2.7 U	2.7 J
Sodium	ug/L	17800	100%	20000	0	NA	NA	8140	9190	17800
Vanadium	ug/L	2.9	100%	NA	NA	NA	NA	0.73 J	0.61 J	2.9 J
Zinc	ug/L	16.6	100%	300	0	5000 *	0	3.9 J	2.8 J	16.6 J
OTHER ANALYSES										
pH	Standard Units							8.4	8.2	7.4
Conductivity	umhos/cm							710	710	1010
Temperature	°C							12.9	14.5	11.6
Turbidity	NTU							14	3.3	331

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)

summary results of the chemical analyses are presented in Table 4.5-3. The following sections describe the nature and extent of surface water contamination identified at SEAD-64B.

4.5.4.1 Volatile Organic Compounds

Carbon disulfide was detected at a concentration of 2 μg/L in surface water from SW64B-2, which is located adjacent to the landfill. There are no criteria for this compound. No other volatile organic compounds were detected in the three surface water samples collected at SEAD-64B.

4.5.4.2 Semivolatile Organic Compounds

No semivolatile organic compounds were found in the three surface water samples collected at SEAD-64B.

4.5.4.3 Pesticides and PCBs

No pesticide or PCB compounds were found in the surface water samples collected at SEAD-64B.

4.5.4.4 Metals

Iron was the only metal detected at a concentration above its criteria value of 300 μg/L in surface water sample SW64B-2. This sample also had most of the maximum concentrations detected in the three samples. The metals concentrations detected in the background sample, SW64B-1, and in the sample downstream of the landfill, SW64B-3, were similar to each other.

4.5.5 Sediment

A total of three sediment samples were collected as part of the investigation at SEAD-64B. The summary chemical analyses are presented in Table 4.5-4. The sediment samples were collected in the same locations as the surface water samples discussed above. The following sections describe the nature and extent of sediment contamination identified at SEAD-64B.

TABLE 4.5-3

SENECA ARMY DEPOT
SEAD-64B ENVIRONMENTAL SITE INSPECTION
SURFACE WATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C (a,c)	NUMBER ABOVE CRITERIA	WATER SEAD-64 04/18/94 SW64B-1 218294 43626	WATER SEAD-64 04/18/94 SW64B-2 218295 43626	WATER SEAD-64 04/18/94 SW64B-3 218296 43626
VOLATILE ORGANICS								
Carbon Disulfide	ug/L	2	33%	NA	NA	10 U	2 J	10 U
METALS								
Aluminum	ug/L	141	67%	NA	NA	23.5 J	141 J	12.7 U
Barium	ug/L	37.8	100%	NA	NA	34 J	37.8 J	28.2 J
Calcium	ug/L	61200	100%	NA	NA	61100	61200	54000
Chromium	ug/L	0.42	67%	390	0	0.4 U	0.41 J	0.42 J
Copper	ug/L	1.5	100%	23	0	1 J	1.5 J	1.3 J
Iron	ug/L	331	100%	300	1	36.6 J	331	30.2 J
Magnesium	ug/L	10900	100%	NA	NA	10900	10800	9250
Manganese	ug/L	39.2	100%	NA	NA	4.7 J	39.2	1.8 J
Nickel	ug/L	1.2	67%	172	0	0.59 U	1.2 J	1.1 J
Potassium	ug/L	1180	100%	NA	NA	1150 J	1180 J	1070 J
Sodium	ug/L	3050	100%	NA	NA	3050 J	2990 J	2960 J
Zinc	ug/L	7.7	100%	160	0	3.5 J	7.7 J	1.5 J
OTHER ANALYSES								
pH	Standard Units			NA	0	7.9	7.8	7.6
Conductivity	umhos/cm					293	280	255
Temperature	°C					16	16	15.9
Turbidity	NTU					0.6	0.5	0.6

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class C surface water.
b) EPA Water Quality Criteria Summary: Quality Criteria for Water, 1986 and Updates # 1 and 2.
c) Hardness dependent values assume a hardness of 217 mg/L.
d) NA = Not Available
e) U = The compound was not detected below this concentration.
f) J = The reported value is an estimated concentration.
g) UJ = The compound may have been present above this concentration, but was not detected due to problems with the analysis.
h) R = The data was rejected during the data validation process.

TABLE 4.5-4

SENECA ARMY DEPOT
SEAD-64B ENVIRONMENTAL SITE INSPECTION
SEDIMENT ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT CHRONIC CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a)	LOWEST EFFECT LEVEL (a)(b)	SEVERE EFFECT LEVEL (a)(b)	NUMBER ABOVE CRITERIA	SOIL SEAD-64 0-0.2 04/18/94 SD64B-1 218210 43543	SOIL SEAD-64 0-0.2 04/18/94 SD64B-2 218211 43543	SOIL SEAD-64 0-0.2 04/18/94 SD64B-3 218212 43543
VOLATILE ORGANICS												
Methylene Chloride	ug/Kg	6	100%	NA	NA	NA		NA	NA	3 J	6 J	2 J
SEMIVOLATILE ORGANICS												
Phenanthrene	ug/Kg	31	33%	1200	NA	NA			0	460 U	460 U	31 J
Fluoranthene	ug/Kg	55	33%	10200	NA	NA			0	460 U	460 U	55 J
Pyrene	ug/Kg	32	33%	NA	NA	NA			NA	460 U	460 U	32 J
bis(2-Ethylhexyl)phthalate	ug/Kg	79	67%	1995	NA	NA			0	460 U	79 J	23 J
Benzo(b)fluoranthene	ug/Kg	39	33%	NA	13	NA			1	460 U	460 U	39 J
Benzo(k)fluoranthene	ug/Kg	30	33%	NA	13	NA			1	460 U	460 U	30 J
Benzo(a)pyrene	ug/Kg	29	33%	NA	13	NA			1	460 U	460 U	29 J
PESTICIDES/PCB												
Heptachlor	ug/Kg	1.1	33%	1	.008	.3			1	2.4 U	2.4 U	1.1 J
Endosulfan I	ug/Kg	2.4	33%	0.3	NA	NA			1	2.4 U	2.4 U	2.4
4,4'-DDE	ug/Kg	3.3	33%	NA	0.1	10			1	4.6 U	4.6 U	3.3 J
METALS												
Aluminum	mg/Kg	12800	100%				NA	NA	NA	7730	8730	12800
Antimony	mg/Kg	0.25	33%				2	25	NA	0.19 UJ	0.22 UJ	0.25 J
Arsenic	mg/Kg	7.5	100%				6	33	1	5	4.5	7.5
Barium	mg/Kg	102	100%				NA	NA	NA	71.7	60.7	102
Beryllium	mg/Kg	0.67	100%				NA	NA	NA	0.42 J	0.44 J	0.67 J
Cadmium	mg/Kg	0.45	100%				.6	9	0	0.35 J	0.25 J	0.45 J
Calcium	mg/Kg	75900	100%				NA	NA	NA	75900	63000	54200
Chromium	mg/Kg	19.3	100%				26	110	0	11.9	13.2	19.3
Cobalt	mg/Kg	11.8	100%				NA	NA	NA	8.5 J	8.2 J	11.8
Copper	mg/Kg	27	100%				16	110	2	17.6	15.7	27
Iron	mg/Kg	28100	100%				2%	4%	1	17000	16500	28100
Lead	mg/Kg	16.5	100%				31	110	0	10.7	9.1	16.5
Magnesium	mg/Kg	14100	100%				NA	NA	NA	11800	13200	14100
Manganese	mg/Kg	684	100%				460	1100	2	447	351	684
Mercury	mg/Kg	0.19	100%				.15	1.3	1	0.03 J	0.03 J	0.19 J
Nickel	mg/Kg	32	100%				16	50	3	20.5	20.3	32
Potassium	mg/Kg	2190	100%				NA	NA	NA	1330	1950	2190
Sodium	mg/Kg	35.5	33%				NA	NA	NA	30.3 U	35.5 J	33.6 U
Vanadium	mg/Kg	25.9	100%				NA	NA	NA	15.7	17.1	25.9
Zinc	mg/Kg	82.2	100%				120	270	0	66.1	52.2	82.2
OTHER ANALYSES												
Total Solids	%W/W									72.2	72.4	74.3

NOTES:
a) NYSDEC Sediment Criteria - 1994
b) A sediment is considered contaminated if either criteria is exceeded
c) 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) 2%=20,000 mg/Kg; 4%=40,000 mg/Kg

4.5.5.1 Volatile Organic Compounds

Only one volatile organic compound was detected in the sediment samples. Methylene chloride was detected from 2 to 6 μg/kg in the three sediment samples. There were no sediment criteria for this compound.

4.5.5.2 Semivolatile Organic Compounds

A total of seven SVOs were detected in the three sediment samples collected at SEAD-64B. Six of the semivolatile compounds were polynuclear aromatic hydrocarbons; the seventh was bis(2-ethylhexyl)phthalate. The polynuclear aromatic hydrocarbons were only detected in the sediment sample located downstream of the landfill, SD64B-3, at concentrations ranging from 29 to 55 μg/kg. The following PAHs were detected at concentrations above their respective NYSDEC criteria: benzo(b)fluoranthene, benzo(k)fluoranthene, and benzo(a)pyrene.

4.5.5.3 Pesticides and PCBs

Three pesticide compounds were detected in the sediment sample located downstream of the landfill, SD64B-3: heptachlor, endosulfan I, and 4,4'-DDE. All three of these compounds exceeded their respective NYSDEC criteria values. They were detected at concentrations of 1.1 to 3.3 μg/kg.

4.5.5.4 Metals

Most of the maximum concentrations and exceedances of criteria occurred in the sediment sample obtained downstream of the landfill, SD64B-3. Six metals (arsenic, copper, iron, manganese, mercury, and nickel) were detected at concentrations above their lowest criteria value in SD64B-3. The metals concentrations detected in the background sample, SD64B-1, and in the sample adjacent to the landfill were similar.

4.5.6 Tentatively Identified Compounds

The total concentrations of Tentatively Identified Compounds (TICs) were below 50 mg/kg of SVOCs and below 10 mg/kg of VOCs in each of the samples collected at SEAD-64B.

4.6 SEAD-64C

4.6.1 Introduction

Three surface soil samples, six subsurface soil samples from test pits, and groundwater samples from five monitoring wells were obtained as part of the SEAD-64C investigation. The following sections describe the nature and extent of contamination identified at SEAD-64C. The sample locations are shown in Figure 2.8-3.

4.6.2 Soil

The analytical results for three surface soil samples and six subsurface soil samples from test pits are presented in Table 4.6-1. The following sections describe the nature and extent of contamination in SEAD-62 soils.

4.6.2.1 Volatile Organic Compounds

No volatile organic compounds were detected in the soil samples collected at SEAD-64C.

4.6.2.2 Semivolatile Organic Compounds

Two semivolatile organic compounds, both phthalate esters, were detected in approximately half the soil samples at concentrations well below their TAGMs. Di-n-butylphthalate was detected at concentrations ranging from 25 to 39 μg/kg. Bis(2-ethylhexyl)phthalate was detected at concentrations ranging from 25 to 920 μg/kg.

4.6.2.3 Pesticides and PCBs

Two pesticides were detected in two surface soil samples at concentrations well below their TAGMs: 2.6 μg/kg heptachlor in SS64C-1 and 4.7 μg/kg dieldrin in SS64C-2.

4.6.2.4 Metals

The soil samples collected at SEAD-64C were found to contain various metals at concentrations that exceeded the associated TAGM or site background values. Of the 21 metals detected, 12 of these (aluminum, beryllium, calcium, chromium, copper, iron, lead,

TABLE 4.6-1

SENECA ARMY DEPOT
SEAD-64C ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-64 0-0.2 04/11/94 SS64C-1 217070 43257	SOIL SEAD-64 0-0.2 04/11/94 SS64C-2 217072 43257	SOIL SEAD-64 0-0.2 04/11/94 SS64C-3 217073 43257	SOIL SEAD-64 3 06/09/94 TP64C-1-1 223776 44725	SOIL SEAD-64 4 06/09/94 TP64C-1-2 223777 44725	SOIL SEAD-64 2 06/09/94 TP64C-2-1 223778 44725
SEMIVOLATILE ORGANICS											
Di-n-butylphthalate	ug/Kg	39	44%	8100	0	25 J	25 J	39 J	370 U	370 U	38 J
bis(2-Ethylhexyl)phthalate	ug/Kg	1100	67%	50000*	0	920	920 U	1100	74 J	140 J	69 J
PESTICIDES/PCB											
Heptachlor	ug/Kg	2.6	11%	100	0	2.6 J	2.6 U	2.7 U	1.9 U	1.9 U	1.9 U
Dieldrin	ug/Kg	4.7	11%	44	0	4.2 U	4.7 J	5.3 U	3.7 U	3.7 U	3.7 U
METALS											
Aluminum	mg/Kg	18700	100%	14593	2	14200	18700	15300	12400	4970	11400
Antimony	mg/Kg	0.43	22%	3.59	0	0.32 J	0.43 J	0.27 UJ	0.24 UJ	0.16 UJ	0.21 UJ
Arsenic	mg/Kg	6.6	100%	7.5	0	5.1	6.1	6.5	4.7	3.2	6.1
Barium	mg/Kg	243	100%	300	0	111	111	243	98	35.4	92.6
Beryllium	mg/Kg	0.86	100%	.73	2	0.61 J	0.86 J	0.82 J	0.62 J	0.26 J	0.61 J
Cadmium	mg/Kg	1	100%	1	0	0.19 J	0.19 J	0.37 J	0.77 J	0.43 J	1
Calcium	mg/Kg	129000	100%	101904	1	46800	5840	6340	35900	81500	65400
Chromium	mg/Kg	25.9	100%	22	2	21	25.9	22.1	18.7	7.1	17.4
Cobalt	mg/Kg	13.9	100%	30	0	9.6 J	9.3 J	12.9 J	9.7	4.9 J	13
Copper	mg/Kg	28.7	100%	25	2	24	23.5	22.3	22.5	15.6	28.7
Iron	mg/Kg	29000	100%	26627	2	25200	28000	29000	22700	10500	24100
Lead	mg/Kg	23.3	100%	21.9	2	13.8	22.8	23.3	12.5	5.9	12.9
Magnesium	mg/Kg	29700	100%	12222	4	10600	5000	4480	9880	24600	15900
Manganese	mg/Kg	2220	100%	669	2	434	417	1090	453	330	579
Mercury	mg/Kg	0.05	100%	0.1	0	0.03 J	0.05 J	0.05 J	0.04 J	0.02 J	0.03 J
Nickel	mg/Kg	41.1	100%	34	2	30.5	28.1	26.3	30.1	13.3	35
Potassium	mg/Kg	2690	100%	1762	7	2190 J	2690 J	1670 J	1840 J	1360 J	1790 J
Selenium	mg/Kg	1.9	44%	2	0	1	1	1.9	0.5 U	0.33 U	0.44 U
Sodium	mg/Kg	93.8	77%	104	0	62 J	36.5 U	42.8 U	42.3 J	68.2 J	93.8 J
Vanadium	mg/Kg	32.5	100%	150	0	24.3	32.5	28.9	21.3	9.6	19.4
Zinc	mg/Kg	110	100%	83	4	88.1	110	109	83	43.4	93.9
OTHER ANALYSES											
Total Solids	%W/W					77.8	64.9	62.3	87.7	90.3	89

TABLE 4.6-1

SENECA ARMY DEPOT
SEAD-64C ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-64 2 06/09/94 TP64C-2-2 223779 44725	SOIL SEAD-64 2 06/09/94 TP64C-3-1 223780 44725	SOIL SEAD-64 2 06/09/94 TP64C-3-2 223781 44725
SEMIVOLATILE ORGANICS								
Di-n-butylphthalate	ug/Kg	39	44%	8100	0	390 U	410 U	390 U
bis(2-Ethylhexyl)phthalate	ug/Kg	1100	67%	50000*	0	25 J	69 J	390 U
PESTICIDES/PCB								
Heptachlor	ug/Kg	2.6	11%	100	0	2 U	2.1 U	2 U
Dieldrin	ug/Kg	4.7	11%	44	0	3.9 U	4.1 U	3.8 U
METALS								
Aluminum	mg/Kg	18700	100%	14593	2	13400	9200	10600
Antimony	mg/Kg	0.43	22%	3.59	0	0.17 UJ	0.24 UJ	0.23 UJ
Arsenic	mg/Kg	6.6	100%	7.5	0	6.6	4.2	4.9
Barium	mg/Kg	243	100%	300	0	165	61.1	75.1
Beryllium	mg/Kg	0.86	100%	.73	2	0.63 J	0.46 J	0.52 J
Cadmium	mg/Kg	1	100%	1	0	0.73	0.87 J	0.75 J
Calcium	mg/Kg	129000	100%	101904	1	3300	129000	68200
Chromium	mg/Kg	25.9	100%	22	2	18	13.8	16.1
Cobalt	mg/Kg	13.9	100%	30	0	13.9	7.4 J	9.7
Copper	mg/Kg	28.7	100%	25	2	28.7	17.6	23.2
Iron	mg/Kg	29000	100%	26627	2	21900	18500	20800
Lead	mg/Kg	23.3	100%	21.9	2	9	8.4	11.1
Magnesium	mg/Kg	29700	100%	12222	4	4370	29700	16800
Manganese	mg/Kg	2220	100%	669	2	2220	352	409
Mercury	mg/Kg	0.05	100%	0.1	0	0.04 J	0.03 J	0.02 J
Nickel	mg/Kg	41.1	100%	34	2	41.1	22.4	29
Potassium	mg/Kg	2690	100%	1762	7	1900 J	1990 J	2180 J
Selenium	mg/Kg	1.9	44%	2	0	0.62 J	0.49 U	0.47 U
Sodium	mg/Kg	93.8	77%	104	0	19.8 J	93.6 J	89.1 J
Vanadium	mg/Kg	32.5	100%	150	0	24.4	16.5	19
Zinc	mg/Kg	110	100%	83	4	52.5	80.6	68.1
OTHER ANALYSES								
Total Solids	%W/W					84.7	80.1	85.5

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.

magnesium, manganese, nickel, potassium, and zinc) were found in one or more samples at concentrations above the associated TAGM values; however, the exceedances were generally less than 1.5 times the TAGM value.

Review of the data indicates there was no major difference in the metal concentrations between the three surface soil samples, the two samples obtained from each test pit, and the surface soil and subsurface soil samples. These findings are consistent with not finding fill or waste material in the soil excavated at the three test pits.

4.6.3 Groundwater

Three monitoring wells were installed as part of the investigation at SEAD-64C. The summary analytical results are presented in Table 4.6-2. The following sections describe the nature and extent of the groundwater contamination identified at SEAD-64C.

4.6.3.1 Volatile Organic Compounds

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

4.6.3.2 Semivolatile Organic Compounds

No semivolatile organic compounds were detected in the three groundwater samples collected at SEAD-64C except for a trace amount of phenol and diethylphthalate. Phenol was detected at a estimated concentration of 2 μg/L in groundwater from MW64C-6 and 9 which is below the detection limit of 11 μg/L and above the groundwater criteria of 1 μg/L. The presence of phenol is not of concern due to its presence in the upgradient well, MW64C-9, and its detection at a concentration well below the detection limit. Diethylphthalate was detected at a concentration of 0.7 μg/L in groundwater from the upgradient well MW64C-9, which is well below it's criteria of 50 μg/L.

4.6.3.3 Pesticides and PCBs

No pesticides or PCBs were found in the five groundwater samples collected at SEAD-64C.

TABLE 4.6-2

SENECA ARMY DEPOT
SEAD-64C ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NUMBER ABOVE CRITERIA	FEDERAL DRINKING WATER MCL (h)	NUMBER ABOVE CRITERIA	WATER SEAD-64 07/11/94 MW64C-1 226668 45282	WATER SEAD-64 07/21/94 MW64C-6 227733 45448	WATER SEAD-64 07/21/94 MW64C-7 227734 45448	WATER SEAD-64 07/21/94 MW64C-8 227735 45448	WATER SEAD-64 07/10/94 MW64C-9 226484 45282 Also labelled MW-9
SEMIVOLATILE ORGANICS												
Phenol	ug/L	2	40%	1	2	NA	NA	10 U	2 J	11 U	10 U	2 J
Diethylphthalate	ug/L	0.7	20%	50	0	NA	NA	10 U	11 U	11 U	10 U	0.7 J
METALS												
Aluminum	ug/L	811	100%	NA	NA	50-200 *	3	811	29.3 J	174 J	211	38.2 J
Barium	ug/L	106	100%	1000	0	2000	0	65.1 J	44 J	106 J	95.9 J	20.4 J
Calcium	ug/L	121000	100%	NA	NA	NA	NA	115000	92500	90900	119000	121000
Chromium	ug/L	2.5	60%	50	0	100	0	2.5 J	0.4 U	0.4 J	0.43 J	0.4 U
Cobalt	ug/L	5.5	60%	NA	NA	NA	NA	0.85 J	0.5 U	0.6 J	5.5 J	0.5 U
Copper	ug/L	1.7	100%	200	0	1000 *	0	1.7 J	0.59 J	0.53 J	0.67 J	0.55 J
Iron	ug/L	2640	100%	300	4	300 *	4	2640	78.3 J	311 J	375 J	681
Lead	ug/L	6.4	20%	25	0	15 **	0	0.9 U	6.4	0.89 U	0.89 U	0.9 U
Magnesium	ug/L	49400	100%	NA	NA	NA	NA	44200	27900	22000	22100	49400
Manganese	ug/L	149	100%	300	0	50 *	3	149	69.9	18	17	96
Mercury	ug/L	0.14	60%	2	0	2	0	0.04 U	0.14 J	0.06 J	0.07 J	0.04 U
Nickel	ug/L	2.3	60%	NA	NA	100	0	2.3 J	0.7 U	1 J	0.7 U	1.2 J
Potassium	ug/L	3830	100%	NA	NA	NA	NA	3830 J	1140 J	942 J	794 J	1670 J
Sodium	ug/L	30400	100%	20000	1	NA	NA	5860	4240 J	2880 J	30400	6420
Thallium	ug/L	2.1	20%	NA	NA	2	1	1.9 U	1.9 U	1.9 U	2.1 J	1.9 U
Vanadium	ug/L	2	100%	NA	NA	NA	NA	2 J	0.67 J	0.63 J	0.81 J	0.61 J
Zinc	ug/L	6	100%	300	0	5000 *	0	6 J	5.8 J	5.6 J	5.6 J	3.9 J
OTHER ANALYSES												
pH	Standard Units							7.1	7.6	6.4	6.9	8.6
Conductivity	umhos/cm							520	500	450	725	690
Temperature	°C							11.2	15.4	15.3	17.3	12.4
Turbidity	NTU							88	0.9	10.6	12.1	2.4

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)
i) ** the value is an action level, reported in Drinking Water Regulations and Health Advisories, USEPA, May 1994

4.6.3.4 Metals

Five metals (aluminum, iron, manganese, sodium, and thallium) were detected at concentrations greater than the NY AWQS and Federal Drinking Water criteria. Three wells at SEAD-64C contained aluminum at concentrations (174 to 811 μg/L) that exceeded Federal Secondary Drinking Water MCL of 50 μg/L. Iron was detected in four groundwater samples above the 300 μg/L standard at concentrations ranging between 311 and 2,640 μg/L. Manganese was detected in three wells at concentrations above the Federal Secondary Drinking Water criteria of 50 μg/L with values ranging from 96 to 149 μg/L. Sodium was detected in MW64C-8 at a concentration of 30,400 μg/L, which exceeded the New York state criteria of 20,000 μg/L. Thallium exceeded the Federal Primary Drinking Water MCL (2 μg/L) at MW64C-8 by 0.1 μg/L.

4.6.4 Tentatively Identified Compounds

The total concentrations of Tentatively Identified Compounds (TICs) were below 50 mg/kg of SVOCs and below 10 mg/kg of VOCs in ~~all~~ each of the samples collected at SEAD-64C.

4.7 SEAD-64D

4.7.1 Introduction

A total of five surface soil and 30 subsurface soil boring samples were obtained at SEAD-64D. Five monitoring wells were sampled as part of this investigation. A soil gas survey was also performed. The following sections describe the nature and extent of contamination identified at SEAD-64D. The sample locations are shown on Figures 2.9-2 and 2.9-3.

4.7.2 Soil Gas

The intent of the soil gas survey was to locate areas on the site that have been impacted by volatile organic compounds. Soil gas samples were collected at 162 of 171 sample locations shown in Figure 2.9-2. At five of the locations, soil gas could not be obtained because groundwater filled the soil gas sampling tube after it was driven into the ground. At another four locations, the sampling tube hit refusal within a 2.5 feet of the ground surface.

The soil gas survey did not detect volatile organic compounds at any of the sampling points. The soil gas survey data are summarized in Table 4.7-1. Detector responses were used in conjunction with calibration curve data to calculate concentrations expressed as TCE in parts per million by volume (ppmv). Table 4.7-1 shows the concentrations of volatiles calculated at each sampling point as well as the OVM screening results (maximum value) of the soil gas during the puring process, immediately prior to sampling.

4.7.3 Soil

The analytical results for the soil samples collected as part of the investigation of SEAD-64D are presented in Table 4.7-2. The following sections describe the nature and extent of contamination in SEAD-64D soils.

4.7.3.1 Volatile Organic Compounds

Methylene chloride, 2-butanone, and toluene were detected in several samples at concentrations well below their TAGMs. Methylene chloride was detected in approximately 20 percent of the samples at concentrations up to 3 μg/kg. 2-Butanone and toluene were each detected in one sample at concentrations of 8 and 1 μg/kg, respectively.

4.7.3.2 Semivolatile Organic Compounds

A total of 17 semivolatile organic compounds were found at varying concentrations in the soil samples obtained at SEAD-64D. Thirteen of the compounds are polynuclear aromatic hydrocarbons (PAHs). These PAHs were detected primarily in the soil samples from the 0- to 0.2-foot range.

Only two PAHs, benzo(a)pyrene and dibenzo(g,h)perylene, were detected at concentrations above their TAGMs. These exceedances occurred in the surface soil samples obtained from four borings.

4.7.3.3 Pesticides and PCBs

No pesticides or PCBs were found in the soil samples collected at SEAD-64D.

Table 4.7-1
Summary of Soil Gas Results

Seneca Army Depot
SEAD-64D

Sample Name	Location		OVM Screen (ppm)	Concentration (ppmV as TCE)
	Line	Station		
Soil Gas Points Based on a Grid System:				
SGL53-1	53	8700	0.0	0.0
SGL53-2	53	8900	0.0	0.0
SGL53-3	53	9100	0.0	0.0
SGL53-4	53	9300	0.0	0.0
SGL53-5	53	9500	0.0	0.0
SGL53-6	53	9700	0.0	0.0
SGL53-7	53	9900	0.0	0.0
SGL49-8	49	10,000	0.0	0.0
SGL49-9	49	9800	0.0	0.0
SGL49-10	49	9600	0.0	0.0
SGL49-11	49	9400	0.0	0.0
SGL49-12	49	9200	0.0	0.0
SGL49-13	49	9000	0.0	0.0
SGL49-14	49	8800	0.0	0.0
SGL49-15	49	8600	0.0	0.0
SGL45-16	45	8700	0.0	0.0
SGL45-17	45	8900	0.0	0.0
SGL45-18	45	9100	0.0	0.0
SGL45-19	45	9300	0.0	0.0
SGL45-20	45	9500	0.0	0.0
SGL45-21	45	9700	0.0	0.0
SGL45-22	45	9900	0.0	0.0
SGL41-23	41	10,000	0.0	0.0
SGL41-24	41	9800	0.0	0.0
SGL41-25	41	9600	0.0	0.0
SGL41-26	41	9400	0.0	0.0
SGL41-27	41	9200	0.0	0.0
SGL41-28	41	9000	0.0	0.0
SGL41-29	41	8800	0.0	0.0
SGL41-30	41	8600	0.0	0.0
SGL37-31	37	8700	0.0	0.0
SGL37-32	37	8900	0.0	0.0
SGL37-33	37	9100	No Sample (R)	No Sample (R)
SGL37-34	37	9300	0.0	0.0
SGL37-35	37	9500	0.0	0.0
SGL37-36	37	9700	0.0	0.0
SGL37-37	37	9900	0.0	0.0

Table 4.7-1
Summary of Soil Gas Results

Seneca Army Depot
SEAD-64D

Sample Name	Location		OVM Screen (ppm)	Concentration (ppmV as TCE)
	Line	Station		
SGL33-38	33	10,000	0.0	0.0
SGL33-39	33	9800	0.0	0.0
SGL33-40	33	9600	0.0	0.0
SGL33-41	33	9400	0.0	0.0
SGL33-42	33	9200	0.0	0.0
SGL33-43	33	9000	0.0	0.0
SGL33-44	33	8800	0.0	0.0
SGL33-45	33	8600	0.0	0.0
SGL33-46	33	8400	0.0	0.0
SGL33-47	33	8200	0.0	0.0
SGL33-48	33	8000	0.0	0.0
SGL33-49	33	7800	0.0	0.0
SGL33-50	33	7600	0.0	0.0
SGL33-51	33	7400	0.0	0.0
SGL33-52	33	7200	0.0	0.0
SGL29-53	29	7300	0.0	0.0
SGL29-54	29	7500	0.0	0.0
SGL29-55	29	7700	0.0	0.0
SGL29-56	29	7900	0.0	0.0
SGL29-57	29	8100	No Sample (R)	No Sample (R)
SGL29-58	29	8300	0.0	0.0
SGL29-59	29	8500	0.0	0.0
SGL29-60	29	8700	0.0	0.0
SGL29-61	29	8900	0.0	0.0
SGL29-62	29	9100	0.0	0.0
SGL29-63	29	9300	0.0	0.0
SGL29-64	29	9500	0.0	0.0
SGL29-65	29	9700	0.0	0.0
SGL29-66	29	9900	0.0	0.0
SGL25-67	25	10,000	0.0	0.0
SGL25-68	25	9800	0.0	0.0
SGL25-69	25	9600	0.0	0.0
SGL25-70	25	9400	0.0	0.0
SGL25-71	25	9200	0.0	0.0
SGL25-72	25	9000	0.0	0.0
SGL25-73	25	8800	0.0	0.0
SGL25-74	25	8600	0.0	0.0
SGL25-75	25	8400	0.0	0.0
SGL25-76	25	8200	0.0	0.0
SGL25-77	25	8000	0.0	0.0
SGL25-78	25	7800	0.0	0.0
SGL25-79	25	7600	0.0	0.0
SGL25-80	25	7400	No Sample (W)	No Sample (W)
SGL25-81	25	7200	0.0	0.0

Table 4.7-1
Summary of Soil Gas Results

Seneca Army Depot
SEAD-64D

Sample Name	Location		OVM Screen (ppm)	Concentration (ppmV as TCE)
	Line	Station		
SGL21-82	21	7300	0.0	0.0
SGL21-83	21	7500	0.0	0.0
SGL21-84	21	7700	0.0	0.0
SGL21-85	21	7900	No Sample (W)	No Sample (W)
SGL21-86	21	8100	0.0	0.0
SGL21-87	21	8300	0.0	0.0
SGL21-88	21	8500	0.0	0.0
SGL21-89	21	8700	0.0	0.0
SGL21-90	21	8900	0.0	0.0
SGL21-91	21	9100	0.0	0.0
SGL21-92	21	9300	0.0	0.0
SGL21-93	21	9500	0.0	0.0
SGL21-94	21	9700	0.0	0.0
SGL21-95	21	9900	0.0	0.0
SGL17-96	17	10,000	0.0	0.0
SGL17-97	17	9800	0.0	0.0
SGL17-98	17	9600	0.0	0.0
SGL17-99	17	9400	0.0	0.0
SGL17-100	17	9200	0.0	0.0
SGL17-101	17	9000	0.0	0.0
SGL17-102	17	8800	0.0	0.0
SGL17-103	17	8600	0.0	0.0
SGL17-104	17	8400	0.0	0.0
SGL17-105	17	8200	0.0	0.0
SGL17-106	17	8000	0.0	0.0
SGL17-107	17	7800	0.0	0.0
SGL17-108	17	7600	0.0	0.0
SGL17-109	17	7400	0.0	0.0
SGL13-110	13	7300	0.0	0.0
SGL13-111	13	7500	0.0	0.0
SGL13-112	13	7700	0.0	0.0
SGL13-113	13	7900	0.0	0.0
SGL13-114	13	8100	0.0	0.0
SGL13-115	13	8300	0.0	0.0
SGL13-116	13	8500	0.0	0.0
SGL13-117	13	8700	0.0	0.0
SGL13-118	13	8900	0.0	0.0
SGL13-119	13	9100	0.0	0.0
SGL13-120	13	9300	0.0	0.0
SGL13-121	13	9500	0.0	0.0
SGL13-122	13	9700	0.0	0.0
SGL13-123	13	9900	0.0	0.0

Table 4.7-1
Summary of Soil Gas Results

Seneca Army Depot
SEAD-64D

Sample Name	Location		OVM Screen (ppm)	Concentration (ppmV as TCE)
	Line	Station		
SGL9-124	9	10,000	0.0	0.0
SGL9-125	9	9800	0.0	0.0
SGL9-126	9	9600	0.0	0.0
SGL9-127	9	9400	0.0	0.0
SGL9-128	9	9200	0.0	0.0
SGL9-129	9	9000	0.0	0.0
SGL9-130	9	8800	0.0	0.0
SGL9-131	9	8600	0.0	0.0
SGL9-132	9	8400	0.0	0.0
SGL9-133	9	8200	0.0	0.0
SGL9-134	9	8000	0.0	0.0
SGL9-135	9	7800	0.0	0.0
SGL9-136	9	7600	0.0	0.0
SGL9-137	9	7400	0.0	0.0
SGL9-138	9	7250	0.0	0.0
SGL5-139	5	7300	0.0	0.0
SGL5-140	5	7500	No Sample (R)	No Sample (R)
SGL5-141	5	7700	0.0	0.0
SGL5-142	5	7900	0.0	0.0
SGL5-143	5	8100	0.0	0.0
SGL5-144	5	8300	0.0	0.0
SGL5-145	5	8500	0.0	0.0
SGL5-146	5	8700	0.0	0.0
SGL5-147	5	8900	0.0	0.0
SGL5-148	5	9100	No Sample (W)	No Sample (W)
SGL5-149	5	9300	No Sample (W)	No Sample (W)
SGL5-150	5	9500	0.0	0.0
SGL5-151	5	9700	No Sample (W)	No Sample (W)
SGL5-152	5	9900	0.0	0.0
Soil Gas Points Based on Geophysical Anomalies:				
SG-A	28	8980	0.0	0.0
SG-B	27	8795	0.0	0.0
SG-C	39	8960	0.0	0.0
SG-D	50	8780	0.0	0.0
SG-E	48	8970	0.0	0.0
SG-F	7	7520	No Sample (R)	No Sample (R)
SG-G	21	7600	0.0	0.0
SG-H	7	9770	0.0	0.0
SG-I	11	9530	0.0	0.0
SG-J	15	9780	0.0	0.0
SG-K	19	9940	0.0	0.0

Table 4.7-1
Summary of Soil Gas Results

Seneca Army Depot
SEAD-64D

Sample Name	Location		OVM Screen (ppm)	Concentration (ppmV as TCE)
	Line	Station		
SG-L	18	9540	0.0	0.0
SG-M	23	9360	0.0	0.0
SG-N	22	9620	0.0	0.0
SG-O	28	9760	0.0	0.0
SG-P	31	9400	0.0	0.0
SG-Q	42	9770	0.0	0.0
SG-S	44	9310	0.0	0.0
SG-T	15	7230	0.0	0.0

Notes:
1) Rod Blanks and field duplicates were collected daily for Quality Control.
2) "No Sample" indicates that high groundwater was present (W) or refusal was encountered within 2.5 feet (R); therefore no soil gas sample was collected.
3) The grid soil gas samples were collected prior the geophysically anomaly samples.

TABLE 4.7-2

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-64 0-0.2 04/14/94 SS64D-1 217694 43535	SOIL SEAD-64 0-0.2 04/14/94 SS64D-2 217695 43535	SOIL SEAD-64 0-0.2 04/14/94 SS64D-3 217696 43535	SOIL SEAD-64 0-0.2 04/14/94 SS64D-4 217697 43535	SOIL SEAD-64 0-0.2 04/14/94 SS64D-5 217698 43535	SOIL SEAD-64 0-0.2 06/23/94 SB64D-1-00 225467 44799
VOLATILE ORGANICS											
Methylene Chloride	ug/Kg	3	23%	100	0	2 J	3 J	14 U	12 U	2 J	11 U
2-Butanone	ug/Kg	8	3%	300	0	14 U	14 U	14 U	12 U	14 U	11 U
Toluene	ug/Kg	1	3%	1500	0	14 U	14 U	14 U	12 U	14 U	11 U
SEMIVOLATILE ORGANICS											
Phenol	ug/Kg	42	6%	NA	NA	460 U	470 U	440 U	400 U	420 U	370 U
Naphthalene	ug/Kg	31	6%	13000	0	460 U	470 U	29 J	400 U	420 U	370 U
2-Methylnaphthalene	ug/Kg	49	14%	36400	0	30 J	27 J	49 J	400 U	420 U	370 U
Phenanthrene	ug/Kg	100	31%	50000*	0	35 J	36 J	57 J	400 U	24 J	370 U
Di-n-butylphthalate	ug/Kg	77	49%	8100	0	460 U	470 U	440 U	400 U	420 U	370 U
Fluoranthene	ug/Kg	240	43%	50000*	0	47 J	62 J	99 J	21 J	33 J	370 U
Pyrene	ug/Kg	160	40%	50000*	0	38 J	47 J	81 J	20 J	25 J	370 U
Benzo(a)anthracene	ug/Kg	86	20%	224	0	22 J	23 J	41 J	400 U	420 U	370 U
Chrysene	ug/Kg	110	26%	400	0	34 J	36 J	53 J	400 U	22 J	370 U
bis(2-Ethylhexyl)phthalate	ug/Kg	1100	43%	50000*	0	120 J	470 U	440 U	19 J	420 U	370 U
Di-n-octylphthalate	ug/Kg	75	3%	50000*	0	460 U	470 U	440 U	400 U	420 U	370 U
Benzo(b)fluoranthene	ug/Kg	160	23%	1100	0	26 J	28 J	39 J	400 U	420 U	370 U
Benzo(k)fluoranthene	ug/Kg	110	17%	1100	0	27 J	470 U	53 J	400 U	420 U	370 U
Benzo(a)pyrene	ug/Kg	77	23%	61	3	25 J	27 J	43 J	400 U	420 U	370 U
Indeno(1,2,3-cd)pyrene	ug/Kg	61	14%	3200	0	460 U	470 U	26 J	400 U	420 U	370 U
Dibenz(a,h)anthracene	ug/Kg	40	11%	14	4	460 U	470 U	440 U	400 U	420 U	370 U
Benzo(g,h,i)perylene	ug/Kg	68	17%	50000*	0	460 U	470 U	23 J	400 U	420 U	370 U
METALS											
Aluminum	mg/Kg	20800	100%	14593	17	11300	8930	12900	12000	10300	16700
Antimony	mg/Kg	0.49	26%	3.59	0	0.24 UJ	0.16 UJ	0.18 UJ	0.19 J	0.19 UJ	0.23 UJ
Arsenic	mg/Kg	7.8	100%	7.5	1	4.3	3.9	6.4	4.5	3.6	6.1
Barium	mg/Kg	152	100%	300	0	76.4	74.6	89.3	61.8	77.3	87.7
Beryllium	mg/Kg	0.99	100%	.73	15	0.53 J	0.43 J	0.65 J	0.56 J	0.45 J	0.76 J
Cadmium	mg/Kg	0.97	100%	1	0	0.38 J	0.35 J	0.42 J	0.42 J	0.27 J	0.76 J
Calcium	mg/Kg	162000	100%	101904	3	88900	129000	34900	84800	84100	10600
Chromium	mg/Kg	29.6	100%	22	14	18.3	13.5	20.4	18.8	15.3	25.2
Cobalt	mg/Kg	18.6	100%	30	0	9.3 J	7.8 J	12.7	8.8	7.3 J	12.8
Copper	mg/Kg	32.7	100%	25	10	18.8	14.5	20.6	19.7	15.5	28.1
Iron	mg/Kg	36600	100%	26627	18	23200	17800	28400	22900	17000	33800
Lead	mg/Kg	60.7	100%	21.9	3	13.2	11.4	18.7	10	12.2	14.2
Magnesium	mg/Kg	16300	100%	12222	2	7720	9080	7460	13400	11600	6610
Manganese	mg/Kg	1240	100%	669	18	475 J	424 J	750 J	457 J	323 J	606
Mercury	mg/Kg	0.08	69%	0.1	0	0.02 J	0.01 J	0.02 J	0.01 J	0.01 J	0.02 J
Nickel	mg/Kg	41.2	100%	34	8	25.7	20.3	32.4	28.5	20.3	40.3
Potassium	mg/Kg	3240	100%	1762	20	1610	1480	1590	2200	2330	1870 J
Selenium	mg/Kg	2	80%	2	0	0.53 J	0.27 U	0.49 J	0.21 U	0.33 U	1.7
Sodium	mg/Kg	266	89%	104	5	100 J	95.7 J	59.6 J	151 J	30.3 J	43.6 J
Thallium	mg/Kg	0.76	46%	0.28	16	0.39 U	0.25 U	0.28 U	0.2 U	0.31 U	0.33 U
Vanadium	mg/Kg	35.3	100%	150	0	18.2	14.1	21.1	18.5	18.4	24.7
Zinc	mg/Kg	111	100%	83	19	72.6	63.1	87.9	80.4	54.8	102
OTHER ANALYSES											
Total Solids	%W/W					71.4	70.1	74.1	82.2	78.6	90.5

TABLE 4.7-2

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-64 0.2-1.2 06/23/94 SB64D-1-01 225468 44799	SOIL SEAD-64 2-3 06/23/94 SB64D-1-02 225469 44799	SOIL SEAD-64 0-0.2 06/23/94 SB64D-2-00 225470 44799	SOIL SEAD-64 2-3.5 06/23/94 SB64D-2-02 225471 44799	SOIL SEAD-64 4-6 06/23/94 SB64D-2-03 225472 44799	SOIL SEAD-64 0-0.2 06/24/94 SB64D-3-00 225473 44799
VOLATILE ORGANICS											
Methylene Chloride	ug/Kg	3	23%	100	0	1 J	1 J	12 U	12 U	11 U	13 U
2-Butanone	ug/Kg	8	3%	300	0	12 U	11 U	12 U	12 U	11 U	13 U
Toluene	ug/Kg	1	3%	1500	0	12 U	11 U	12 U	12 U	11 U	13 U
SEMIVOLATILE ORGANICS											
Phenol	ug/Kg	42	6%	NA	NA	380 U	360 U	380 U	410 U	350 U	42 J
Naphthalene	ug/Kg	31	6%	13000	0	380 U	360 U	380 U	410 U	350 U	440 U
2-Methylnaphthalene	ug/Kg	49	14%	36400	0	380 U	360 U	380 U	410 U	350 U	440 U
Phenanthrene	ug/Kg	100	31%	50000*	0	380 U	360 U	380 U	410 U	350 U	98 J
Di-n-butylphthalate	ug/Kg	77	49%	8100	0	380 U	360 U	380 U	410 U	350 U	37 J
Fluoranthene	ug/Kg	240	43%	50000*	0	380 U	360 U	380 U	410 U	350 U	240 J
Pyrene	ug/Kg	160	40%	50000*	0	380 U	360 U	380 U	410 U	350 U	160 J
Benzo(a)anthracene	ug/Kg	86	20%	224	0	380 U	360 U	380 U	410 U	350 U	86 J
Chrysene	ug/Kg	110	26%	400	0	380 U	360 U	380 U	410 U	350 U	110 J
bis(2-Ethylhexyl)phthalate	ug/Kg	1100	43%	50000*	0	32 J	29 J	25 J	410 U	33 J	96 J
Di-n-octylphthalate	ug/Kg	75	3%	50000*	0	380 U	360 U	380 U	410 U	350 U	440 U
Benzo(b)fluoranthene	ug/Kg	160	23%	1100	0	380 U	360 U	380 U	410 U	350 U	86 J
Benzo(k)fluoranthene	ug/Kg	110	17%	1100	0	380 U	360 U	380 U	410 U	350 U	110 J
Benzo(a)pyrene	ug/Kg	77	23%	61	3	380 U	360 U	380 U	410 U	350 U	77 J
Indeno(1,2,3-cd)pyrene	ug/Kg	61	14%	3200	0	380 U	360 U	380 U	410 U	350 U	61 J
Dibenz(a,h)anthracene	ug/Kg	40	11%	14	4	380 U	360 U	380 U	410 U	350 U	34 J
Benzo(g,h,i)perylene	ug/Kg	68	17%	50000*	0	380 U	360 U	380 U	410 U	350 U	54 J
METALS											
Aluminum	mg/Kg	20800	100%	14593	17	14100	7480	14800	17600	11100	14200
Antimony	mg/Kg	0.49	26%	3.59	0	0.17 UJ	0.17 UJ	0.22 UJ	0.28 UJ	0.21 UJ	0.26 UJ
Arsenic	mg/Kg	7.8	100%	7.5	1	6.9	3.8	6.2	6.3	5	5.9
Barium	mg/Kg	152	100%	300	0	81.5	38.5	93.2	115	45.3	103
Beryllium	mg/Kg	0.99	100%	.73	15	0.7	0.32 J	0.73 J	0.93 J	0.5 J	0.71 J
Cadmium	mg/Kg	0.97	100%	1	0	0.66 J	0.54 J	0.78 J	0.97 J	0.65 J	0.64 J
Calcium	mg/Kg	162000	100%	101904	3	3830	36900	13800	4250	45600	4900
Chromium	mg/Kg	29.6	100%	22	14	22.1	11.8	21.7	25.3	16.9	18.6
Cobalt	mg/Kg	18.6	100%	30	0	11.5	7.7	11.8	18.6	11.1	8.1 J
Copper	mg/Kg	32.7	100%	25	10	27.5	18.7	24.9	22.1	20.6	21.6
Iron	mg/Kg	36600	100%	26627	18	32000	16800	29800	36600	24200	23200
Lead	mg/Kg	60.7	100%	21.9	3	15.1	8.8	60.7	15.5	8.2	19.1
Magnesium	mg/Kg	16300	100%	12222	2	5240	11800	5700	5850	9520	3800
Manganese	mg/Kg	1240	100%	669	18	640	415	688	1240	476	549
Mercury	mg/Kg	0.08	69%	0.1	0	0.04 J	0.02 J	0.05 J	0.06 J	0.02 J	0.08 J
Nickel	mg/Kg	41.2	100%	34	8	37.8	20.6	31.4	41.2	28	22.5
Potassium	mg/Kg	3240	100%	1762	20	1380 J	1080 J	1800 J	1470 J	1190 J	1820 J
Selenium	mg/Kg	2	80%	2	0	1.4	0.44 J	1.6	1.6	0.62 J	2
Sodium	mg/Kg	266	89%	104	5	35.7 J	26.4 J	50.4 J	35.9 J	78.9 J	19.7 U
Thallium	mg/Kg	0.76	46%	0.28	16	0.45 J	0.3 J	0.32 U	0.41 U	0.3 U	0.58 J
Vanadium	mg/Kg	35.3	100%	150	0	23.3	13.5	22.1	23.9	15.8	22.4
Zinc	mg/Kg	111	100%	83	19	95.3	63.1	93	98.4	86.1	82.9
OTHER ANALYSES											
Total Solids	%W/W					86.5	91.2	85.9	81.3	93.2	74.7

TABLE 4.7-2

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-64 0.2-2 06/24/94 SB64D-3-01 225497 45048	SOIL SEAD-64 2-3.2 06/24/94 SB64D-3-02 225498 45048	SOIL SEAD-64 0-0.2 06/24/94 SB64D-4-00 225522 45048	SOIL SEAD-64 0.2-2.0 06/24/94 SB64D-4-01 225523 45048	SOIL SEAD-64 2-4 06/24/94 SB64D-4-02 225524 45048
VOLATILE ORGANICS										
Methylene Chloride	ug/Kg	3	23%	100	0	11 U	12 U	14 U	12 U	11 U
2-Butanone	ug/Kg	8	3%	300	0	11 U	12 U	14 U	12 U	11 U
Toluene	ug/Kg	1	3%	1500	0	11 U	12 U	14 U	12 U	11 U
SEMIVOLATILE ORGANICS										
Phenol	ug/Kg	42	6%	NA	NA	390 U	42 J	460 U	420 U	370 U
Naphthalene	ug/Kg	31	6%	13000	0	390 U	390 U	460 U	420 U	370 U
2-Methylnaphthalene	ug/Kg	49	14%	36400	0	390 U	390 U	460 U	420 U	370 U
Phenanthrene	ug/Kg	100	31%	50000*	0	22 J	390 U	36 J	420 U	370 U
Di-n-butylphthalate	ug/Kg	77	49%	8100	0	390 U	37 J	71 J	420 U	370 U
Fluoranthene	ug/Kg	240	43%	50000*	0	31 J	390 U	61 J	420 U	370 U
Pyrene	ug/Kg	160	40%	50000*	0	20 J	390 U	54 J	420 U	370 U
Benzo(a)anthracene	ug/Kg	86	20%	224	0	390 U	390 U	38 J	420 U	370 U
Chrysene	ug/Kg	110	26%	400	0	390 U	390 U	41 J	420 U	370 U
bis(2-Ethylhexyl)phthalate	ug/Kg	1100	43%	50000*	0	390 U	390 U	39 J	1100	34 J
Di-n-octylphthalate	ug/Kg	75	3%	50000*	0	390 U	390 U	460 U	420 U	370 U
Benzo(b)fluoranthene	ug/Kg	160	23%	1100	0	390 U	390 U	61 J	420 U	370 U
Benzo(k)fluoranthene	ug/Kg	110	17%	1100	0	390 U	390 U	47 J	420 U	370 U
Benzo(a)pyrene	ug/Kg	77	23%	61	3	390 U	390 U	68 J	420 U	370 U
Indeno(1,2,3-cd)pyrene	ug/Kg	61	14%	3200	0	390 U	390 U	53 J	420 U	370 U
Dibenz(a,h)anthracene	ug/Kg	40	11%	14	4	390 U	390 U	40 J	420 U	370 U
Benzo(g,h,i)perylene	ug/Kg	68	17%	50000*	0	390 U	390 U	68 J	420 U	370 U
METALS										
Aluminum	mg/Kg	20800	100%	14593	17	14900	16100	17400	20100	9770
Antimony	mg/Kg	0.49	26%	3.59	0	0.22 J	0.47 J	0.4 J	0.3 UJ	0.21 UJ
Arsenic	mg/Kg	7.8	100%	7.5	1	5.9	6	6.6	6.9	4.3
Barium	mg/Kg	152	100%	300	0	92.1	111	116	114	62.7
Beryllium	mg/Kg	0.99	100%	.73	15	0.74	0.73 J	0.78 J	0.81 J	0.46 J
Cadmium	mg/Kg	0.97	100%	1	0	0.36 J	0.51 J	0.43 J	0.4 J	0.41 J
Calcium	mg/Kg	162000	100%	101904	3	3060 J	4940 J	5120 J	11800 J	130000 J
Chromium	mg/Kg	29.6	100%	22	14	20.7	20.5	22.9	27.7	14.3
Cobalt	mg/Kg	18.6	100%	30	0	10.4	8.5 J	11.5 J	13.6	9.7
Copper	mg/Kg	32.7	100%	25	10	20.7	24	20.6	25.2	17.5
Iron	mg/Kg	36600	100%	26627	18	26900	24400	28300	34800	20500
Lead	mg/Kg	60.7	100%	21.9	3	17 J	19.3 J	21.5 J	15.6 J	7.4 J
Magnesium	mg/Kg	16300	100%	12222	2	3890	4110	3990	5330	9290
Manganese	mg/Kg	1240	100%	669	18	690	564	884	859	751
Mercury	mg/Kg	0.08	69%	0.1	0	0.07 J	0.06 J	0.08	0.06 J	0.02 J
Nickel	mg/Kg	41.2	100%	34	8	25.8	23.6	27.2	35.6	24.8
Potassium	mg/Kg	3240	100%	1762	20	1440 J	2130 J	2280 J	2020 J	1520 J
Selenium	mg/Kg	2	80%	2	0	1.3	1.2	1.7	1.1 J	0.51 J
Sodium	mg/Kg	266	89%	104	5	14.5 U	25.4 J	27.1 U	28.6 J	90.4 J
Thallium	mg/Kg	0.76	46%	0.28	16	0.41 J	0.48 J	0.52 U	0.44 U	0.31 U
Vanadium	mg/Kg	35.3	100%	150	0	23.7	25.4	26.9	30.8	14.4
Zinc	mg/Kg	111	100%	83	19	85.8	89	91	88.3	63.9
OTHER ANALYSES										
Total Solids	%W/W					85.4	84.4	71.2	78.5	89.9

TABLE 4.7-2

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-64 0-0.2 06/25/94 SB64D-5.00 225570 45058	SOIL SEAD-64 2-4 06/25/94 SB64D-5.02 225571 45058	SOIL SEAD-64 4-6 06/25/94 SB64D-5.03 225572 45058	SOIL SEAD-64 0-0.2 06/25/94 SB64D-6.00 225573 45058	SOIL SEAD-64 0.2-2 06/25/94 SB64D-6.01 225574 45058	SOIL SEAD-64 2-4 06/25/94 SB64D-6.02 225575 45058
VOLATILE ORGANICS											
Methylene Chloride	ug/Kg	3	23%	100	0	13 U	1 J	12 U	13 U	12 U	1 J
2-Butanone	ug/Kg	8	3%	300	0	13 U	12 U	12 U	13 U	12 U	11 U
Toluene	ug/Kg	1	3%	1500	0	13 U	1 J	12 U	13 U	12 U	11 U
SEMIVOLATILE ORGANICS											
Phenol	ug/Kg	42	6%	NA	NA	450 U	380 U	370 U	440 U	380 U	370 U
Naphthalene	ug/Kg	31	6%	13000	0	31 J	380 U	370 U	440 U	380 U	370 U
2-Methylnaphthalene	ug/Kg	49	14%	36400	0	46 J	22 J	370 U	440 U	380 U	370 U
Phenanthrene	ug/Kg	100	31%	50000*	0	100 J	29 J	370 U	34 J	380 U	370 U
Di-n-butylphthalate	ug/Kg	77	49%	8100	0	77 J	46 J	75 J	76 J	32 J	74 J
Fluoranthene	ug/Kg	240	43%	50000*	0	140 J	25 J	370 U	52 J	380 U	370 U
Pyrene	ug/Kg	160	40%	50000*	0	100 J	380 U	370 U	41 J	380 U	370 U
Benzo(a)anthracene	ug/Kg	86	20%	224	0	66 J	380 U	370 U	43 J	380 U	370 U
Chrysene	ug/Kg	110	26%	400	0	97 J	28 J	370 U	47 J	380 U	370 U
bis(2-Ethylhexyl)phthalate	ug/Kg	1100	43%	50000*	0	450 U	380 U	370 U	440 U	380 U	370 U
Di-n-octylphthalate	ug/Kg	75	3%	50000*	0	450 U	380 U	370 U	75 J	380 U	370 U
Benzo(b)fluoranthene	ug/Kg	160	23%	1100	0	160 J	22 J	370 U	48 J	380 U	370 U
Benzo(k)fluoranthene	ug/Kg	110	17%	1100	0	450 UJ	21 J	370 U	47 J	380 U	370 U
Benzo(a)pyrene	ug/Kg	77	23%	61	3	64 J	23 J	370 U	47 J	380 U	370 U
Indeno(1,2,3-cd)pyrene	ug/Kg	61	14%	3200	0	53 J	380 U	370 U	43 J	380 U	370 U
Dibenz(a,h)anthracene	ug/Kg	40	11%	14	4	34 J	380 U	370 U	33 J	380 U	370 U
Benzo(g,h,i)perylene	ug/Kg	68	17%	50000*	0	41 J	22 J	370 U	46 J	380 U	370 U
METALS											
Aluminum	mg/Kg	20800	100%	14593	17	16400	16900	20800	14500	18900	12200
Antimony	mg/Kg	0.49	26%	3.59	0	0.49 J	0.24 UJ	0.28 UJ	0.22 J	0.23 UJ	0.22 UJ
Arsenic	mg/Kg	7.8	100%	7.5	1	5.8 J	6 J	6 J	5.6 J	5.5 J	3.4 J
Barium	mg/Kg	152	100%	300	0	116	123	110	113	152	59.1
Beryllium	mg/Kg	0.99	100%	.73	15	0.88 J	0.8 J	0.87 J	0.72 J	0.88 J	0.56 J
Cadmium	mg/Kg	0.97	100%	1	0	0.75 J	0.43 J	0.4 J	0.48 J	0.45 J	0.35 J
Calcium	mg/Kg	162000	100%	101904	3	4770	3260	2760	3700	3630	30500
Chromium	mg/Kg	29.6	100%	22	14	22.4	23.3	29.6	20	24	19.5
Cobalt	mg/Kg	18.6	100%	30	0	10.5 J	11.4	12.9	10.1	10.7	11.1
Copper	mg/Kg	32.7	100%	25	10	22.7	21.6	23.7	27.2	24.9	17
Iron	mg/Kg	36600	100%	26627	18	25600	29000	34600	24300	28200	25300
Lead	mg/Kg	60.7	100%	21.9	3	29.9	13.5	13.4	16.4	13.1	6.1
Magnesium	mg/Kg	16300	100%	12222	2	3970	4540	6030	3980	4650	7390
Manganese	mg/Kg	1240	100%	669	18	698	851	638	627	851	645
Mercury	mg/Kg	0.08	69%	0.1	0	0.14 R	0.07 J R	0.04 J R	0.06 J R	0.06 J R	0.01 U
Nickel	mg/Kg	41.2	100%	34	8	25.7	28.2	39.5	24.7	26.1	30.8
Potassium	mg/Kg	3240	100%	1762	20	3240 J	2470 J	3090 J	2170 J	2340 J	1220 J
Selenium	mg/Kg	2	80%	2	0	1.6	1.1	1.2	0.94	1.2	0.46 U
Sodium	mg/Kg	266	89%	104	5	71.2 J	90 J	99.7 J	75 J	94.9 J	170 J
Thallium	mg/Kg	0.76	46%	0.28	16	0.65 J	0.5 J	0.53 J	0.74 J	0.34 U	0.33 U
Vanadium	mg/Kg	35.3	100%	150	0	26.6	26.4	32	24.9	31.9	16.6
Zinc	mg/Kg	111	100%	83	19	111 J	83.3 J	101 J	70.3 J	77 J	60.7 J
OTHER ANALYSES											
Total Solids	%W/W					73.6	85.9	88.2	75.2	85.8	88

TABLE 4.7-2

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-64 0-0.2 06/24/94 SB64D-7-00 225525 45048	SOIL SEAD-64 0.2-2.0 06/24/94 SB64D-7-01 225526 45048	SOIL SEAD-64 2-4 06/24/94 SB64D-7-02 225527 45048	SOIL SEAD-64 0-0.2 06/24/94 SB64D-8-00 225528 45048	SOIL SEAD-64 0.2-2.0 06/24/94 SB64D-8-01 225529 45048	SOIL SEAD-64 2-4 06/24/94 SB64D-8-02 225530 45048
VOLATILE ORGANICS											
Methylene Chloride	ug/Kg	3	23%	100	0	14 U	12 U	11 U	13 UJ	12 U	11 U
2-Butanone	ug/Kg	8	3%	300	0	14 U	12 U	11 U	13 UJ	8 J	11 U
Toluene	ug/Kg	1	3%	1500	0	14 U	12 U	11 U	13 UJ	12 U	11 U
SEMIVOLATILE ORGANICS											
Phenol	ug/Kg	42	6%	NA	NA	460 U	390 U	360 U	450 U	380 U	370 U
Naphthalene	ug/Kg	31	6%	13000	0	460 U	390 U	360 U	450 U	380 U	370 U
2-Methylnaphthalene	ug/Kg	49	14%	36400	0	460 U	390 U	360 U	450 U	380 U	370 U
Phenanthrene	ug/Kg	100	31%	50000*	0	460 U	390 U	360 U	24 J	380 U	370 U
Di-n-butylphthalate	ug/Kg	77	49%	8100	0	54 J	390 U	360 U	56 J	44 J	370 U
Fluoranthene	ug/Kg	240	43%	50000*	0	39 J	390 U	360 U	48 J	380 U	370 U
Pyrene	ug/Kg	160	40%	50000*	0	41 J	390 U	360 U	54 J	380 U	370 U
Benzo(a)anthracene	ug/Kg	86	20%	224	0	460 U	390 U	360 U	450 U	380 U	370 U
Chrysene	ug/Kg	110	26%	400	0	460 U	390 U	360 U	450 U	380 U	370 U
bis(2-Ethylhexyl)phthalate	ug/Kg	1100	43%	50000*	0	66 J	58 J	46 J	48 J	380 U	32 J
Di-n-octylphthalate	ug/Kg	75	3%	50000*	0	460 U	390 U	360 U	450 U	380 U	370 U
Benzo(b)fluoranthene	ug/Kg	160	23%	1100	0	460 U	390 U	360 U	450 U	380 U	370 U
Benzo(k)fluoranthene	ug/Kg	110	17%	1100	0	460 U	390 U	360 U	450 U	380 U	370 U
Benzo(a)pyrene	ug/Kg	77	23%	61	3	460 U	390 U	360 U	450 U	380 U	370 U
Indeno(1,2,3-cd)pyrene	ug/Kg	61	14%	3200	0	460 U	390 U	360 U	450 U	380 U	370 U
Dibenz(a,h)anthracene	ug/Kg	40	11%	14	4	460 U	390 U	360 U	450 U	380 U	370 U
Benzo(g,h,i)perylene	ug/Kg	68	17%	50000*	0	460 U	390 U	360 U	450 U	380 U	370 U
METALS											
Aluminum	mg/Kg	20800	100%	14593	17	17700	17500	13000	16100	15500	12400
Antimony	mg/Kg	0.49	26%	3.59	0	0.25 UJ	0.25 UJ	0.24 UJ	0.28 UJ	0.22 UJ	0.27 UJ
Arsenic	mg/Kg	7.8	100%	7.5	1	5.7	5.7	3.7	5.8	4.5	5.3
Barium	mg/Kg	152	100%	300	0	127	124	59.3	116	85	65.6
Beryllium	mg/Kg	0.99	100%	.73	15	0.82 J	0.85 J	0.6 J	0.81 J	0.68 J	0.56 J
Cadmium	mg/Kg	0.97	100%	1	0	0.49 J	0.42 J	0.46 J	0.61 J	0.49 J	0.44 J
Calcium	mg/Kg	162000	100%	101904	3	5980 J	3690 J	80900 J	10900 J	29700 J	64000 J
Chromium	mg/Kg	29.6	100%	22	14	23.9	24.1	19	23.3	21.3	19.3
Cobalt	mg/Kg	18.6	100%	30	0	11.5	12.2	11.7	13.9	10.8	12.7
Copper	mg/Kg	32.7	100%	25	10	32.7	28.5	17.2	28	21.2	22.4
Iron	mg/Kg	36600	100%	26627	18	30100	34400	26600	32500	28200	28600
Lead	mg/Kg	60.7	100%	21.9	3	18.9 J	15.8 J	13.8 J	32.5 J	9.9 J	9 J
Magnesium	mg/Kg	16300	100%	12222	2	4350	4980	5810	5740	6010	8170
Manganese	mg/Kg	1240	100%	669	18	776	830	642	1040	659	748
Mercury	mg/Kg	0.08	69%	0.1	0	0.07 J	0.05	0.04 J	0.06 J	0.04 J	0.02 J
Nickel	mg/Kg	41.2	100%	34	8	28	30.5	29.5	34.4	29.4	34.7
Potassium	mg/Kg	3240	100%	1762	20	2550 J	1670 J	1790 J	2030 J	1840 J	1390 J
Selenium	mg/Kg	2	80%	2	0	1.2	1.7	0.62 J	1.9	1.3	0.55 U
Sodium	mg/Kg	266	89%	104	5	27.5 J	22.6 J	90.6 J	21.3 U	37.3 J	94.7 J
Thallium	mg/Kg	0.76	46%	0.28	16	0.47 J	0.37 U	0.57 J	0.57 J	0.32 U	0.39 U
Vanadium	mg/Kg	35.3	100%	150	0	28.3	27.2	16.7	23.9	22.3	16.7
Zinc	mg/Kg	111	100%	83	19	90.8	86	69.8	106	85.2	85.9
OTHER ANALYSES											
Total Solids	%W/W					71.2	83.8	92.3	73.6	86	89.5

TABLE 4.7-2

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

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-64 0-0.2 06/25/94 SB64D-9.00 225576 45058	SOIL SEAD-64 0.2-2 06/25/94 SB64D-9.01 225577 45058	SOIL SEAD-64 2-4 06/25/94 SB64D-9.02 225578 45058	SOIL SEAD-64 0-0.2 06/25/94 SB64D-10.00 225579 45058	SOIL SEAD-64 0.2-2 06/25/94 SB64D-10.01 225580 45058	SOIL SEAD-64 4-5.1 06/25/94 SB64D-10.03 225581 45058
VOLATILE ORGANICS											
Methylene Chloride	ug/Kg	3	23%	100	0	13 U	12 U	1 J	14 U	12 U	12 U
2-Butanone	ug/Kg	8	3%	300	0	13 U	12 U	11 U	14 U	12 U	12 U
Toluene	ug/Kg	1	3%	1500	0	13 U	12 U	11 U	14 U	12 U	12 U
SEMIVOLATILE ORGANICS											
Phenol	ug/Kg	42	6%	NA	NA	450 U	400 U	360 U	460 U	400 U	370 U
Naphthalene	ug/Kg	31	6%	13000	0	450 U	400 U	360 U	460 U	400 U	370 U
2-Methylnaphthalene	ug/Kg	49	14%	36400	0	450 U	400 U	360 U	460 U	400 U	370 U
Phenanthrene	ug/Kg	100	31%	50000*	0	450 U	400 U	360 U	460 U	400 U	370 U
Di-n-butylphthalate	ug/Kg	77	49%	8100	0	53 J	34 J	360 U	70 J	45 J	24 J
Fluoranthene	ug/Kg	240	43%	50000*	0	33 J	400 U	360 U	38 J	400 U	370 U
Pyrene	ug/Kg	160	40%	50000*	0	24 J	400 U	360 U	33 J	400 U	370 U
Benzo(a)anthracene	ug/Kg	86	20%	224	0	450 U	400 U	360 U	460 U	400 U	370 U
Chrysene	ug/Kg	110	26%	400	0	450 U	400 U	360 U	460 U	400 U	370 U
bis(2-Ethylhexyl)phthalate	ug/Kg	1100	43%	50000*	0	450 U	400 U	360 U	460 U	400 U	370 U
Di-n-octylphthalate	ug/Kg	75	3%	50000*	0	450 U	400 U	360 U	460 U	400 U	370 U
Benzo(b)fluoranthene	ug/Kg	160	23%	1100	0	450 U	400 U	360 U	460 U	400 U	370 U
Benzo(k)fluoranthene	ug/Kg	110	17%	1100	0	450 U	400 U	360 U	460 U	400 U	370 U
Benzo(a)pyrene	ug/Kg	77	23%	61	3	450 U	400 U	360 U	460 U	400 U	370 U
Indeno(1,2,3-cd)pyrene	ug/Kg	61	14%	3200	0	450 U	400 U	360 U	460 U	400 U	370 U
Dibenz(a,h)anthracene	ug/Kg	40	11%	14	4	450 U	400 U	360 U	460 U	400 U	370 U
Benzo(g,h,i)perylene	ug/Kg	68	17%	50000*	0	450 U	400 U	360 U	460 U	400 U	370 U
METALS											
Aluminum	mg/Kg	20800	100%	14593	17	13800	15800	12600	12100	19900	9180
Antimony	mg/Kg	0.49	26%	3.59	0	0.31 UJ	0.25 J	0.33 J	0.28 UJ	0.26 UJ	0.35 J
Arsenic	mg/Kg	7.8	100%	7.5	1	6 J	6.7 J	5.2 J	4.6 J	7.8 J	4.4 J
Barium	mg/Kg	152	100%	300	0	110	107	62.5	100	147	97.7
Beryllium	mg/Kg	0.99	100%	.73	15	0.82 J	0.84 J	0.61 J	0.66 J	0.99 J	0.47 J
Cadmium	mg/Kg	0.97	100%	1	0	0.53 J	0.51 J	0.38 J	0.43 J	0.56 J	0.4 J
Calcium	mg/Kg	162000	100%	101904	3	3090	16300	47700	4750	5810	162000
Chromium	mg/Kg	29.6	100%	22	14	20.2	23.7	19.9	16.7	27.5	14.5
Cobalt	mg/Kg	18.6	100%	30	0	11.2 J	12.8	9.8 J	8.5 J	11.9	6.7 J
Copper	mg/Kg	32.7	100%	25	10	30.4	28.3	23.5	25	26.8	15.7
Iron	mg/Kg	36600	100%	26627	18	25500	32500	26000	21000	36200	17000
Lead	mg/Kg	60.7	100%	21.9	3	19.1	12.6	9.7	17.5	13.6	8
Magnesium	mg/Kg	16300	100%	12222	2	3620	4850	5700	3140	5180	16300
Manganese	mg/Kg	1240	100%	669	18	973	971	539	684	776	352
Mercury	mg/Kg	0.08	69%	0.1	0	0.06 J R	0.47 R	0.09 J R	0.11 J R	0.06 J R	0.03 J
Nickel	mg/Kg	41.2	100%	34	8	25.1	34	31.5	18.1	35.3	19
Potassium	mg/Kg	3240	100%	1762	20	1970 J	1530 J	1540 J	1670 J	2300 J	2040 J
Selenium	mg/Kg	2	80%	2	0	1 J	1.2	0.54 U	1.3	1.3	0.5 U
Sodium	mg/Kg	266	89%	104	5	103 J	101 J	148 J	97.3 J	108 J	266 J
Thallium	mg/Kg	0.76	46%	0.28	16	0.66 J	0.76 J	0.38 U	0.49 J	0.62 J	0.35 U
Vanadium	mg/Kg	35.3	100%	150	0	23.7	23.9	19.1	21.4	35.3	17.3
Zinc	mg/Kg	111	100%	83	19	72.9 J	81.8 J	75.7 J	61.8 J	89.4 J	40.6 J
OTHER ANALYSES											
Total Solids	%W/W					73.9	82.4	91	71.1	82.2	87.7

NOTES:
b) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) 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.

4.7.3.4 Metals

A variety of samples were found to contain metals at concentrations that exceeded the associated TAGM. Of the 22 metals reported, 14 were found in one or more samples at concentrations above the TAGM values. There is no apparent pattern to the distribution or occurrence of the metals concentrations that exceeded a TAGM value.

4.7.4 Groundwater

Groundwater from five monitoring wells was sampled as part of the investigation of SEAD-64D. The summary of chemical analyses are presented in Table 4.7-3. The following sections describe the nature and extent of groundwater contamination identified at SEAD-64D.

4.7.4.1 Volatile Organic Compounds

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

4.7.4.2 Semivolatile Organic Compounds

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

4.7.4.3 Pesticides and PCBs

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

4.7.4.4 Metals

Seven metals (aluminum, iron, lead, manganese, nickel, thallium, and zinc) were detected in groundwater samples at SEAD-64D at concentrations above NY AWQS Class GA and/or Federal Primary and Secondary Drinking Water MCLs. Of these seven metals, all but two (thallium and zinc) exhibited an increase in concentration coincidentally with the turbidity of the sample. Aluminum and iron concentrations in wells downgradient were up to two orders of magnitude greater than the background well concentration. A turbidity of 1.5 NTUs was measured in the background sample, whereas the downgradient samples ranged from 127 to

TABLE 4.7-3

SENECA ARMY DEPOT
SEAD-64D ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NUMBER ABOVE CRITERIA	FEDERAL DRINKING WATER MCL (h)	NUMBER ABOVE CRITERIA	WATER SEAD-64 07/08/94 MW64D-1 226385 45257	WATER SEAD-64 07/09/94 MW64D-2 226386 45257	WATER SEAD-64 07/08/94 MW64D-3 226387 45257	WATER SEAD-64 07/08/94 MW64D-4 226388 45257	WATER SEAD-64 07/18/94 MW64D-5 227269 45332
METALS												
Aluminum	ug/L	30100	100%	NA	NA	50-200 *	5	177 J	1390	453	494	30100 J
Antimony	ug/L	1.5	20%	3	0	6	0	1.3 U	1.3 U	1.5 J	1.3 U	1.3 U
Arsenic	ug/L	10	20%	25	0	NA	NA	2 U	2 U	2 U	2 U	10
Barium	ug/L	693	100%	1000	0	2000	0	88.6 J	62.8 J	75.9 J	63 J	693
Beryllium	ug/L	3.1	20%	NA	NA	4	0	0.1 U	0.1 U	0.1 U	0.1 U	3.1 J
Cadmium	ug/L	1.3	40%	10	0	5	0	0.2 U	0.2 U	1.3 J	0.2 U	1 J
Calcium	ug/L	902000	100%	NA	NA	NA	NA	142000	122000	120000	140000	902000
Chromium	ug/L	47.1	80%	50	0	100	0	0.4 U	1.5 J	0.63 J	0.42 J	47.1
Cobalt	ug/L	82.3	100%	NA	NA	NA	NA	0.69 J	2.8 J	1.5 J	1.4 J	82.3
Copper	ug/L	41.3	80%	200	0	1000 *	0	0.5 U	3.9 J	2 J	0.68 J	41.3
Iron	ug/L	65800	100%	300	5	300 *	5	440	1730	538	552	65800
Lead	ug/L	71.6	40%	25	1	15 **	1	0.9 U	1.2 J	0.89 U	0.89 U	71.6
Magnesium	ug/L	35900	100%	NA	NA	NA	NA	14800	13000	14800	13200	35900
Manganese	ug/L	8250	100%	300	2	50 *	5	223	456	86.6	106	8250
Mercury	ug/L	0.05	40%	2	0	2	0	0.04 U	0.04 U	0.04 U	0.04 J	0.05 J
Nickel	ug/L	108	100%	NA	NA	100	1	1.4 J	4.1 J	1.1 J	1.5 J	108
Potassium	ug/L	7080	100%	NA	NA	NA	NA	3340 J	3240 J	1770 J	1280 J	7080 J
Sodium	ug/L	12300	100%	20000	0	NA	NA	12300	4490 J	6520	3350 J	4390 J
Thallium	ug/L	3.2	60%	NA	NA	2	3	2.2 J	1.9 U	3.2 J	1.9 U	2.1 J
Vanadium	ug/L	42.9	100%	NA	NA	NA	NA	0.69 J	2.1 J	0.9 J	0.69 J	42.9 J
Zinc	ug/L	305	100%	300	1	5000 *	0	3.8 J	12.4 J	14.4 J	6.5 J	305
OTHER ANALYSES												
pH	Standard Units							7.2	7.9	7.5	7.3	7.8
Conductivity	umhos/cm							725	490	550	595	550
Temperature	°C							22	15.6	16.9	15.2	15.3
Turbidity	NTU							1.5	181	127	141	>200

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)
i) ** the value is an action level, reported in Drinking Water Regulations and Health Advisories, USEPA, May 1994

greater than 200 NTUs. Most of the maximum metals concentrations and exceedances occurred in MW64D-5. Groundwater from this well had a turbidity greater than 200 NTUs. The particulates that caused the elevated turbidity are the likely source of the high metals concentrations in this sample of groundwater.

4.7.5 Tentatively Identified Compounds

The total concentrations of Tentatively Identified Compounds (TICs) were below 50 mg/kg of SVOCs and below 10 mg/kg of VOCs in ~~all~~ each of the samples collected at SEAD-64D.

4.8 SEAD-67

4.8.1 Introduction

A total of eight subsurface soil samples were collected from a soil boring and test pits at SEAD-67. To assess the potential impact from surface water runoff, three surface water and sediment samples were collected in drainage ditches and an intermittent stream that are suspected to receive surface water runoff from the site. Three monitoring wells were also sampled as part of this investigation. The following sections describe the nature and extent of contamination identified at SEAD-67. The sample locations are shown in Figures 2.10-2.

4.8.2 Soil

The analytical results for the eight subsurface soil samples (three from a background soil sample and five from individual soil piles) collected as part of the investigation of SEAD-67 are presented in Table 4.8-1. The following sections describe the nature and extent of contamination in SEAD-67 soils.

4.8.2.1 Volatile Organic Compounds

No volatile organic compounds were detected in any of the soil samples collected.

4.8.2.2 Semivolatile Organic Compounds

A total of 21 semivolatile organic compounds were found at varying concentrations mostly in the test pit samples from the five piles investigated; only a few SVOs were found in the three

TABLE 4.8-1

SENECA ARMY DEPOT
SEAD-67 EXPANDED SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-67 0-0.2 03/30/94 MW67-2.00 216109 43257	SOIL SEAD-67 2-4 03/30/94 MW67-2.02 216112 43257	SOIL SEAD-67 4-5 03/30/94 MW67-2.03 216113 43257	SOIL SEAD-67 2-3 06/06/94 TP67-1 223303 44410
SEMIVOLATILE ORGANICS									
Naphthalene	ug/Kg	34	25%	13000	0	480 U	380 U	370 U	34 J
2-Methylnaphthalene	ug/Kg	44	25%	36400	0	480 U	380 U	370 U	44 J
Acenaphthylene	ug/Kg	210	50%	41000	0	480 U	380 U	370 U	38 J
Acenaphthene	ug/Kg	50	13%	50000*	0	480 U	380 U	370 U	50 J
Dibenzofuran	ug/Kg	50	13%	6200	0	480 U	380 U	370 U	50 J
Fluorene	ug/Kg	110	38%	50000*	0	480 U	380 U	370 U	110 J
Phenanthrene	ug/Kg	740	63%	50000*	0	480 U	380 U	370 U	740
Anthracene	ug/Kg	140	50%	50000*	0	480 U	380 U	370 U	97 J
Carbazole	ug/Kg	80	38%	50000*	0	480 U	380 U	370 U	80 J
Di-n-butylphthalate	ug/Kg	47	13%	8100	0	480 U	47 J	370 U	390 U
Fluoranthene	ug/Kg	860	75%	50000*	0	36 J	380 U	370 U	760
Pyrene	ug/Kg	950	75%	50000*	0	31 J	380 U	370 U	520
Benzo(a)anthracene	ug/Kg	610	63%	220	4	480 U	380 U	370 U	280 J
Chrysene	ug/Kg	690	63%	400	1	480 U	380 U	370 U	300 J
bis(2-Ethylhexyl)phthalate	ug/Kg	250	38%	50000*	0	480 U	250 J	230 J	29 J
Benzo(b)fluoranthene	ug/Kg	1300	63%	1100	1	480 U	380 U	370 U	440 J
Benzo(k)fluoranthene	ug/Kg	28	13%	1100	0	480 U	380 U	370 U	390 UJ
Benzo(a)pyrene	ug/Kg	830	63%	61	4	480 U	380 U	370 U	210 J
Indeno(1,2,3-cd)pyrene	ug/Kg	620	63%	3200	0	480 U	380 U	370 U	96 J
Dibenz(a,h)anthracene	ug/Kg	310	50%	14	4	480 U	380 U	370 U	70 J
Benzo(g,h,i)perylene	ug/Kg	620	63%	50000*	0	480 U	380 U	370 U	64 J
PESTICIDES/PCB									
Heptachlor epoxide	ug/Kg	5.5	25%	20	0	5.5	2 U	1.9 U	2 U
Endosulfan I	ug/Kg	25	75%	900	0	4	2 U	1.9 U	3.2 J
4,4'-DDE	ug/Kg	4.8	50%	2100	0	4.8 U	3.8 U	3.7 U	2.3 J
Endosulfan sulfate	ug/Kg	2.1	13%	1000	0	4.8 U	3.8 U	3.7 U	3.9 U
4,4'-DDT	ug/Kg	9.4	38%	2100	0	4.8 U	3.8 U	3.7 U	3.9 U
alpha-Chlordane	ug/Kg	2.1	38%	540	0	2.5 U	2 U	1.9 U	2 U
Aroclor-1254	ug/Kg	72	13%	1000/10000(a)	0	48 U	38 U	37 U	39 U
METALS									
Aluminum	mg/Kg	19100	100%	14593	5	16700	14900	9460	16100
Antimony	mg/Kg	0.44	63%	3.59	0	0.27 J	0.22 J	0.2 UJ	0.26 UJ
Arsenic	mg/Kg	6	100%	7.5	0	4.4	4.5	4.2	4.8
Barium	mg/Kg	182	100%	300	0	114	105	80.8	86.7
Beryllium	mg/Kg	0.87	100%	.73	3	0.67 J	0.61 J	0.4 J	0.74 J
Cadmium	mg/Kg	0.73	100%	1	0	0.2 J	0.11 J	0.12 J	0.46 J
Calcium	mg/Kg	139000	100%	101904	1	3580	79000	77800	6810
Chromium	mg/Kg	24.8	100%	22	4	19.5	22.5	14.8	22.2
Cobalt	mg/Kg	12.8	100%	30	0	7.5 J	10.4 J	9.7 J	10.7
Copper	mg/Kg	29.7	100%	25	1	16.5	20.3	20.5	22
Iron	mg/Kg	27300	100%	26627	2	20500	24400	18700	26000
Lead	mg/Kg	40.9	100%	21.9	1	17.5	9.3	8.5	12.8
Magnesium	mg/Kg	20900	100%	12222	3	3590	15600	20900	4760
Manganese	mg/Kg	1380	100%	669	2	438	528	411	594
Mercury	mg/Kg	4	100%	0.1	3	0.04	0.01 J	0.02 J	4 J
Nickel	mg/Kg	32.3	100%	34	0	18.7	32.3	25.9	27.8
Potassium	mg/Kg	3160	100%	1762	6	1780 J	3160 J	1970 J	1620 J
Selenium	mg/Kg	2	75%	2	0	0.81	0.36 U	0.34 U	1
Sodium	mg/Kg	112	75%	104	3	25.1 U	112 J	107 J	19.9 U
Thallium	mg/Kg	0.48	13%	0.28	1	0.48 J	0.34 U	0.32 U	0.38 U
Vanadium	mg/Kg	31.8	100%	150	0	28.2	24.8	16.5	26.5
Zinc	mg/Kg	100	100%	83	2	64.8	62	60.1	70.5
OTHER ANALYSES									
Total Solids	%W/W					68.9	85.5	90.2	83.8

TABLE 4.8-1

SENECA ARMY DEPOT
SEAD-67 EXPANDED SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-67 2-3 06/06/94 TP67-2 223305 44410	SOIL SEAD-67 2-3 06/06/94 TP67-3 223306 44410	SOIL SEAD-67 2-3 06/06/94 TP67-4 223307 44410	SOIL SEAD-67 2-3 06/06/94 TP67-5 223308 44410
SEMIVOLATILE ORGANICS									
Naphthalene	ug/Kg	34	25%	13000	0	380 U	34 J	400 U	450 U
2-Methylnaphthalene	ug/Kg	44	25%	36400	0	380 U	25 J	400 U	450 U
Acenaphthylene	ug/Kg	210	50%	41000	0	33 J	210 J	400 U	26 J
Acenaphthene	ug/Kg	50	13%	50000*	0	380 U	380 U	400 U	450 U
Dibenzofuran	ug/Kg	50	13%	6200	0	380 U	380 U	400 U	450 U
Fluorene	ug/Kg	110	38%	50000*	0	31 J	380 U	400 U	27 J
Phenanthrene	ug/Kg	740	63%	50000*	0	340 J	180 J	32 J	280 J
Anthracene	ug/Kg	140	50%	50000*	0	44 J	140 J	400 U	43 J
Carbazole	ug/Kg	80	38%	50000*	0	23 J	380 U	400 U	32 J
Di-n-butylphthalate	ug/Kg	47	13%	8100	0	380 U	380 U	400 U	450 U
Fluoranthene	ug/Kg	860	75%	50000*	0	610	860	55 J	510
Pyrene	ug/Kg	950	75%	50000*	0	500	950	43 J	450
Benzo(a)anthracene	ug/Kg	610	63%	220	4	250 J	610	24 J	240 J
Chrysene	ug/Kg	690	63%	400	1	290 J	690	29 J	230 J
bis(2-Ethylhexyl)phthalate	ug/Kg	250	38%	50000*	0	380 U	380 U	400 U	450 U
Benzo(b)fluoranthene	ug/Kg	1300	63%	1100	1	470 J	1300 J	26 J	430 J
Benzo(k)fluoranthene	ug/Kg	28	13%	1100	0	380 UJ	380 UJ	28 J	450 UJ
Benzo(a)pyrene	ug/Kg	830	63%	61	4	220 J	830	28 J	220 J
Indeno(1,2,3-cd)pyrene	ug/Kg	620	63%	3200	0	120 J	620	25 J	130 J
Dibenz(a,h)anthracene	ug/Kg	310	50%	14	4	53 J	310 J	400 U	65 J
Benzo(g,h,i)perylene	ug/Kg	620	63%	50000*	0	93 J	620	40 J	97 J
PESTICIDES/PCB									
Heptachlor epoxide	ug/Kg	5.5	25%	20	0	2 U	1.2 J	2.1 U	2.3 U
Endosulfan I	ug/Kg	25	75%	900	0	11 J	25 J	1.2 J	15 J
4,4'-DDE	ug/Kg	4.8	50%	2100	0	4.5 J	4.8 J	4 U	3 J
Endosulfan sulfate	ug/Kg	2.1	13%	1000	0	3.8 U	2.1 J	4 U	4.5 U
4,4'-DDT	ug/Kg	9.4	38%	2100	0	6.3 J	9.4	4 U	4.2 J
alpha-Chlordane	ug/Kg	2.1	38%	540	0	1.4 J	2.1 J	2.1 U	1.9 J
Aroclor-1254	ug/Kg	72	13%	1000/10000(a)	0	72 J	38 U	40 U	45 U
METALS									
Aluminum	mg/Kg	19100	100%	14593	5	12200	9870	19100	17200
Antimony	mg/Kg	0.44	63%	3.59	0	0.27 J	0.44 J	0.39 J	0.32 UJ
Arsenic	mg/Kg	6	100%	7.5	0	5.4	5	6	4.9
Barium	mg/Kg	182	100%	300	0	105	82.2	158	182
Beryllium	mg/Kg	0.87	100%	.73	3	0.62 J	0.49 J	0.87 J	0.83 J
Cadmium	mg/Kg	0.73	100%	1	0	0.5 J	0.69 J	0.69 J	0.73 J
Calcium	mg/Kg	139000	100%	101904	1	5940	139000	12000	20100
Chromium	mg/Kg	24.8	100%	22	4	18.7	15.1	24.8	23.2
Cobalt	mg/Kg	12.8	100%	30	0	9.5	7.5	11	12.8
Copper	mg/Kg	29.7	100%	25	1	21.3	21.5	29.7	24.5
Iron	mg/Kg	27300	100%	26627	2	24000	16800	27300	27300
Lead	mg/Kg	40.9	100%	21.9	1	21.3	40.9	19.1	12
Magnesium	mg/Kg	20900	100%	12222	3	4730	12900	6660	5010
Manganese	mg/Kg	1380	100%	669	2	624	627	863	1380
Mercury	mg/Kg	4	100%	0.1	3	0.05 J	0.62 J	0.13 J	0.06 J
Nickel	mg/Kg	32.3	100%	34	0	27.2	22	30.1	30.2
Potassium	mg/Kg	3180	100%	1762	6	1390 J	2090 J	2520 J	2040 J
Selenium	mg/Kg	2	75%	2	0	1.1	0.41 J	1.2	2
Sodium	mg/Kg	112	75%	104	3	26.4 J	111 J	39.4 J	26.1 J
Thallium	mg/Kg	0.48	13%	0.28	1	0.34 U	0.28 U	0.41 U	0.47 U
Vanadium	mg/Kg	31.8	100%	150	0	22.7	20.9	31.8	27.8
Zinc	mg/Kg	100	100%	83	2	70.5	72.8	100	86.6
OTHER ANALYSES									
Total Solids	%W/W					88.4	86.3	82	73.5

NOTES:
a) The TAGM value for PCBs is 1000ug/Kg for surface soils and 10,000 ug/Kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) 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.

soil samples from the background soil boring MW67-2. Five TAGM exceedences were found for the soil samples from the five piles, and none for the soil samples from the background boring. Two SVO compounds, namely chrysene and benzo(b)fluoranthene, only slightly exceeded their respective TAGMs in only one sample each; the concentrations were 690 μg/kg and 1,300 μg/kg. The other three compounds [benzo(a)anthracene, benzo(a)pyrene and dibenz(a,h)anthracene] were found at concentrations in excess of their respective TAGMs in four of the five samples. The maximum concentrations of these three compounds were, respectively, 610 μg/kg, 830 μg/kg, and 310 μg/kg. The maximum concentrations of the five semivolatile organic compounds that exceeded TAGM values were found in sample TP67-3. TP67-4 did not contain SVOs above TAGM values.

4.8.2.3 Pesticides and PCBs

Six pesticide compounds and one PCB compound were detected in six of the eight soil samples collected, however, none were detected above their respective TAGM values. The majority of the pesticides were detected in samples TP67-2, TP67-3, and TP67-5 from the soil piles; the PCB compound Aroclor-1254 was detected in only one sample, TP67-2. One of the three background soil samples (MW67-2.00, the surface sample) contained only two pesticide compounds; no other compounds were detected in these samples.

4.8.2.4 Metals

A number of samples were found to contain metals at concentrations that exceed the associated TAGM or site background values. Of the 22 metals reported, 14 were found in one or more samples at concentrations above the TAGM values. TAGM exceedances were found in all samples except for sample TP67-2. Of the metals that exceeded the TAGM values, most exceeded it only slightly, generally by up to one to two times the TAGM value.

However, the concentration of mercury in sample TP67-1 (4 mg/kg, the maximum detected) is noteworthy because it is 40 times the TAGM value of 0.1 mg/kg. The next highest mercury concentration (0.62 mg/kg) was found in sample TP67-3.

4.8.3 Groundwater

Three monitoring wells were sampled as part of the investigation of SEAD-67. The summary of chemical analyses are presented in Table 4.8-2. The following sections describe the nature and extent of groundwater contamination identified at SEAD-67.

TABLE 4.8-2

SENECA ARMY DEPOT
SEAD-67 ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NUMBER ABOVE CRITERIA	FEDERAL DRINKING WATER MCL (i)	NUMBER ABOVE CRITERIA	WATER SEAD-67 07/07/94 MW67-1 226307 45257	WATER SEAD-67 07/10/94 MW67-2 226488 45282	WATER SEAD-67 07/08/94 MW67-3 226308 45257
METALS										
Aluminum	ug/L	5790	100%	NA	NA	50-200 *	3	5790	1240	448
Arsenic	ug/L	2.5	33%	25	0	NA	NA	2.5 J	2 U	2 U
Barium	ug/L	203	100%	1000	0	2000	0	203	100 J	98.9 J
Beryllium	ug/L	0.72	33%	NA	NA	4	0	0.72 J	0.1 U	0.1 U
Calcium	ug/L	351000	100%	NA	NA	NA	NA	351000	119000	122000
Chromium	ug/L	10	100%	50	0	100	0	10	2 J	0.9 J
Cobalt	ug/L	12.3	100%	NA	NA	NA	NA	12.3 J	1.4 J	1.3 J
Copper	ug/L	13.1	100%	200	0	1000 *	0	13.1 J	1.5 J	2 J
Iron	ug/L	10800	100%	300	3	300 *	3	10800	2270	689
Lead	ug/L	8.3	33%	25	0	15 **	0	8.3	0.9 U	0.9 U
Magnesium	ug/L	51800	100%	NA	NA	NA	NA	51800	24200	24000
Manganese	ug/L	1710	100%	300	1	50 *	3	1710	153	194
Mercury	ug/L	0.09	67%	2	0	2	0	0.09 J	0.04 U	0.06 J
Nickel	ug/L	15.9	100%	NA	NA	100	0	15.9 J	2.9 J	2.2 J
Potassium	ug/L	5740	100%	NA	NA	NA	NA	5740	1870 J	1670 J
Sodium	ug/L	13700	100%	20000	0	NA	NA	4240 J	13700	4970 J
Thallium	ug/L	2	33%	NA	NA	2	1	2 J	1.9 U	1.9 U
Vanadium	ug/L	9.2	100%	NA	NA	NA	NA	9.2 J	2.1 J	0.86 J
Zinc	ug/L	29.6	100%	300	0	5000 *	0	29.6	6.5 J	6.7 J
OTHER ANALYSES										
pH	Standard Units							7.2	7	7
Conductivity	umhos/cm							520	490	440
Temperature	°C							14.9	12	11.9
Turbidity	NTU							>1000	90	NR

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) NR = Not Recorded
i) Federal Primary and Secondary(*) Drinking Water Maximum Contaminant Levels (40 CFR 141.61-62 and 40 CFR 143.3)
j) ** the value is an action level, reported in Drinking Water Regulations and Health Advisories, USEPA, May 1994

4.8.3.1 Volatile Organic Compounds

No volatile organic compounds were detected in the groundwater samples collected at SEAD-67.

4.8.3.2 Semi-Volatile Organic Compounds

No semivolatile organic compounds were detected in the three groundwater samples collected at SEAD-67.

4.8.3.3 Pesticides and PCBs

No pesticides or PCBs were detected in the groundwater samples collected at SEAD-67.

4.8.3.4 Metals

Numerous metals were detected in the groundwater samples. Four metals were found at concentrations above their respective criteria. The largest concentrations exceeding state and federal criteria for metals occurred at MW67-1, which consequently had the highest turbidity (> 1,000NTUs). Aluminum was detected in the three monitoring wells at concentrations (448 μg/L to 5790 μg/L) outside the Federal Secondary Drinking Water MCL range of 50 μg/L to 200 μg/L. Iron was found in the monitoring wells at concentrations between 689 μg/L and 10,800 μg/L, which exceeded the state and federal criteria values of 300 μg/L. Manganese exceeded the Federal Secondary Drinking Water MCL (50 μg/L) in three monitoring wells with concentrations from 153 μg/L to 1,710 μg/L. Thallium was found at an estimated concentration of 2 μg/L, the same concentration as the Federal Drinking Water MCL.

4.8.4 Surface Water

Two surface water samples were collected as part of the investigation of SEAD-67. The summary results of the chemical analyses are presented in Table 4.8-3. The following sections describe the nature and extent of surface water contamination identified at SEAD-67.

4.8.4.1 Volatile Organic Compounds

No volatile organic compounds were found in the two surface water samples collected at SEAD-67.

TABLE 4.8-3

SENECA ARMY DEPOT
SEAD-67 EXPANDED SITE INSPECTION
SURFACE WATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C (a)	NUMBER ABOVE CRITERIA	WATER SEAD-67 04/26/94 SW67-1 219464 43810	WATER SEAD-67 04/26/94 SW67-2 219465 43810
METALS							
Aluminum	ug/L	129	100%	NA	NA	129 J	38.1 J
Barium	ug/L	45.8	100%	NA	NA	45.8 J	45.6 J
Calcium	ug/L	77100	100%	NA	NA	77100	75900
Copper	ug/L	1.1	100%	23	0	1.1 J	0.86 J
Iron	ug/L	369	100%	300	1	369	84.6 J
Magnesium	ug/L	14700	100%	NA	NA	14100	14700
Manganese	ug/L	161	100%	NA	NA	161	37.7
Potassium	ug/L	1160	100%	NA	NA	1160 J	1120 J
Sodium	ug/L	7860	100%	NA	NA	5830	7860
Thallium	ug/L	2.1	50%	8	0	1.6 U	2.1 J
Zinc	ug/L	3.3	100%	160	0	2.4 J	3.3 J
OTHER ANALYSES							
pH	Standard Units			6.5 - 9	0	7.9	7.5
Conductivity	umhos/cm					445	440
Temperature	°C					21.4	22.7
Turbidity	NTU					1.4	1.6

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class C surface water.
b) Hardness dependent values assume a hardness of 217 mg/L.
c) 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.

4.8.4.2 Semi-Volatile Organic Compounds

No semi-volatile organic compounds were found in the surface water samples collected at SEAD-67.

4.8.4.3 Pesticides and PCBs

No pesticide or PCB compounds were found in the surface water samples collected at SEAD-67.

4.8.4.4 Metals

Numerous metals were detected in the surface water samples collected at the site. Only iron (at 369 μg/L) was found at a concentration above its surface water criteria value (300 μg/L).

4.8.5 Sediment

A total of two sediment samples were collected as part of the investigation at SEAD-67. The summary chemical analyses are presented in Table 4.8-4. The sediment samples were collected in the same locations as the surface water samples discussed above. The following sections describe the nature and extent of sediment contamination identified at SEAD-67.

4.8.5.1 Volatile Organic Compounds

Two volatile organic compounds were detected in one of the sediment samples, all at relatively low concentrations (i.e., below the TAGM values). Acetone and 2-butanone were detected at concentrations of 53 μg/kg and 21 μg/kg in sample SD67-1.

4.8.5.2 Semivolatile Organic Compounds

A total of 17 SVOCs were identified in the two sediment samples (SD67-1 and SD67-2) collected at SEAD-67. The SVOCs detected were mostly PAHs, eight of which were found at concentrations above their respective NYSDEC criteria values. Six of the compounds

TABLE 4.8-4

SENECA ARMY DEPOT
SEAD-67 EXPANDED SITE INSPECTION
SEDIMENT ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT CHRONIC CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a)	LOWEST EFFECT LEVEL (a)(b)	SEVERE EFFECT LEVEL (a)(b)	NUMBER ABOVE CRITERIA	SOIL SEAD-67 0-0.2 04/26/94 SD67-1 219450 43663	SOIL SEAD-67 0-0.2 04/26/94 SD67-2 219451 43663
VOLATILE ORGANICS											
Acetone	ug/Kg	53	50%	NA	NA	NA			NA	53 J	28 UJ
2-Butanone	ug/Kg	21	50%	NA	NA	NA			NA	21 J	20 UJ
SEMIVOLATILE ORGANICS											
Acenaphthylene	ug/Kg	54	50%	NA	NA	NA			NA	820 UJ	54 J
Acenaphthene	ug/Kg	120	50%	1400	NA	NA			0	820 UJ	120 J
Dibenzofuran	ug/Kg	83	50%	NA	NA	NA			NA	820 UJ	83 J
Fluorene	ug/Kg	280	50%	NA	NA	NA			NA	820 UJ	270 J
Phenanthrene	ug/Kg	2400	100%	1200	NA	NA			1	260 J	2400
Anthracene	ug/Kg	600	50%	NA	13	NA			1	820 UJ	600 J
Carbazole	ug/Kg	78	50%	NA	NA	NA			NA	820 UJ	78 J
Fluoranthene	ug/Kg	3400	100%	10200	NA	NA			0	440 J	3400
Pyrene	ug/Kg	3000	100%	NA	NA	NA			NA	370 J	3000
Benzo(a)anthracene	ug/Kg	1400	100%	NA	13	NA			2	180 J	1400
Chrysene	ug/Kg	1300	100%	NA	13	NA			2	220 J	1300
Benzo(b)fluoranthene	ug/Kg	880	100%	NA	13	NA			2	180 J	880
Benzo(k)fluoranthene	ug/Kg	930	100%	NA	13	NA			2	160 J	930
Benzo(a)pyrene	ug/Kg	970	100%	NA	13	NA			2	170 J	970
Indeno(1,2,3-cd)pyrene	ug/Kg	460	100%	NA	13	NA			2	98 J	460 J
Dibenz(a,h)anthracene	ug/Kg	230	50%	NA	NA	NA				820 UJ	230 J
Benzo(g,h,i)perylene	ug/Kg	370	100%	NA	NA	NA			NA	87 J	370 J
PESTICIDES/PCB											
Endosulfan I	ug/Kg	20	50%	0.3	NA	NA			1	4.2 UJ	20 J
4,4'-DDT	ug/Kg	4.1	50%	10	.1	10			0	8.2 UJ	4.1 J
alpha-Chlordane	ug/Kg	4.8	100%	NA	NA	NA			2	4.8 J	3.6 J
METALS											
Aluminum	mg/Kg	12000	100%				NA	NA	NA	12000 J	10700 J
Arsenic	mg/Kg	4.2	100%				6	33	0	3.7 J	4.2 J
Barium	mg/Kg	95.8	100%				NA	NA	NA	95.8 J	92.7 J
Beryllium	mg/Kg	0.58	100%				NA	NA	NA	0.58 J	0.56 J
Cadmium	mg/Kg	0.37	100%				.6	9	0	0.37 J	0.34 J
Calcium	mg/Kg	13200	100%				NA	NA	NA	6620 J	13200 J
Chromium	mg/Kg	18	100%				26	110	0	18 J	16.4 J
Cobalt	mg/Kg	8.3	100%				NA	NA	NA	8 J	8.3 J
Copper	mg/Kg	37.7	100%				16	110	2	37.7 J	22.6 J
Iron	mg/Kg	19800	100%				2%	4%	0	18900 J	19800 J
Lead	mg/Kg	17.8	100%				31	110	0	15.4 J	17.8 J
Magnesium	mg/Kg	5030	100%				NA	NA	NA	4160 J	5030 J
Manganese	mg/Kg	731	100%				460	1100	1	413 J	731 J
Nickel	mg/Kg	23.2	100%				16	50	2	22.6 J	23.2 J
Potassium	mg/Kg	1650	100%				NA	NA	NA	1650 J	1330 J
Silver	mg/Kg	1.7	100%				1	2.2	2	1.7 J	1.1 J
Sodium	mg/Kg	107	100%				NA	NA	NA	84.5 J	107 J
Vanadium	mg/Kg	20.4	100%				NA	NA	NA	20.4 J	18.8 J
Zinc	mg/Kg	85.4	100%				120	270	0	85.4 J	76.5 J
OTHER ANALYSES											
Total Solids	%W/W									40.1	48.9

NOTES:
a) NYSDEC Sediment Criteria - 1994
b) A sediment is considered contaminated if either criteria is exceeded
c) 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) 2%=20,000 mg/Kg; 4%=40,000 mg/Kg

exceeded their criteria values in both samples, however, the concentrations of individual PAHs are greater in sample SD67-2 than in sample SD67-1. Two other compounds, phenanthrene and anthracene, were detected above their criteria values only in sample SD67-2.

4.8.5.3 Pesticides and PCBs

Three pesticide compounds were detected in three of the sediment samples. Two of the three compounds exceeded their respective NYSDEC criteria values. The pesticides endosolfan I and alpha-chlordane were found at 20 μg/kg and 4.8 μg/kg, respectively, and exceeded their associated criteria values of 0.3 μg/kg and 0.06 μg/kg. The elevated concentration for endosulfan I (20 μg/kg) was found only in sample SD67-2.

4.8.5.4 Metals

A number of metals were detected in the two sediment samples collected at SEAD-67. Of these, copper, manganese, nickel, silver, and zinc were found at concentrations slightly in excess of the NYSDEC sediment criteria. Copper, nickel and silver were found to exceed the sediment criteria in both samples, with maximum concentrations of 37.7 mg/kg, 23.2 mg/kg, and 1.7 mg/kg. Maximum concentrations of manganese and zinc (731 mg/kg and 85.4 mg/kg) were found to exceed their criteria values in two separate samples.

4.8.6 Tentatively Identified Compounds

The total concentrations of Tentatively Identified Compounds (TICs) were below 50 mg/kg of SVOCs in all of the samples collected at SEAD-67. No VOC TICs were detected in the samples collected at SEAD-67.

4.9 SEAD-70

4.9.1 Introduction

A total of 12 subsurface soil samples were collected from a soil borings at SEAD-70. To assess the potential impact from surface water runoff, two surface water and sediment samples were collected in drainage ditches and an intermittent stream that are suspected to receive surface water runoff from the site. Three monitoring wells were also sampled as part of this

investigation. The following sections describe the nature and extent of contamination identified at SEAD-70. The sample locations are shown in Figures 2.11-2.

4.9.2 Soil

The analytical results for the 12 subsurface soil samples collected as part of the investigation of SEAD-70 are presented in Table 4.9-1. The following sections describe the nature and extent of contamination in SEAD-70 soils.

4.9.2.1 Volatile Organic Compounds

Low concentrations of three volatile organic compounds were detected in two of the 12 soil samples collected. The compounds acetone, 2-butanone, and toluene were detected a concentrations of 79 μg/kg, 36 μg/kg and 3 μg/kg, in sample SB70-1.01. Acetone (at 62 μg/kg) was detected in sample SB70-2.01.

4.9.2.2 Semivolatile Organic Compounds

A total of five semivolatile organic compounds were found at varying concentration in the samples. None were found at concentrations above their respective TAGM values. The PAH compounds fluoranthene and pyrene were found at low concentrations (a maximum of 29 μg/kg for both compounds) in only one sample (SB70-2.01). Bis(2-ethylhexl)phthalate was found in all of the samples at a maximum concentration of 610 μg/kg. Di-n-butylphthalate was found at low concentrations in seven of the 12 samples. One other phthalate compound was found in sample SB70-1.01.

4.9.2.3 Pesticides and PCBs

No pesticide or PCB compounds were detected in the 12 soil samples collected.

4.9.2.4 Metals

A number of samples were found to contain metals at concentrations that exceeded their associated TAGM or site background values. Of the 21 metals reported, 12 were found in one or more samples at concentrations above the TAGM values. TAGM exceedances were

TABLE 4.9-1

SENECA ARMY DEPOT
SEAD-70 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-70 0-0.2 05/11/94 MW70-1.00 221049 44090	SOIL SEAD-70 2-4 05/11/94 MW70-1.02 221050 44090	SOIL SEAD-70 4-6 05/11/94 MW70-1.03 221051 44090	SOIL SEAD-70 0-0.2 02/22/94 SB70-1.01 212426 42510	SOIL SEAD-70 2-4 02/22/94 SB70-1.02 212427 42510	SOIL SEAD-70 4-6 02/22/94 SB70-1.03 212428 42510
VOLATILE ORGANICS											
Acetone	ug/Kg	79	17%	200	0	14 U	14 U	11 U	11 U	79	35 U
2-Butanone	ug/Kg	36	8%	300	0	14 U	12 U	11 U	11 U	36	17 U
Toluene	ug/Kg	3	8%	1500	0	14 U	12 U	11 U	11 U	3 J	11 U
SEMIVOLATILE ORGANICS											
Di-n-butylphthalate	ug/Kg	54	58%	8100	0	490 U	400 U	370 U	35 J	28 J	35 J
Fluoranthene	ug/Kg	29	8%	50000*	0	490 U	400 U	370 U	390 U	370 U	400 U
Pyrene	ug/Kg	26	8%	50000*	0	490 U	400 U	370 U	390 U	370 U	400 U
bis(2-Ethylhexyl)phthalate	ug/Kg	610	100%	50000*	0	78 J	550	610	21 J	27 J	73 J
Di-n-octylphthalate	ug/Kg	30	8%	50000*	0	490 U	400 U	370 U	390 U	30 J	400 U
METALS											
Aluminum	mg/Kg	16600	100%	14593	3	12200	9480	11000	12400	15600	16600
Antimony	mg/Kg	0.59	75%	3.59	0	0.23 UJ	0.21 UJ	0.19 UJ	0.36 J	0.45 J	0.39 J
Arsenic	mg/Kg	88.5	100%	7.5	1	5.4	4.1	5.7	3.5 J	4.8 J	4.5 J
Barium	mg/Kg	170	100%	300	0	67.5	56.6	79.9	55.9	91.7	170
Beryllium	mg/Kg	0.81	100%	.73	2	0.44 J	0.41 J	0.54 J	0.6 J	0.77 J	0.81 J
Cadmium	mg/Kg	0.8	100%	1	0	0.57 J	0.43 J	0.8 J	0.05 J	0.07 J	0.14 J
Calcium	mg/Kg	59100	100%	101904	0	3600	51600	48600	15000	6150	4300
Chromium	mg/Kg	26.2	100%	22	2	13.7	14.7	17.8	21.3	26.2	25.3
Cobalt	mg/Kg	21	100%	30	0	5.5 J	7.1 J	21	11.9	15	13.1
Copper	mg/Kg	35.2	100%	25	4	12.4	19.7	33.5	22.9	35.2	22.5
Iron	mg/Kg	32200	100%	26627	3	17700	16000	26400	26300	32200	30300
Lead	mg/Kg	22.1	100%	21.9	1	20.7	9.1	13.6	17.2 J	22.1 J	11.4 J
Magnesium	mg/Kg	13600	100%	12222	1	2830	13600	7980	5070	6150	5580
Manganese	mg/Kg	1040	100%	669	2	233	470	1040	465	425	689
Mercury	mg/Kg	0.1	92%	0.1	0	0.1	0.03 J	0.02 J	0.04 J	0.04 J	0.04 J
Nickel	mg/Kg	52.4	100%	34	4	12.3	17.6	52.4	39.3	47.4	36
Potassium	mg/Kg	1750	100%	1762	0	982 J	1590	1350	1170	1300	1400
Selenium	mg/Kg	1	67%	2	0	1 J	0.64 J	0.32 U	0.32 J	0.48 J	0.89 J
Sodium	mg/Kg	165	75%	104	2	36.4 U	126 J	165 J	30.3 J	34.7 J	34.9 U
Vanadium	mg/Kg	26.9	100%	150	0	23.3	17.2	17.6	16.4	21.7	26.9
Zinc	mg/Kg	116	100%	83	1	55.4	42.4	116	46.4	78.8	79.2
OTHER ANALYSES											
Total Solids	%W/W					68.5	83.3	90.2	84.8	88.3	82.6

TABLE 4.9-1

SENECA ARMY DEPOT
SEAD-70 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-70 0-0.2 02/21/94 SB70-2.01 212429 42510	SOIL SEAD-70 4-6 02/21/94 SB70-2.03 212077 42510	SOIL SEAD-70 8-10 02/21/94 SB70-2.05 212078 42510	SOIL SEAD-70 0-0.2 02/21/94 SB70-3.01 212430 42510	SOIL SEAD-70 4-6 02/21/94 SB70-3.03 212431 42510	SOIL SEAD-70 8-10 02/21/94 SB70-3.05 212432 42510
VOLATILE ORGANICS											
Acetone	ug/Kg	79	17%	200	0	62	11 U	11 U	12 U	11 U	11 U
2-Butanone	ug/Kg	36	8%	300	0	15 U	11 U	11 U	12 U	11 U	11 U
Toluene	ug/Kg	3	8%	1500	0	15 U	11 U	11 U	12 U	11 U	11 U
SEMIVOLATILE ORGANICS											
Di-n-butylphthalate	ug/Kg	54	58%	8100	0	54 J	360 U	360 U	45 J	51 J	25 J
Fluoranthene	ug/Kg	29	8%	50000*	0	29 J	360 U	360 U	430 U	370 U	360 U
Pyrene	ug/Kg	26	8%	50000*	0	26 J	360 U	360 U	430 U	370 U	360 U
bis(2-Ethylhexyl)phthalate	ug/Kg	610	100%	50000*	0	550	43 J	66 J	48 J	89 J	48 J
Di-n-octylphthalate	ug/Kg	30	8%	50000*	0	500 U	360 U	360 U	430 U	370 U	360 U
METALS											
Aluminum	mg/Kg	16600	100%	14593	3	15800	11600	12900	9340	11000	11400
Antimony	mg/Kg	0.59	75%	3.59	0	0.59 J	0.47 J	0.41 J	0.19 J	0.45 J	0.25 J
Arsenic	mg/Kg	88.5	100%	7.5	1	88.5 J	4.5 J	4.5 J	6.9 J	4 J	3.9 J
Barium	mg/Kg	170	100%	300	0	106	42.1	55.8	40.5	74.8	50.4
Beryllium	mg/Kg	0.81	100%	.73	2	0.73 J	0.54 J	0.62 J	0.44 J	0.53 J	0.55 J
Cadmium	mg/Kg	0.8	100%	1	0	0.24 J	0.23 J	0.12 J	0.07 J	0.18 J	0.13 J
Calcium	mg/Kg	59100	100%	101904	0	4260	55500	31700	22500	59100	37300
Chromium	mg/Kg	26.2	100%	22	2	21.1	19	21.9	15.3	18	19.7
Cobalt	mg/Kg	21	100%	30	0	8.5 J	10.8	12.3	8.4	10.5	12.1
Copper	mg/Kg	35.2	100%	25	4	18.9	28.8	28.7	17.9	24.2	17.2
Iron	mg/Kg	32200	100%	26627	3	24700	23300	26700	18900	22800	24800
Lead	mg/Kg	22.1	100%	21.9	1	17.9 J	9.5 J	4.2 J	8.9 J	8.1 J	5.3 J
Magnesium	mg/Kg	13600	100%	12222	1	4070	8260	8360	5490	11000	8170
Manganese	mg/Kg	1040	100%	669	2	367	439	390	299	441	414
Mercury	mg/Kg	0.1	92%	0.1	0	0.05 J	0.02 J	0.02 J	0.02 J	0.02 J	0.02 UJ
Nickel	mg/Kg	52.4	100%	34	4	22	30.6	34	24.6	30.4	30.8
Potassium	mg/Kg	1750	100%	1762	0	1730	1750	1420	1260	1680	1260
Selenium	mg/Kg	1	67%	2	0	0.95	0.25 U	0.24 U	0.58 J	0.31 U	0.49 J
Sodium	mg/Kg	165	75%	104	2	27.9 U	81.8 J	89.5 J	47.1 J	84.5 J	89.1 J
Vanadium	mg/Kg	26.9	100%	150	0	26.7	17.3	17.7	13.9	16.6	16
Zinc	mg/Kg	116	100%	83	1	75.1	78.6	67.1	53.4	67.8	73
OTHER ANALYSES											
Total Solids	%W/W					65.7	92.2	91.2	76.3	90.3	90.9

NOTES:
a) The TAGM value for PCBs is 1000ug/Kg for surface soils and 10,000 ug/Kg for subsurface soils.
b) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVOs < 50 ppm.
c) 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.

found in eight of the samples. Of the metals that exceeded the TAGM values, most exceeded by up to one to two times the TAGM value.

However, the concentration of arsenic in sample SB70-2.01 (88.5 mg/kg, the maximum detected), is noteworthy because it is approximately 12 times the TAGM value of 7.5 mg/kg; this was the only TAGM exceedance for arsenic.

4.9.3 Groundwater

Four monitoring wells were sampled as part of the investigation of SEAD-70. The summary of chemical analyses are presented in Table 4.9-2. The following sections describe the nature and extent of groundwater contamination identified at SEAD-70.

4.9.3.1 Volatile Organic Compounds

Only one volatile organic compound (acetone) was detected in the groundwater samples collected at SEAD-70. Acetone was found at a concentration of 11 μg/L in MW70-2.

4.9.3.2 Semi-Volatile Organic Compounds

No semivolatile organic compounds were detected in the four groundwater samples collected at SEAD-70.

4.9.3.3 Pesticides and PCBs

No pesticides or PCBs were detected in the groundwater samples collected at SEAD-70.

4.9.3.4 Metals

Numerous metals were detected in the four groundwater samples. Four metals (aluminum, iron, manganese and thallium) were found at concentrations above their respective criteria values. The aluminum concentration from the MW70-1 sample, 88.2 μg/L, was within the federal criterion range of 50-200 μg/l. The results for MW70-2 and MW70-3 exceeded this criteria range with concentrations of 1260 μg/L and 229 μg/L, respectively. Iron (at 2,140 μg/L) was found in one of the four groundwater samples at a concentration above the state and federal criteria value of 300 μg/L. Thallium was found in MW70-3 at an estimated concentration of 2 μg/L, the same concentration as the Federal Primary Drinking Water

TABLE 4.9-2

SENECA ARMY DEPOT
SEAD-70 ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NUMBER ABOVE CRITERIA	FEDERAL DRINKING WATER MCL (f)	NUMBER ABOVE CRITERIA	WATER SEAD-70 07/07/94 MW70-1 226309 45257	WATER SEAD-70 07/07/94 MW70-2 226310 45257	WATER SEAD-70 07/08/94 MW70-3 226389 45257	WATER SEAD-70 07/08/94 MW70-4 226390 45257
VOLATILE ORGANICS											
Acetone	ug/L	11	25%	NA	NA	NA	NA	10 U	11	10 U	10 U
METALS											
Aluminum	ug/L	1260	100%	NA	NA	50-200 *	3	88.2 J	1260	229	32.1 J
Barium	ug/L	165	100%	1000	0	2000	0	86.5 J	165 J	130 J	152 J
Calcium	ug/L	213000	100%	NA	NA	NA	NA	119000	213000	180000	171000
Chromium	ug/L	2.9	25%	50	0	100	0	0.4 U	2.9 J	0.4 U	0.4 U
Cobalt	ug/L	1.7	75%	NA	NA	NA	NA	0.5 U	1.7 J	0.79 J	1.6 J
Copper	ug/L	4.1	25%	200	0	1000 *	0	0.5 U	4.1 J	0.5 U	0.5 U
Iron	ug/L	2140	100%	300	1	300 *	1	213	2140	284	78.7 J
Magnesium	ug/L	51400	100%	NA	NA	NA	NA	28100	51400	40800	41000
Manganese	ug/L	519	100%	300	1	50 *	4	107	192	60.2	519
Mercury	ug/L	0.09	100%	2	0	2	0	0.06 J	0.07 J	0.09 J	0.04 J
Nickel	ug/L	4.5	100%	NA	NA	100	0	1.5 J	4.5 J	0.82 J	1.8 J
Potassium	ug/L	6380	100%	NA	NA	NA	NA	1540 J	2330 J	1250 J	6380
Sodium	ug/L	17800	100%	20000	0	NA	NA	5220	13700	8700	17800
Thallium	ug/L	2	25%	NA	NA	2	1	1.9 U	1.9 U	2 J	1.9 U
Vanadium	ug/L	2.6	75%	NA	NA	NA	NA	0.5 U	2.6 J	0.73 J	0.6 J
Zinc	ug/L	16.5	100%	300	0	5000 *	0	3.5 J	16.5 J	5.6 J	4.2 J
OTHER ANALYSES											
pH	Standard Units							8.2	7.1	8.2	8.1
Conductivity	umhos/cm							590	1010	850	875
Temperature	°C							13.8	15.8	15.3	16
Turbidity	NTU							26.7	329	54.6	2.8

NOTES:

a) The New York State Class GA Groundwater Regulations.
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) Federal Primary and Secondary(*) Drinking Water Maximum Contaminant Levels (40 CFR 141.61-62 and 40 CFR 143.3)

MCL. MW70-2 turbidity results were six to one hundred eighteen times the turbidity results from surrounding wells at SEAD-70.

4.9.4 Surface Water

Two surface water samples were collected as part of the investigation of SEAD-70. The summary results of the chemical analyses are presented in Table 4.9-3. The following sections describe the nature and extent of surface water contamination identified at SEAD-70.

4.9.4.1 Volatile Organic Compounds

No volatile organic compounds were found in the two surface water samples collected at SEAD-70.

4.9.4.2 Semi-Volatile Organic Compounds

No semi-volatile organic compounds were found in the two surface water samples collected at SEAD-70.

4.9.4.3 Pesticides and PCBs

No pesticide or PCB compounds were found in the two surface water samples collected at SEAD-70.

4.9.4.4 Metals

Numerous metals were detected in the surface water samples collected at the site. Iron was the only element that was detected at concentrations which exceeded the NYS Class C surface water guidelines by an order of magnitude in both of the surface water samples collected at SEAD-70.

4.9.5 Sediment

A total of two sediment samples were collected as part of the investigation at SEAD-70. The summary chemical analyses are presented in Table 4.9-4. The sediment samples were collected in the same locations as the surface water samples discussed above. The following sections describe the nature and extent of sediment contamination identified at SEAD-70.

TABLE 4.9-3

SENECA ARMY DEPOT
SEAD-70 ENVIRONMENTAL SITE INSPECTION
SURFACE WATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYS GUIDELINES CLASS C	NUMBER ABOVE CRITERIA	WATER SEAD-70 04/27/94 SW70-1 219466 43810	WATER SEAD-70 04/27/94 SW70-2 219467 43810
METALS							
Aluminum	ug/L	273	100%	NA	NA	137 J	273
Arsenic	ug/L	4.6	100%	190	0	4.4 J	4.6 J
Barium	ug/L	52.3	100%	NA	NA	52.3 J	33.3 J
Calcium	ug/L	63500	100%	NA	NA	63500	50000
Chromium	ug/L	0.46	50%	390	0	0.4 U	0.46 J
Cobalt	ug/L	3	100%	NA	NA	3 J	1.3 J
Copper	ug/L	2.4	100%	23	0	1.5 J	2.4 J
Iron	ug/L	3160	100%	300	2	3160	2720
Lead	ug/L	0.92	50%	8.6	0	0.79 U	0.92 J
Magnesium	ug/L	12400	100%	NA	NA	12400	9140
Manganese	ug/L	2300	100%	NA	NA	2300	462
Mercury	ug/L	0.04	50%	NA	NA	0.04 J	0.03 U
Nickel	ug/L	1.9	100%	172	0	1.4 J	1.9 J
Potassium	ug/L	3280	100%	NA	NA	3010 J	3280 J
Sodium	ug/L	7540	100%	NA	NA	7540	5140
Thallium	ug/L	2.1	50%	8	0	1.6 U	2.1 J
Vanadium	ug/L	1.5	100%	14	0	0.92 J	1.5 J
Zinc	ug/L	7.7	100%	160	0	3 J	7.7 J
OTHER ANALYSES							
pH	Standard Units			6.5 - 9	0	6.7	7.9
Conductivity	umhos/cm					370	277
Temperature	°C					17.4	16.6
Turbidity	NTU					3.4	4.2

NOTES:

a) The New York State Ambient Water Quality standards and guidelines for Class C surface water.
b) Hardness dependent values assume a hardness of 217 mg/L.
c) 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.

TABLE 4.9-4

SENECA ARMY DEPOT
SEAD-70 ENVIRONMENTAL SITE INSPECTION
SEDIMENT ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NYSDEC SEDIMENT CHRONIC CRITERIA FOR AQUATIC LIFE (a)	NYSDEC SEDIMENT CRITERIA FOR HUMAN HEALTH (a)	NYSDEC SEDIMENT CRITERIA FOR WILDLIFE (a)	LOWEST EFFECT LEVEL (a)(b)	SEVERE EFFECT LEVEL (a)(b)	NUMBER ABOVE CRITERIA	SOIL SEAD-70 0-0.2 04/27/94 SD70-1 219452 43663	SOIL SEAD-70 0-0.2 04/27/94 SD70-2 219453 43663
SEMIVOLATILE ORGANICS											
Phenanthrene	ug/Kg	40	50%	1200	NA	NA			0	690 UJ	40 J
Fluoranthene	ug/Kg	79	50%	10200	NA	NA			0	690 UJ	79 J
Pyrene	ug/Kg	77	50%	NA	NA	NA			NA	690 UJ	77 J
Benzo(a)anthracene	ug/Kg	33	50%	NA	13	NA			1	690 UJ	33 J
Chrysene	ug/Kg	45	50%	NA	13	NA			1	690 UJ	45 J
METALS											
Aluminum	mg/Kg	13300	100%				NA	NA	NA	13300 J	10400
Arsenic	mg/Kg	3.4	100%				6	33	0	3.4 J	3.4 J
Barium	mg/Kg	126	100%				NA	NA	NA	126 J	73.7
Beryllium	mg/Kg	0.59	100%				NA	NA	NA	0.59 J	0.51 J
Cadmium	mg/Kg	0.4	100%				.6	9	0	0.34 J	0.4 J
Calcium	mg/Kg	21400	100%				NA	NA	NA	4500 J	21400
Chromium	mg/Kg	16.3	100%				26	110	0	16.3 J	15.5
Cobalt	mg/Kg	7.2	100%				NA	NA	NA	5.8 J	7.2 J
Copper	mg/Kg	21.9	100%				16	110	1	14.3 J	21.9
Iron	mg/Kg	17900	100%				2%(h)	4%(h)	0	17900 J	16900
Lead	mg/Kg	20.6	100%				31	110	0	16.9 J	20.6
Magnesium	mg/Kg	5300	100%				NA	NA	NA	2900 J	5300
Manganese	mg/Kg	512	100%				460	1100	1	512 J	212 J
Nickel	mg/Kg	23.3	100%				16	50	1	15 J	23.3
Potassium	mg/Kg	1690	100%				NA	NA	NA	1690 J	1500 J
Selenium	mg/Kg	0.75	50%				NA	NA	NA	0.75 J	0.59 U
Thallium	mg/Kg	0.8	50%				NA	NA	NA	0.43 UJ	0.8 J
Vanadium	mg/Kg	21.7	100%				NA	NA	NA	21.7 J	19.4
Zinc	mg/Kg	105	100%				120	270	1	60.1 J	105
OTHER ANALYSES											
Total Solids	%W/W									47.6	52.8

NOTES:
a) NYSDEC Sediment Criteria - 1994
b) A sediment is considered contaminated if either criteria is exceeded
c) 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) 2%=20,000 mg/Kg; 4%=40,000 mg/Kg

4.9.5.1 Volatile Organic Compounds

No volatile organic compounds were detected in any of the sediment samples.

4.9.5.2 Semivolatile Organic Compounds

A total of five SVOCs were identified in the two sediment samples collected at SEAD-70. The SVOCs detected were PAHs, two of which (benzo(a)anthracene and chrysene) were found at concentrations above their respective NYSDEC criteria values. The analysis results from sample SD70-1 had sample quantitation limits which were two times higher than the contract required quantitation limit. (The sample quantitation limits were 690 μg/kg for this sample). Elevated sample quantitation limits in sediment sample analyses often result from the high water content of the sampled media. The low reported total solids for each of these samples (47.6% w/w in sample SD70-1 and 52.8% w/w in sample SD70-2) indicate that high water content in these samples raised the sample quantitation limits.

4.9.5.3 Pesticides and PCBs

No pesticide or PCB compounds were detected in the sediment samples.

4.9.5.4 Metals

A number of metals were detected in the two sediment samples collected at SEAD-70. Of these, copper, manganese, nickel, and zinc were at concentrations slightly in excess of their NYSDEC sediment criteria. Copper, nickel and zinc were found to exceed the sediment criteria in sample SD70-2, with maximum concentrations of 21.9 mg/kg, 23.3 mg/kg and 105 mg/kg, respectively. Manganese (at 512 mg/kg) exceeded its criteria value in sample SD70-1.

4.9.6 Tentatively Identified Compounds

The total concentrations of Tentatively Identified Compounds (TICs) were below 50 mg/kg of SVOCs and below 10 mg/kg of VOCs in each of the samples collected at SEAD-70.

4.10 SEAD-71

4.10.1 Introduction

A total of eight subsurface soil samples were obtained from two test pits at SEAD-71. Groundwater from two of the three installed monitoring wells were also sampled as part of this investigation. The upgradient monitoring well, MW71-2, was dry. The following sections describe the nature and extent of contamination identified at SEAD-71. The sample locations are shown in Figure 2.12-2.

4.10.2 Soil

The eight subsurface soil samples were obtained from two test pits that were excavated at two geophysical anomalies. Test pit TP71-1 contained construction debris and a crushed drum in the depth range of 0 to 1.3 feet and angular black debris from 1.3 to 2.0 feet. Test pit TP71-2 was located near some empty heating oil storage tanks and oil-stained roadstone. The analytical results for these samples are presented in Table 4.10-1. The following sections describe the type of contaminants detected in the soils from these two test pits.

4.10.2.1 Volatile Organic Compounds

2 μg/kg methylene chloride, 4 to 23 μg/kg 1,1,1-trichloroethane, and 1 to 3 μg/kg tetrachloroethane were detected in the solids from TP71-1. 2 to 11 μg/kg methylene chloride was detected in all four samples and 3 μg/kg 1,1,1-trichloroethane was detected in one sample from TP71-2. These concentrations are well below their associated TAGMs.

4.10.2.2 Semivolatile Organic Compounds

A total of 18 semivolatile organic compounds, all polynuclear aromatic hydrocarbons, were found at varying concentrations in the test pit samples. In TP71-1, sample TP71-1-1 contained PAHs at concentrations generally ranging from 10,000 to 88,000 μg/kg. The three samples obtained at three and four foot depths contained PAHs generally in the range of 100 to 1,000 μg/kg with a maximum concentration of 2,600 μg/kg. The deepest sample contained the least amount of PAHs. All four samples contained PAHs at concentrations greater than their associated TAGMs.

TABLE 4.10-1

SENECA ARMY DEPOT
SEAD-71 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-71 3 06/07/94 TP71-1-1 223344 44665	SOIL SEAD-71 3 06/07/94 TP71-1-2 223345 44665	SOIL SEAD-71 3 06/07/94 TP71-1-3 223346 44665	SOIL SEAD-71 4 06/07/94 TP71-1-4 223347 44665
VOLATILE ORGANICS									
Methylene Chloride	ug/Kg	11	100%	100	0	2 J	2 J	2 J	2 J
1,1,1-Trichloroethane	ug/Kg	23	63%	800	0	4 J	7 J	10 J	23
Tetrachloroethene	ug/Kg	3	38%	1400	0	1 J	1 J	3 J	12 U
SEMIVOLATILE ORGANICS									
Naphthalene	ug/Kg	77	25%	13000	0	19000 U	77 J	370 U	29 J
2-Methylnaphthalene	ug/Kg	29	13%	36400	0	19000 U	29 J	370 U	390 U
Acenaphthene	ug/Kg	5800	50%	50000*	0	5800 J	280 J	76 J	38 J
Dibenzofuran	ug/Kg	120	13%	6200	0	19000 U	120 J	370 U	390 U
Fluorene	ug/Kg	2800	38%	50000*	0	2800 J	230 J	56 J	390 U
Phenanthrene	ug/Kg	66000	100%	50000*	1	66000	1900	770	260 J
Anthracene	ug/Kg	11000	50%	50000*	0	11000 J	560	120 J	59 J
Carbazole	ug/Kg	9500	50%	50000*	0	9500 J	360 J	100 J	30 J
Fluoranthene	ug/Kg	88000	100%	50000*	1	88000	2600	1400	330 J
Pyrene	ug/Kg	63000	100%	50000*	1	63000	1600	2000	390
Benzo(a)anthracene	ug/Kg	37000	88%	224	5	37000	1200	660	180 J
Chrysene	ug/Kg	36000	88%	400	4	36000	1000	750	220 J
Benzo(b)fluoranthene	ug/Kg	26000	88%	1100	1	26000	930	710	130 J
Benzo(k)fluoranthene	ug/Kg	15000	88%	1100	1	15000 J	570	490	140 J
Benzo(a)pyrene	ug/Kg	22000	88%	61	7	22000	750	630	160 J
Indeno(1,2,3-cd)pyrene	ug/Kg	12000	88%	3200	1	12000 J	390 J	520	88 J
Dibenz(a,h)anthracene	ug/Kg	9800	75%	14	6	9800 J	190 J	320 J	38 J
Benzo(g,h,i)perylene	ug/Kg	10000	88%	50000*	0	10000 J	500	500	82 J
PESTICIDES/PCB									
Heptachlor	ug/Kg	1.2	13%	100	0	19 U	1.2 J	1.9 U	2 U
Endosulfan I	ug/Kg	200	88%	900	0	200 J	3.5	6.6 J	2.8 J
Dieldrin	ug/Kg	3.5	13%	44	0	37 U	3.5 J	3.7 U	3.9 U
4,4'-DDE	ug/Kg	4.2	25%	2100	0	37 U	3.7 U	3.1 J	4.2 J
Endrin	ug/Kg	29	13%	100	0	29 J	3.7 U	3.7 U	3.9 U
Endosulfan II	ug/Kg	26	38%	900	0	26 J	2.5 J	3.7 U	3.9 U
4,4'-DDD	ug/Kg	3.4	13%	2900	0	37 U	3.7 U	3.7 U	3.9 U
Endosulfan sulfate	ug/Kg	2.2	13%	1000	0	37 U	3.7 U	3.7 U	3.9 U
4,4'-DDT	ug/Kg	13	38%	2100	0	37 U	3.7 U	8.4	13
alpha-Chlordane	ug/Kg	74	25%	540	0	74 J	1.9 U	1.9 U	2 U

TABLE 4.10-1

SENECA ARMY DEPOT
SEAD-71 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-71 3 06/07/94 TP71-1-1 223344 44665	SOIL SEAD-71 3 06/07/94 TP71-1-2 223345 44665	SOIL SEAD-71 3 06/07/94 TP71-1-3 223346 44665	SOIL SEAD-71 4 06/07/94 TP71-1-4 223347 44665
METALS									
Aluminum	mg/Kg	18000	100%	14593	2	12900	13100	10900	9960
Antimony	mg/Kg	0.47	38%	3.59	0	0.19 J	0.27 UJ	0.23 UJ	0.47 J
Arsenic	mg/Kg	7.8	100%	7.5	2	5.4	5.1	5.2	4.8
Barium	mg/Kg	108	100%	300	0	86.2	69.2	69.8	63.5
Beryllium	mg/Kg	0.88	100%	.73	1	0.58 J	0.56 J	0.53 J	0.47 J
Cadmium	mg/Kg	0.53	100%	1	0	0.53 J	0.39 J	0.45 J	0.45 J
Calcium	mg/Kg	52800	100%	101904	0	38000 J	52800 J	32200 J	36500 J
Chromium	mg/Kg	25.8	100%	22	1	18.4	17.9	16.3	15.5
Cobalt	mg/Kg	14.6	100%	30	0	9.4	9.3 J	9.7	8.7 J
Copper	mg/Kg	37.5	100%	25	4	25.4	19	23	26.7
Iron	mg/Kg	32700	100%	26627	2	23600	22700	21600	20000
Lead	mg/Kg	96.9	100%	21.9	4	96.9	10.3	43.8	67.8
Magnesium	mg/Kg	13100	100%	12222	1	8690	7910	8840	9180
Manganese	mg/Kg	749	100%	669	1	497	390	474	458
Mercury	mg/Kg	0.15	100%	0.1	1	0.03 J	0.03 J	0.03 J	0.03 J
Nickel	mg/Kg	42.5	100%	34	3	26.8	25.2	24.9	24.6
Potassium	mg/Kg	1830	100%	1762	1	1340 J	1540 J	1230 J	1520 J
Selenium	mg/Kg	0.91	50%	2	0	0.43 J	0.57 U	0.47 U	0.56 U
Sodium	mg/Kg	140	88%	104	2	54.9 J	108 J	140 J	90.7 J
Vanadium	mg/Kg	29.2	100%	150	0	19.7	20.1	17.9	18.2
Zinc	mg/Kg	128	100%	83	2	96.2	63.9	86.1	79.7
OTHER ANALYSES									
Total Solids	%W/W					88.9	87.7	88.8	84.7

TABLE 4.10-1

SENECA ARMY DEPOT
SEAD-71 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-71 1 06/07/94 TP71-2-1 223348 44665	SOIL SEAD-71 2 06/07/94 TP71-2-2 223349 44665	SOIL SEAD-71 2-3.3 06/07/94 TP71-2-3 223350 44665	SOIL SEAD-71 2 06/07/94 TP71-2-4 223351 44665
VOLATILE ORGANICS									
Methylene Chloride	ug/Kg	11	100%	100	0	2 J	2 J	3 J	11 J
1,1,1-Trichloroethane	ug/Kg	23	63%	800	0	11 U	11 U	3 J	12 U
Tetrachloroethene	ug/Kg	3	38%	1400	0	11 U	11 U	12 U	12 U
SEMIVOLATILE ORGANICS									
Naphthalene	ug/Kg	77	25%	13000	0	1500 U	380 U	420 U	380 U
2-Methylnaphthalene	ug/Kg	29	13%	36400	0	1500 U	380 U	420 U	380 U
Acenaphthene	ug/Kg	5800	50%	50000*	0	1500 U	380 U	420 U	380 U
Dibenzofuran	ug/Kg	120	13%	6200	0	1500 U	380 U	420 U	380 U
Fluorene	ug/Kg	2800	38%	50000*	0	1500 U	380 U	420 U	380 U
Phenanthrene	ug/Kg	66000	100%	50000*	1	270 J	180 J	30 J	80 J
Anthracene	ug/Kg	11000	50%	50000*	0	1500 U	380 U	420 U	380 U
Carbazole	ug/Kg	9500	50%	50000*	0	1500 U	380 U	420 U	380 U
Fluoranthene	ug/Kg	88000	100%	50000*	1	690 J	580	63 J	240 J
Pyrene	ug/Kg	63000	100%	50000*	1	1000 J	660	73 J	260 J
Benzo(a)anthracene	ug/Kg	37000	88%	224	5	370 J	250 J	420 U	120 J
Chrysene	ug/Kg	36000	88%	400	4	610 J	360 J	420 U	130 J
Benzo(b)fluoranthene	ug/Kg	26000	88%	1100	1	750 J	400	420 U	110 J
Benzo(k)fluoranthene	ug/Kg	15000	88%	1100	1	490 J	240 J	420 U	77 J
Benzo(a)pyrene	ug/Kg	22000	88%	61	7	490 J	290 J	420 U	94 J
Indeno(1,2,3-cd)pyrene	ug/Kg	12000	88%	3200	1	430 J	220 J	420 U	52 J
Dibenz(a,h)anthracene	ug/Kg	9800	75%	14	6	170 J	130 J	420 U	380 U
Benzo(g,h,i)perylene	ug/Kg	10000	88%	50000*	0	370 J	150 J	420 U	36 J
PESTICIDES/PCB									
Heptachlor	ug/Kg	1.2	13%	100	0	1.9 U	2 U	2.2 U	2 U
Endosulfan I	ug/Kg	200	88%	900	0	5.1 J	6.9 J	2.2 U	3.4 J
Dieldrin	ug/Kg	3.5	13%	44	0	3.7 U	3.8 U	4.2 U	3.8 U
4,4'-DDE	ug/Kg	4.2	25%	2100	0	3.7 U	3.8 U	4.2 U	3.8 U
Endrin	ug/Kg	29	13%	100	0	3.7 U	3.8 U	4.2 U	3.8 U
Endosulfan II	ug/Kg	26	38%	900	0	2 J	3.8 U	4.2 U	3.8 U
4,4'-DDD	ug/Kg	3.4	13%	2900	0	3.4 J	3.8 U	4.2 U	3.8 U
Endosulfan sulfate	ug/Kg	2.2	13%	1000	0	2.2 J	3.8 U	4.2 U	3.8 U
4,4'-DDT	ug/Kg	13	38%	2100	0	2.7 J	3.8 U	4.2 U	3.8 U
alpha-Chlordane	ug/Kg	74	25%	540	0	2 J	2 U	2.2 U	2 U

TABLE 4.10-1

SENECA ARMY DEPOT
SEAD-71 ENVIRONMENTAL SITE INSPECTION
SOIL ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION DEPTH (FEET) SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	TAGM	NUMBER ABOVE TAGM	SOIL SEAD-71 1 06/07/94 TP71-2-1 223348 44665	SOIL SEAD-71 2 06/07/94 TP71-2-2 223349 44665	SOIL SEAD-71 2-3.3 06/07/94 TP71-2-3 223350 44665	SOIL SEAD-71 2 06/07/94 TP71-2-4 223351 44665
METALS									
Aluminum	mg/Kg	18000	100%	14593	2	9630	12500	18000	15200
Antimony	mg/Kg	0.47	38%	3.59	0	0.21 J	0.18 UJ	0.23 UJ	0.25 UJ
Arsenic	mg/Kg	7.8	100%	7.5	2	4.2	4.8	7.6	7.8
Barium	mg/Kg	108	100%	300	0	37.5	57.6	108	76.1
Beryllium	mg/Kg	0.88	100%	.73	1	0.44 J	0.48 J	0.88 J	0.7 J
Cadmium	mg/Kg	0.53	100%	1	0	0.44 J	0.43 J	0.45 J	0.48 J
Calcium	mg/Kg	52800	100%	101904	0	10500 J	37200 J	4260 J	27300 J
Chromium	mg/Kg	25.8	100%	22	1	18.1	16.7	25.8	22
Cobalt	mg/Kg	14.6	100%	30	0	11.4	9	14.6	13.4
Copper	mg/Kg	37.5	100%	25	4	37.5	17.5	36.2	23.5
Iron	mg/Kg	32700	100%	26627	2	22400	22100	32700	32100
Lead	mg/Kg	96.9	100%	21.9	4	25.3	11.2	15.3	15.1
Magnesium	mg/Kg	13100	100%	12222	1	4830	13100	6680	6320
Manganese	mg/Kg	749	100%	669	1	255	434	749	503
Mercury	mg/Kg	0.15	100%	0.1	1	0.04 J	0.15	0.04 J	0.02 J
Nickel	mg/Kg	42.5	100%	34	3	42.5	23.2	38.8	36.1
Potassium	mg/Kg	1830	100%	1762	1	992 J	1010 J	1830 J	1300 J
Selenium	mg/Kg	0.91	50%	2	0	0.91	0.37 U	0.61 J	0.74 J
Sodium	mg/Kg	140	88%	104	2	50 J	45.6 J	17.6 U	37.2 J
Vanadium	mg/Kg	29.2	100%	150	0	15.4	19.2	29.2	23.1
Zinc	mg/Kg	128	100%	83	2	128	58.9	71.8	79.3
OTHER ANALYSES									
Total Solids	%W/W					87.6	86.4	78.5	85.7

NOTES:

a) * = As per proposed TAGM, total VOCs < 10 ppm, total SVOs < 500 ppm, and individual SVO's <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.

In TP71-2, only 11 of the 18 PAHs were detected in the soil samples. The sample at one foot contained PAHs at concentrations in the range of 100 to 800 μg/kg. The two samples obtained at two feet contained slightly lower concentrations of PAHs. The deepest sample (2 to 3.3 feet) contained 3 PAHs at concentrations less than 100 μg/kg. The three samples obtained at one and two feet contained PAHs at concentrations greater than their associated TAGMs. The concentrations of PAHs in subsurface soils are shown in Figure 4.10-1.

4.10.2.3 Pesticides and PCBs

Eight pesticides were detected in soil samples from TP71-1 and six pesticides were detected in soil samples from TP71-2, though none were detected above their respective TAGM values. The pesticides were more prevalent and at higher concentrations in the test pit soil samples nearest the ground surface.

4.10.2.4 Metals

A number of samples were found to contain metals at concentrations that exceeded the associated TAGMs. Of the 21 metals reported, 14 were found in one or more samples at concentrations above the TAGM values. In TP71-1, only four metals exceeded their TAGMs. Copper, sodium, and zinc exceeded their TAGMs by less than 1.5 times the TAGM, whereas lead exceeded the TAGM by up to 3 times the TAGM. In TP71-2, 13 metals exceeded their TAGMs, however, the exceedences were less than 1.5 times the TAGM values. In addition, the number of exceedances increased with depth: five at one foot, 2 to 4 at two feet, and nine at 2 to 3.3 feet.

4.10.3 Groundwater

Two of the three monitoring wells installed for this investigation at SEAD-71 were sampled. The upgradient well, MW71-2, was dry. The summary of chemical analyses are presented in Table 4.10-2. The following sections describe the nature and extent of groundwater contamination identified at SEAD-71.

4.10.3.1 Volatile Organic Compounds

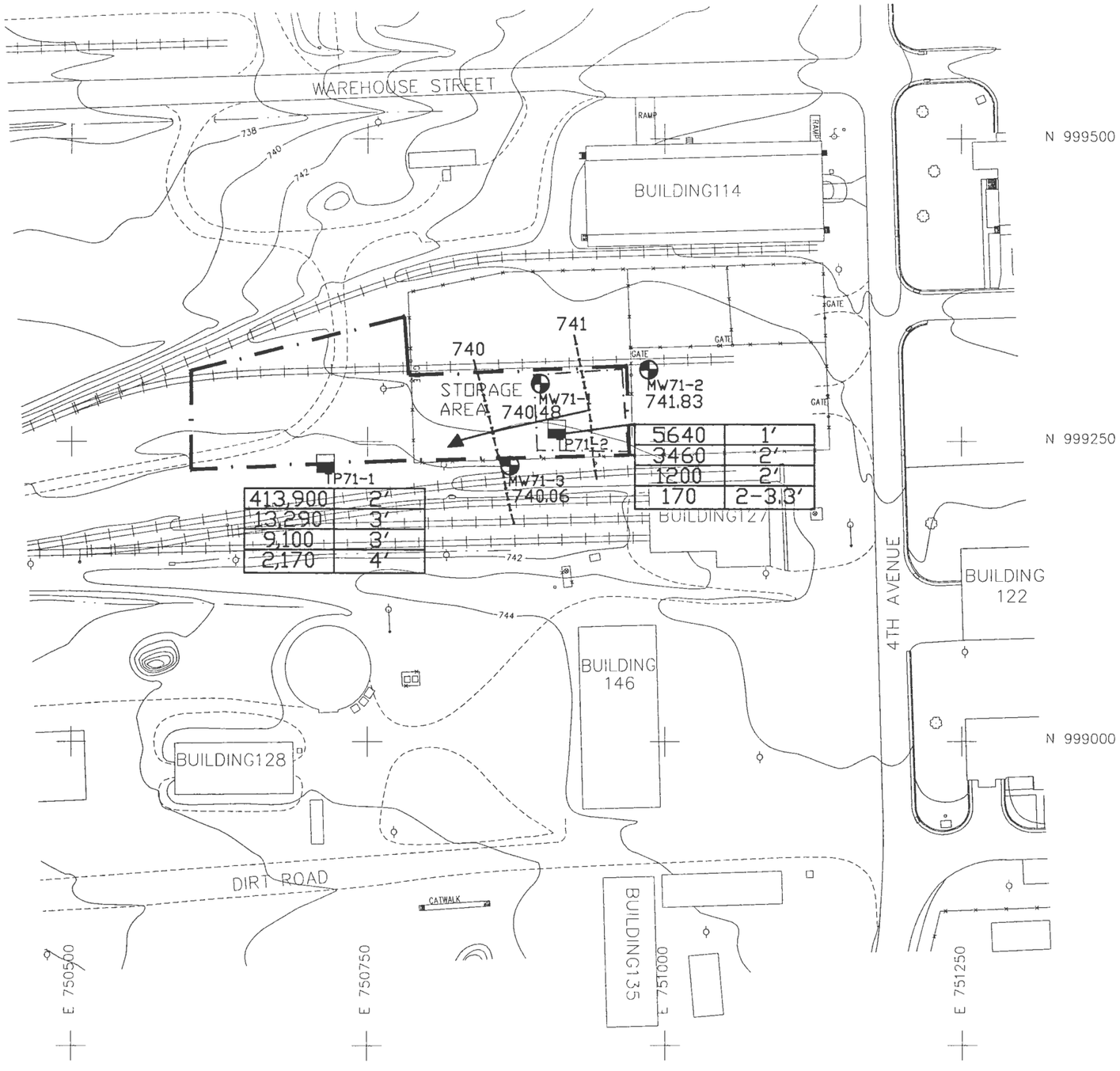
No volatile organic compounds were detected in the groundwater samples collected at SEAD-71.

TABLE 4.10-2

SENECA ARMY DEPOT
SEAD-71 ENVIRONMENTAL SITE INSPECTION
GROUNDWATER ANALYSIS RESULTS

COMPOUND	MATRIX LOCATION SAMPLE DATE ES ID LAB ID SDG NUMBER UNITS	MAXIMUM	FREQUENCY OF DETECTION	NY AWQS CLASS GA (a)	NUMBER ABOVE CRITERIA	FEDERAL DRINKING WATER MCL (h)	NUMBER ABOVE CRITERIA	WATER SEAD-71 03/29/94 MW71-1 215839 43179	WATER SEAD-71 07/07/94 MW71-3 226311 45257
METALS									
Aluminum	ug/L	19700	100%	NA	NA	50-200 *	2	19700	334
Arsenic	ug/L	2.7	50%	25	0	NA	NA	2.7 J	2 U
Barium	ug/L	164	100%	1000	0	2000	0	164 J	37.7 J
Beryllium	ug/L	0.88	50%	NA	NA	4	0	0.88 J	0.1 U
Cadmium	ug/L	0.33	50%	10	0	5	0	0.33 J	0.2 U
Calcium	ug/L	212000	100%	NA	NA	NA	NA	212000	146000
Chromium	ug/L	33.1	100%	50	0	100	0	33.1	0.59 J
Cobalt	ug/L	22.1	100%	NA	NA	NA	NA	22.1 J	1.1 J
Copper	ug/L	16.1	100%	200	0	1000 *	0	16.1 J	0.75 J
Iron	ug/L	35100	100%	300	2	300 *	2	35100	613
Lead	ug/L	17.2	50%	25	0	15 **	1	17.2	0.89 U
Magnesium	ug/L	32400	100%	NA	NA	NA	NA	32400	18000
Manganese	ug/L	1680	100%	300	2	50 *	2	1680	557
Mercury	ug/L	0.06	100%	2	0	2	0	0.06 J	0.05 J
Nickel	ug/L	49.4	100%	NA	NA	100	0	49.4	2.6 J
Potassium	ug/L	4910	100%	NA	NA	NA	NA	3260 J	4910 J
Sodium	ug/L	9180	100%	20000	0	NA	NA	9180	4130 J
Thallium	ug/L	2.5	50%	NA	NA	2	1	1.6 U	2.5 J
Vanadium	ug/L	25.7	100%	NA	NA	NA	NA	25.7 J	0.9 J
Zinc	ug/L	97.3	100%	300	0	5000 *	0	97.3	6.5 J
OTHER ANALYSES									
pH	Standard Units							6.8	7.1
Conductivity	umhos/cm							620	660
Temperature	°C							6.1	17.5
Turbidity	NTU							1860	64

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)
i) ** the value is an action level, reported in Drinking Water Regulations and Health Advisories, USEPA, May 1994



N

LEGEND

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

(NOT ALL SYMBOLS MAY APPEAR ON MAP)

APPROXIMATE AOC EXTENT

AOC EXTENT FROM THE 15 SWMU ESI WORK PLAN

- TEST PIT
- MW71-1 MONITORING WELL WITH
- 740.48 WATER TABLE ELEVATION
- 741 ESTIMATED GROUNDWATER ELEVATION CONTOUR (ARROW INDICATES DIRECTION OF FLOW)

GROUNDWATER LEVEL MEASUREMENTS MADE ON 7/6/94

- TOTAL PAHs (µg/Kg) in left column
- DEPTH OF SAMPLE in right column

50 0 50 100
(feet)

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW-PRIORITY AOC'S

DEPT.	Dwg. No.
ENVIRONMENTAL ENGINEERING	720518-01002

FIGURE 4.10-1

SEAD-71

TOTAL PAHs IN SUBSURFACE SOILS

SCALE	DATE	REV
1" = 100'	APRIL 1998	A

ACAD\SENECA\7LPSWMU\ACADFIG\SD71TAPH.DWG

4.10.3.2 Semivolatile Organic Compounds

No semivolatile organic compounds were detected in the groundwater samples collected at SEAD-71.

4.10.3.3 Pesticides and PCBs

No pesticides or PCBs were detected in the groundwater samples collected at SEAD-71.

4.10.3.4 Metals

Numerous metals were detected in the groundwater samples. Aluminum, iron, lead, manganese and thallium were found at concentrations exceeding either the state or federal criteria. Aluminum exceeded the maximum Federal Secondary Drinking Water MCL (200 μg/L) at MW71-1 (19,700 μg/L) and at MW71-3 (334 μg/L).

Iron was found at concentrations of 35,100 μg/L and 613 μg/L in MW71-1 and MW71-3, both exceeding the state and federal criteria value of 300 μg/L. Lead was present in one sample at a concentration of 17.2 μg/L, 15% larger than the Federal Secondary Drinking Water MCL.

Manganese concentrations exceeded the Federal Secondary Drinking Water MW71-1 (1,680 μg/L) and at MW71-2 (557 μg/L). Thallium was estimated at 2.5 μg/L in MW71-3, 0.5 μg/L above the Federal Primary Drinking Water MCL.

Eighteen out of the twenty metals analyzed had maximum concentrations at MW71-1. This is probably due to the very high turbidity of this sample (1,860 NTUs).

4.10.4 Tentatively Identified Compounds

Semivolatile Organic TICs were detected at total concentrations greater than 50 mg/kg in 2 of the test pit soil samples. Test pit sample TP71-1-1 had a reported total TIC concentration of 180.9 mg/kg. The occurrence of high TIC concentrations in this sample correlates to the high concentrations of NYSDEC CLP TCL SVOCs detected in the same sample. Test pit sample TP71-2-1 had a reported total TIC concentration of 144.3 mg/kg. The occurrence of

high TIC concentrations in this sample may account for the high sample quantitation limits reported for several of the NYSDEC CLP TCL SVOCs in this sample.

The total VOC TIC concentrations were below 10 mg/kg in all of the samples collected at SEAD-71.

5.0 HEALTH AND ENVIRONMENTAL CONCERNS

This section will identify the source areas, release mechanisms, potential exposure pathways and the likely human and environmental receptors at each of the eight AOCs.

SEDA is a government-owned installation under the jurisdiction of the U.S. Army Material Command (AMC). The facilities include storage areas and warehouses, munitions destruction and deactivation facilities, and administration building.

In preparing this document, residential future use is considered as a conservative criterion for eliminating an AOC from future investigation. This does not suggest, however, that the Army intends to remediate any site to such standards. Actual degrees of remediation will be proposed on a site-by-site basis and the future plans for the site will be taken into account.

In July 1995, the Base Realignment and Closure Act (BRAC) Commission voted to recommend closure of SEDA. Congress approved the recommendation, which became public law on October 1, 1995. According to BRAC regulations, future uses of the site will be determined by the Army.

In accordance with BRAC regulations, the Army will notify all appropriate regulatory agencies and will perform any additional investigations and remedial actions to assure that any changes in the intended use of the sites is protective of human health and the environment in accordance with CERCLA. Also, Army regulations (Regulation 200-1, paragraph 12-5, Real Property Transactions), requires the Army to perform an Environmental Baseline Study (EBS) prior to a transfer of Army property. The EBS is an inventory and a comprehensive evaluation of the existing environmental conditions and consists of scope definition, survey, sampling, investigative and risk assessment.

Information about potential future land use in the area of the SEDA was obtained from the Romulus Town Clerk to determine if any master plans exist for this area or if any land use restriction could apply to the future use of portions of the SEDA facility. No zoning maps or master plans were found to exist for the site or surrounding area in the town of Romulus. Consequently, the use of this area for light industrial or residential uses is not restricted by local zoning laws and either use could be permitted. The existing land use surrounding the SEDA facility is generally agricultural with sparse housing. Large tracts of undeveloped land are widely available for future development however, the area is not experiencing a high degree of growth nor is it expected to.

Information was obtained about potential offsite receptors by reviewing tax maps for the two towns which surround the SEDA facility (Varick and Romulus), conducting field reconnaissance of the area adjacent to SEDA to identify locations of potential receptors, and evaluating current land use maps for the area surrounding SEDA.

Land use adjacent to and off-site of the SEDA facility is sparse residential areas with some farmland. The population density in the two towns of Varick and Romulus is 67 people per square mile based on the 1990 U.S. Census. Potential off-site receptors would include any recreators such as waders who may use downstream portions of Kendaia Creek, Hicks Gully, or any drainage ditches, which flow off-site, on a seasonal basis. The nearest sensitive subgroup (receptor) location is the Central School in Romulus Village, approximately 1,000 feet from the eastern boundary of the SEDA. Additionally, recreation activities take place at Sampson State Park approximately 1 mile from the western boundary of the SEDA facility.

Residential communities surrounding the depot use potable water wells for drinking water supplies, which, however unlikely, could be a possible route of exposure to any contaminants released from the 8 AOCs. The use of the overburden aquifer as a source of drinking water is unlikely due to the limited aquifer yields and the high turbidity of the well water. As a result, well water supplies are bedrock wells rather than overburden wells.

The use of TAGM values as the criteria for comparison of detected concentrations of constituents from the sites provides some uncertainty in the determination of threats. The TAGM criteria are conservative values derived on exposure factors for residential land use. The land use of the sites at SEDA are currently industrial and any change to this usage in the future will require more extensive evaluations and risk determinations to be performed by the Army. The use of TAGM values in this analysis implies a future residential land use and results in conservative conclusions.

5.1 EXPOSURE PATHWAY SUMMARIES

A preliminary exposure pathway summary was developed for each of the seven AOCs (10 sites). The pathway summary combines both site conditions and expected behavior of the detected chemicals in the environment into a preliminary understanding of the site. The pathways were developed by evaluating the physical aspects of environmental conditions and the effect these conditions may have on the migration potential of the detected chemicals.

The proper framework of an exposure pathway involves a source, transport medium, exposure point, and an exposure route. A pathway is considered incomplete if one or more of these components is not present with the exception of the transport medium, which may be absent in the case of direct exposures. Therefore, if there is not a complete pathway, there is no risk from that theoretical pathway. This is designated on the Exposure Path Summary figures as NA. A pathway is an unlikely risk if there is only a remote possibility of an exposure above the appropriate criteria.

Ingestion of dust was not evaluated as a pathway because the quantity of compounds ingested as dust would be insignificant when compared to the quantity ingested as soil or inhaled as dust.

5.2 SEAD-60

5.2.1 Potential Source Areas and Release Mechanisms

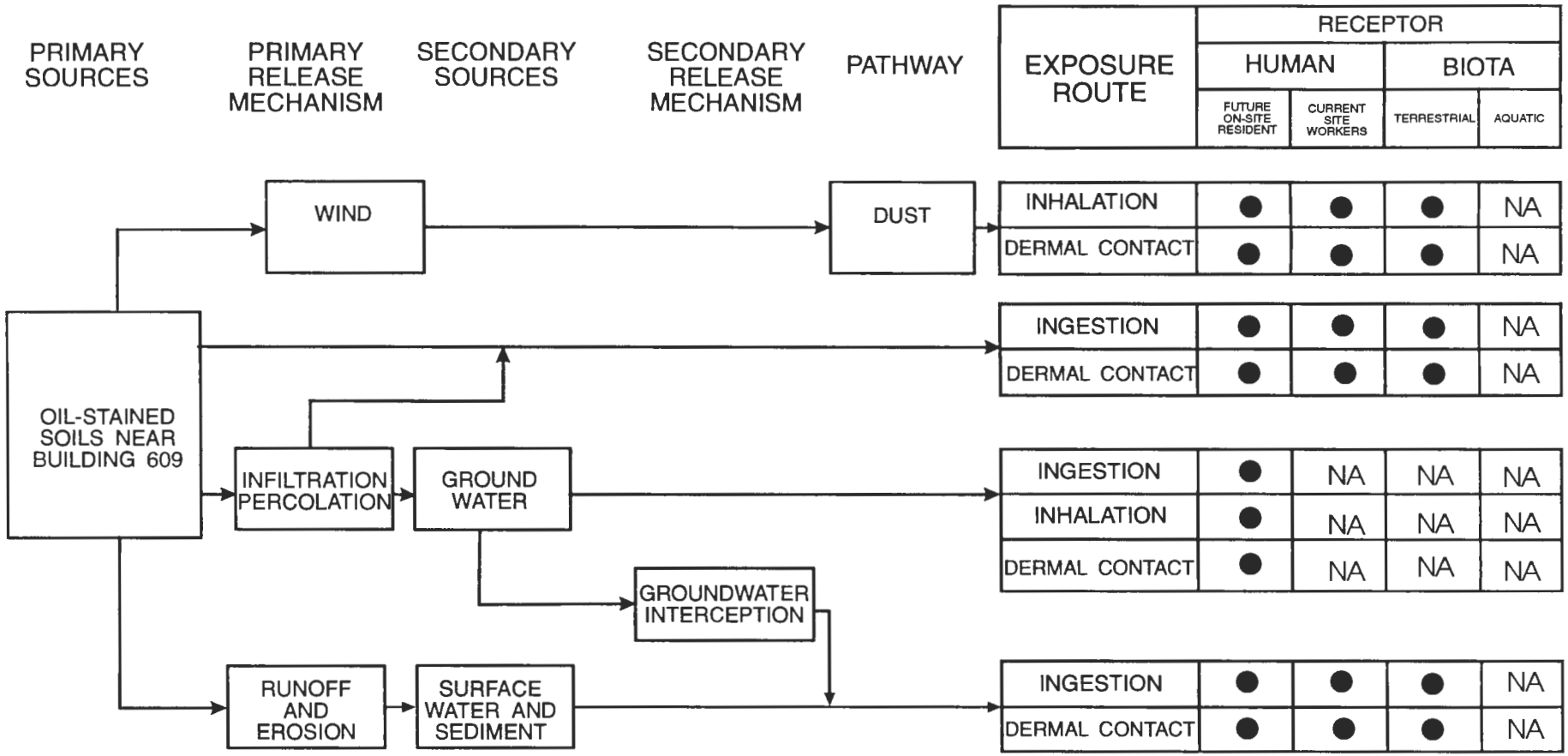
SEAD-60 is the location of oil-stained soil near the southwestern corner of Building 609. The primary release mechanisms from the oil-stained soil are surface water runoff and infiltration of precipitation. Wind is also a primary release mechanism from the oil-stained soil. Groundwater, soils underlying and downgradient of the oil-stained area, surface water and sediment are secondary sources. Groundwater interception of surface water is a secondary release mechanism.

5.2.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.2-1. The potential for human exposure is directly affected by the accessibility to the site. Within the boundaries of SEDA, human and vehicular access to the site is restricted since SEAD-60 is located within the confines of the ammunition storage area.

There are three primary receptor populations for potential releases of contaminants from the oil-stained soil area near Building 609 at SEAD-60:

1. Future on-site residents;
2. SEDA personnel or visitors to the site; and
3. Terrestrial biota on or near the oil-stained area.



PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT ACTIVITY
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOC'S

DEPT. ENVIRONMENTAL ENGINEERING
DWG NO. 720518-01002

FIGURE 5.2-1
EXPOSURE PATHWAY SUMMARY
FOR SEAD-60

SCALE NA
DATE APRIL 1996

R:\GRAPHICS\SENECA\7LPSWMU\SD60.CDR

Aquatic biota are not considered because there are no ponds or streams on or near the site. The exposure pathways and media of exposure are described below as they may affect the various receptors.

5.2.2.1 Ingestion and Dermal Exposure Due to Surface Water and Sediment

The oil-spill area is located at the upgradient end of a drainage ditch that parallels a set of SEDA railroad tracks and leads to a somewhat larger, east-west trending drainage ditch located approximately 300 feet from Building 609. Based on topographic expression, the oil-spill area would be expected to receive surface water runoff via overland flow from areas to the east, south and west. This water is funneled into the elongate drainage ditch that eventually leads to a larger drainage ditch north of the site. Thus, there is a potential for surface waters and sediment to be impacted by the oil and transported away from the site. These two ditches are believed to be ephemeral, and any transport of oil-impacted surface water and sediment to the ditches would likely occur during precipitation or spring snow melt events via overland flow. Due to these events, the ditches may fill with water for extended periods of time.

The primary human receptors of the surface water and sediment impacts are site visitors and future residents. Visitors to the site, as well as hunters or SEDA workers, could experience dermal exposure from walking in the drainage ditch near the spill area, but they would be considered to have an unlikely risk of exposure from ingesting surface water or sediment. SEDA workers could visit the site for security reasons. Future residents could come in contact with surface water and sediment.

The primary environmental receptors of any impacted surface water and sediment are the biota of the drainage ditches. Organisms which feed on the biota may be affected due to bioaccumulation of pollutants from the water and sediment. Terrestrial biota that drink from impacted surface water bodies (e.g., water-filled drainage ditches) may also be affected.

5.2.2.2 Soil Ingestion and Dermal Contact

Ingestion of soil is a potential exposure pathway for future on-site residents and terrestrial biota. During the course of work activities conducted at the site, a SEDA worker may, on occasion, involuntarily ingest and/or make dermal contact with contaminated surficial soils.

This exposure pathway assumes that during the course of a work day involuntary ingestion of the surficial soil occurs, therefore this pathway is considered to pose a risk of exposure to visitors to the site.

Dermal contact with soil is a potential exposure pathway for future on-site residents, on-site visitors and workers, and terrestrial biota.

5.2.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

Ingestion of, inhalation of, and dermal contact with groundwater are potential exposure pathways for future on-site residents. This assumes that the residents will obtain their water supply from wells installed on-site. The groundwater beneath the oil-stained soil near Building 609 is currently not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there would be direct exposure to the groundwater from the site under current uses to site workers and visitors, and terrestrial biota. Groundwater beneath the site flows to the west-northwest. The potential groundwater contribution to the surface water (i.e., water-filled drainage ditches) during periods of high groundwater could result in the exposures identified for surface water and sediments above.

5.2.2.4 Dust Inhalation and Dermal Contact

Inhalation of, and dermal contact with, dust are considered to be potential exposure pathways for future on-site residents, site workers and visitors, and terrestrial biota.

5.2.3 Summary of Affected Media

The impacts to the SEAD-60 site media (soil, groundwater surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedances) were presented in Section 4.0.

Soils

Soils at the site have been impacted primarily by TPH, semivolatile organic compounds (mostly PAHs) and metals. Other constituents that were detected, include volatile organic compounds, pesticides and PCBs. These latter constituents are present at low concentrations and/or only a small number of samples exceed their respective TAGMs.

At the location of the release of oil, surface soils (0 to 2 inches) are the most significantly impacted, with TPH concentrations of 218,000 μg/kg and 50,900 μg/kg. Significant concentrations of PAHs (up to 18,000 μg/kg) correlated spatially with the elevated TPH concentrations in surface soils, and TAGM exceedences for PAHs were more numerous for surface soils. At depth, the concentrations of these constituents in soil was reduced; only one subsurface sample contained a TAGM exceedence for an individual PAH compound. Heavy metals concentrations above the TAGM were present in all the samples and, while the surface soil samples from the two borings near the release of oil generally contained the most TAGM exceedances for metals, no consistent pattern was evident.

Groundwater

Groundwater at the site appears to have been impacted by TPH. Other constituents that were detected include volatile organic compounds, pesticides and metals. These latter constituents were considered to pose an unlikely risk to receptors because they are present at low concentrations and only one VOC and three metals exceeded their respective groundwater criteria.

The analytical results indicate that TPH has impacted the groundwater beneath the oil release, even though the concentrations of TPH in soil were reduced at depth. A TPH concentration of 1.22 mg/L was detected in the hydraulically downgradient monitoring well MW60-2. Monitoring well MW60-1, located approximately 130 feet east and hydraulically upgradient of Building 609, also contained TPH (2.2 mg/L).

Surface Water

Surface water at the site has not been significantly impacted by any of the constituents that were analyzed for during the investigation. Metals were the only constituents detected. The metals were considered to pose little risk to receptors because they are present at low concentrations and only iron was detected in one sample at a concentration that exceeded its criteria value by a factor of 1.5.

Sediment

Sediment at the site has been impacted primarily by semivolatile organic compounds (mostly PAHs) and TPH. Generally, the types and concentrations of PAHs in samples SD60-2 and SD60-3 were the same. However, sample SD60-2 nearest the spill area contained a

significantly higher concentration of TPH (149 mg/kg) than sample SD60-3, in which no TPH was detected. Other constituents that were detected at elevated concentrations are pesticide compounds. Constituents that were detected at low concentrations include one volatile organic compound and metals. Of these latter constituents, only 5 metals exceeded their respective criteria, however, none by more than a factor of two.

5.3 SEAD-62

5.3.1 Potential Source Areas and Release Mechanisms

The site (SEAD-62) was potentially used for the disposal of nicotine sulfate. The suspected source(s) on the site are burial pits that contain the nicotine sulfate. Infiltration from precipitation is a primary release mechanism to groundwater. If infiltration of precipitation occurs then groundwater would be a secondary source. Surface water runoff across the site is also a primary release mechanism, although it is likely to be less significant because the nicotine sulfate is suspected to be buried on-site. If the nicotine sulfate was buried close to the ground surface, surface water runoff would likely be a more significant release mechanism. Soil, surface water and sediment are also secondary sources.

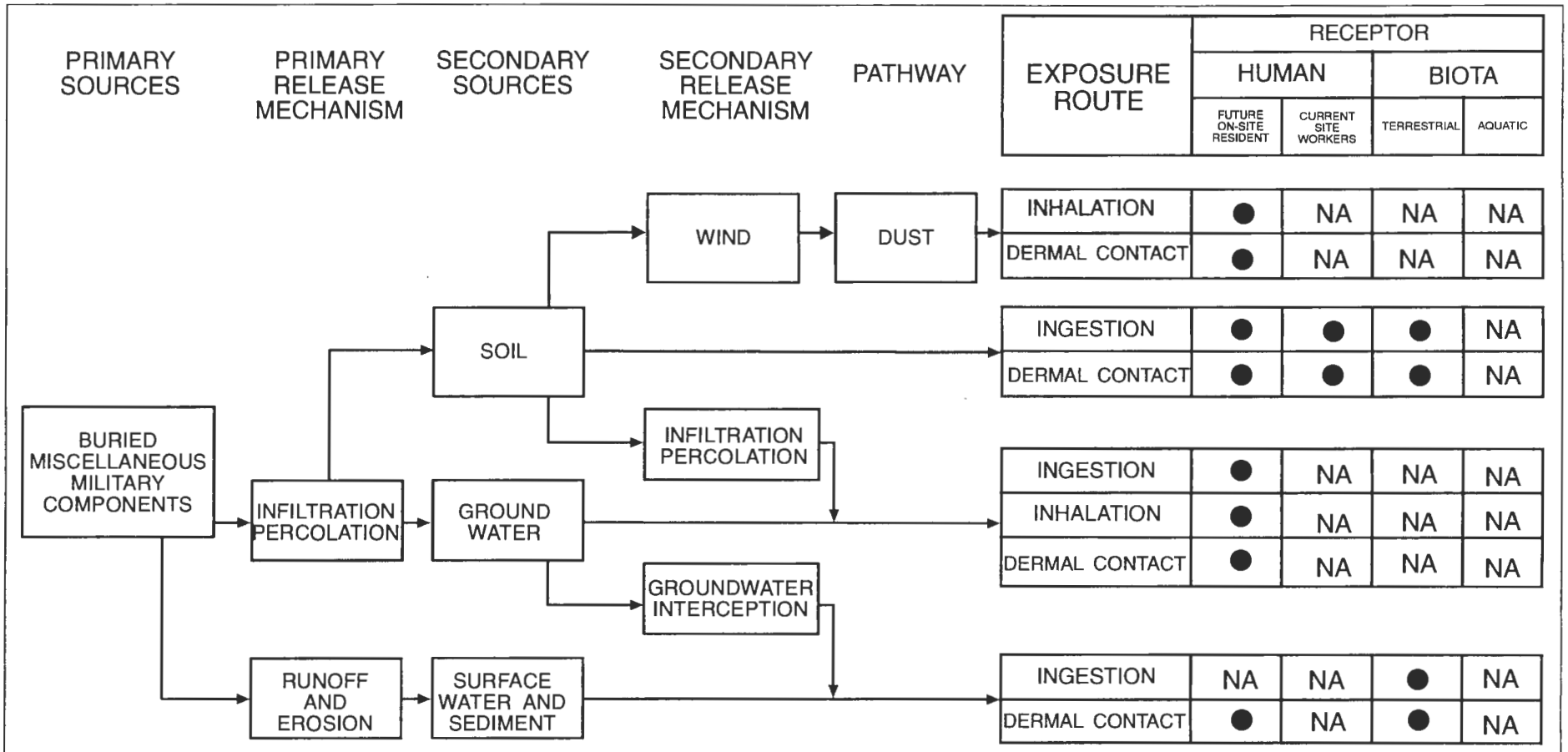
5.3.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.3-1. The potential for human exposure is directly affected by the accessibility to the site. At SEDA, human and vehicular access to the site is restricted by a chain-link fence with a locking gate. Since this facility is within the ammunition storage area further access is restricted.

There are three primary receptor populations for potential releases of contaminants from SEAD-62:

1. Future on-site residents;
2. SEDA personnel and other people who might occasionally visit the site (because this is not an active site, these receptors are periodic); and
3. Terrestrial biota on or near the site.

Aquatic biota are not considered because there are no ponds or streams on or near the site. The exposure pathways and media of exposure are described below as they may affect the various receptors.



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

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOC's

DEPT. ENVIRONMENTAL ENGINEERING

DWG NO. 720518-01002

FIGURE 5.3-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-62

SCALE NA

DATE APRIL 1996

H:\ENG\SENECA\7SWMU.LOW\62EXP.CDR

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

The nature of the primary source (i.e., buried wastes) and the lack of a substantial surface water media, indicates that potential risks for exposure to surface water and sediment are not significant. Additionally, surface water drainage ditches are not common on-site and few are well defined. However, surface water would be expected to flow via overland flow to drainage ditches in the central and northern portions of the site; both ditches drain to the west. As is common at SEDA, these ditches are believed to be ephemeral, and any transport of impacted surface water and sediment to the ditches would likely occur during precipitation or spring snow melt events via overland flow. Due to these events, these peripheral ditches may fill with water for extended periods of time.

Although unlikely, the primary human receptors of the surface water and sediment impacts are site visitors and future residents. Visitors to the site, other than hunters, are unlikely due to it's undeveloped nature, although if present, visitors could experience dermal exposure from walking in the drainage ditches that have been impacted. They would be considered to have an unlikely risk of exposure from ingesting surface water or sediment. Future residents could come in contact with surface water and sediment.

Although unlikely, the primary environmental receptors of any impacted surface water and sediment are the biota of the drainage ditches. Organisms which feed on the biota may be affected due to bioaccumulation of pollutants from the water and sediment. Terrestrial biota that drink from impacted surface water bodies (e.g., water-filled drainage ditches) may also be affected.

5.3.2.2 Soil Ingestion and Dermal Contact

Ingestion of and dermal contact with soil is a potential exposure pathway for future on-site residents and terrestrial biota. Dermal contact with and ingestion of soil are also potential pathways for current site workers and visitors.

5.3.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-62 is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to current on-site workers and visitors, and terrestrial biota. All three pathways are potential routes of exposure to future on-site residents assuming on-site groundwater is used as their water

supply. Groundwater beneath the site flows to the west-northwest. The potential groundwater contribution to the surface water during periods of high groundwater (i.e., the drainage ditches) could result in the exposures identified for surface water and sediments above.

5.3.2.4 Dust Inhalation and Dermal Contact

The nature of the primary source (i.e., buried wastes) and the lack of a substantial unvegetated land at the site, indicates that the dust exposure media is not significant. Because the site is vegetated, it is highly unlikely that dust inhalation and dermal contact would occur on-site under the current use scenario. These exposure routes may be valid under a future use scenario.

5.3.3 Summary of Affected Media

The impacts to the SEAD-62 site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at the site have not been significantly impacted by any of the constituents analyzed for during the investigation. Constituents that were detected, but are considered to pose an unlikely risk to receptors include herbicides, semivolatile organic compounds and metals. These constituents are present at low concentrations and/or only a small number of samples exceed their respective TAGMs.

Groundwater

Groundwater at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Constituents that were detected include volatile organic compounds, herbicides and metals. The two latter constituents are considered to pose an unlikely risk to receptors because most are present at concentrations at or below their respective state or federal criteria levels. Also, the metals are present at concentrations that could be found in a natural developed groundwater system. However, the volatile organic compound Benzene was found in two of the three wells at SEAD-62 and could pose a potential risk to future onsite residents who may use groundwater as their primary source of drinking water.

Surface Water

Surface water is not regarded as a significant exposure media for the site and thus no surface water samples were collected.

Sediment

Sediment is not regarded as a significant exposure media for the site, and thus no surface water samples were collected.

5.4 SEAD-63

5.4.1 Potential Source Areas and Release Mechanisms

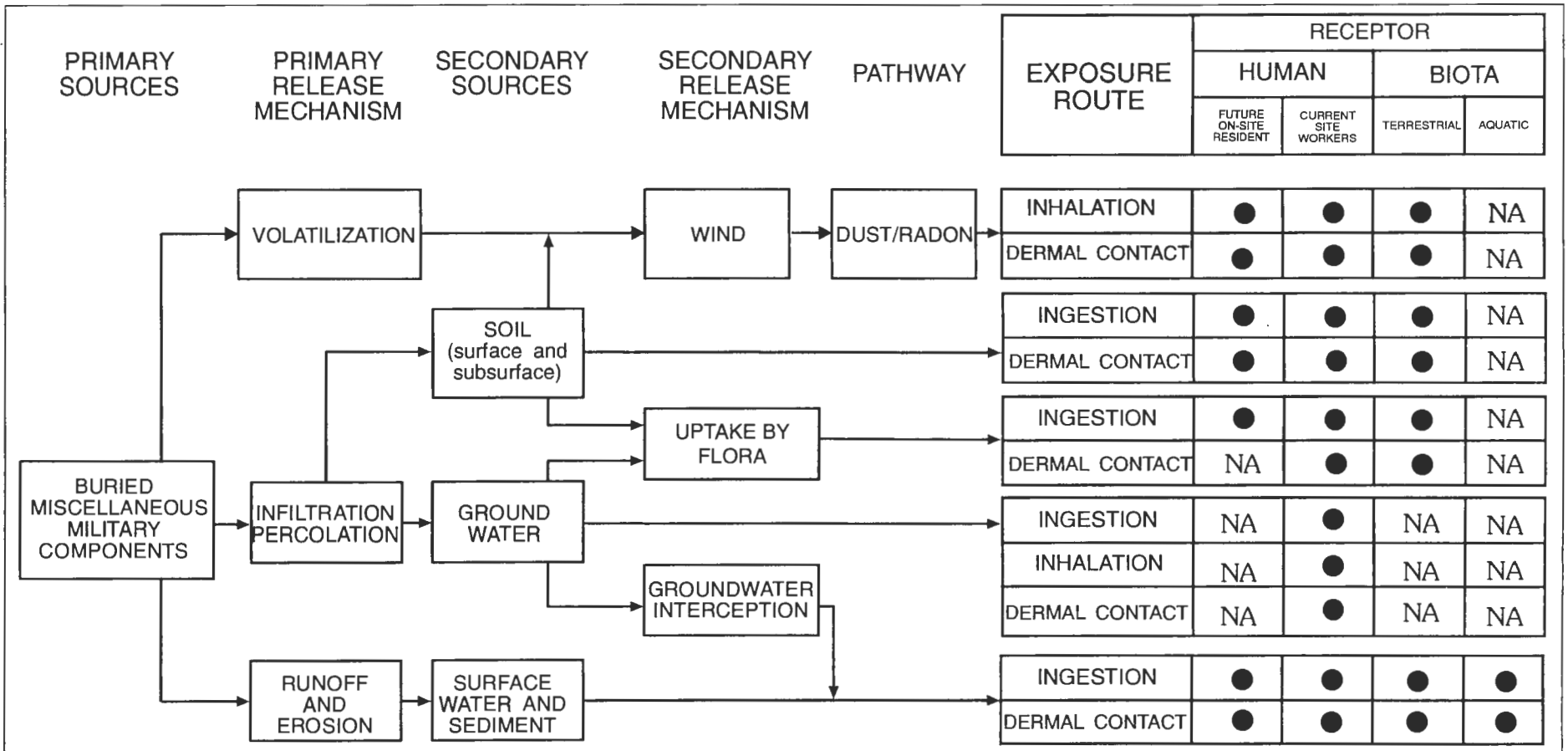
The primary source areas identified during the ESI are disposal trenches in the central and northern portions SEAD-63. The primary release mechanisms from the buried wastes and soils that comprise the disposal pits are infiltration and percolation of precipitation, surface water runoff and erosion, and, if a source of Ra-226 is present, emanation of radon-222. Groundwater, surface water, sediment, and soils surrounding the disposal pits are secondary sources. Groundwater interception to surface water and uptake of potential chemicals of concern by plants and/or livestock are secondary release mechanisms. Wind is also a secondary release mechanism from impacted soil.

5.4.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors, based upon current and future use scenarios, are shown in Figure 5.4-1. The potential for human exposures, with the exception of fugitive dust and radon gas, is directly affected by the accessibility to the site. Human and vehicular access to the site is restricted by a chain-link fence with a locking gate, which is part of SEDA's general security provisions.

There are two primary receptor populations that could be affected by potential releases of contaminants from SEAD-63:

- Current site workers;
- Terrestrial biota on or near the site.



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 720518-01002

FIGURE 5.4-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-63

SCALE NA | DATE APRIL 1996

H:\ENG\SENECA\7SWMU.LOW\63EXP.CDR

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

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

Surface water run-off from the site is controlled by the general west-sloping surface topography and by drainage ditches located on the southern, western and northern sides of the site. The ditches drain to the south beneath the service road that provides access to the storage igloo in the southern portion of the site. These ditches are believed to be ephemeral and any transport of impacted surface water and sediment to the ditches would likely occur during precipitation or spring snow melt events via overland flow. Due to these events, the ditches may fill with water for extended periods of time.

The primary human receptors of any surface water and sediment impacts are site visitors and future residents. Visitors to the site are unlikely due to it's undeveloped nature, although if present, visitors could experience dermal exposure from walking in the drainage ditches that have been impacted. They would be considered to have an unlikely risk of exposure from ingesting surface water or sediment. No hunting occurs in the fenced area where SEAD-63 is located. Future residents could come in contact with surface water and sediment at the site.

The primary environmental receptors of any impacted surface water and sediment are the biota of the drainage ditches. Organisms which feed on the biota may be affected due to bioaccumulation of pollutants from the water and sediment. Terrestrial biota that drink from impacted surface water bodies (e.g., water-filled drainage ditches) may also be affected.

5.4.2.2 Incidental Soil Ingestion and Dermal Contact

Ingestion of and dermal contact with soil is a potential exposure pathway for future on-site residents and terrestrial biota. Dermal contact with and ingestion of soil are also potential pathways for current site workers and visitors.

5.4.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-63 is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to current on-site workers and visitors and terrestrial biota. All three pathways are potential routes of

exposure to future on-site residents assuming on-site groundwater is used as their water supply. Groundwater beneath the site flows to the west toward Reeder Creek, located approximately 1,500 feet to the west. The potential groundwater contribution to the surface water during periods of high groundwater (i.e., the drainage ditches) could result in the exposures identified for surface water and sediments above.

5.4.2.4 Dust Inhalation and Dermal Contact

Inhalation and dermal contact with impacted dust and radon gas are potential exposure pathways for current site workers, future on-site, residents, and terrestrial biota.

5.4.2.5 Ingestion of Plants and/or Livestock raised on Affected Areas

The ingestion of flora and fauna and the dermal contact with flora and fauna from affected areas are not potential exposure pathways for current site workers. However, the ingestion of fauna which have grazed in affected areas is considered as an exposure pathway for current site visitors who are permitted to hunt at SEDA. Dermal contact with hunted fauna (e.g., leather) is not considered as a potential exposure pathway for hunters because the principal constituents of concern which could pose a risk from dermal contact, radium-226 and radon-222, are accumulated primarily in bone and the respiratory systems. These animal tissues would be expected to be discarded by hunters.

Ingestion of affected flora is considered as a potential route of exposure for site fauna.

5.4.3 Summary of Affected Media

The impacts to the site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at the site have been impacted by radioactive constituents. Radioactivity results indicate that the soils of SEAD-63 have been moderately impacted by Ra-226. Although the concentrations of this radionuclide were only slightly above background concentration the annual radiation dose associated with the highest reported concentrations (in TP63-9) was

twice the radiation dose calculated for background soils. Other constituents that were detected, include volatile organic compounds, semivolatile organic compounds, pesticides and metals. The volatile organic compounds, semivolatile organic compounds and pesticides are present at low concentrations and only one semivolatile compound was found at a concentration which slightly exceeded TAGM. The occurrence of volatile and semivolatile compounds was concentrated in the soil samples from TP63-8 and TP63-9. Phthalates were the only compounds detected in the remaining soil samples. All of the soil samples contained various heavy metals in concentrations which exceeded their respective TAGMs. It is noteworthy, though, that two separate samples did contain elevated concentrations of two individual metals; sample TP63-3 contained a mercury concentration five times the TAGM value, while TP63-4 contained a cadmium concentration 24 times the TAGM value.

Groundwater

Groundwater at the site has been impacted by radioactive constituents. Radioactivity results indicate that the groundwater in MW63-3 (located hydraulically downgradient of the disposal pits) is being impacted by gross alpha and gross beta radiation. The concentration of gross alpha radiation in this well was an order of magnitude above the NYS AWQS Class GA and federal drinking water criteria. Based upon the dose calculation performed for gross beta radiation, the groundwater from MW63-3 also exceeds the federal drinking water criteria. It is noteworthy that the groundwater sample from MW63-1 (considered to be a background location for the purposes of this ESI) also moderately exceeded both gross alpha and gross beta criteria. Other constituents that were detected include one semivolatile organic compound and metals. Phenol was detected in one sample at a concentration of 2J μg/L which was twice the NYS Class GA Standard of 1 μg/L. Iron and manganese were the only metals detected in the groundwater samples at concentrations that exceeded their respective NYS Class GA Standards. None of the reported concentrations exceeded their respective criteria by more than a factor of five.

Surface Water

Surface water at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Constituents that were detected include semivolatile organic compounds and metals. Iron was present in two surface water samples at concentrations that exceeded the NYS Class C surface water criteria and lead and silver were each present in one sample at concentrations that exceeded NYS Class C surface water

criteria. Radioactivity results indicate that the surface water at SEAD-63 is not being significantly impacted by radionuclides. One surface water sample showed an elevated concentration of naturally occurring Potassium 40, though no other radionuclides were detected.

Sediment

Sediment at the site has been impacted most significantly by semivolatile organic compounds (mostly PAHs) and pesticides. Relatively low concentrations (although above the TAGM) of PAHs were widespread and found in all sediment samples. The pesticides endosulfan and 4,4-DDE were found above their TAGMs in two of the samples; 4,4-DDD was found above the TAGM in one sample. Volatile organic compounds and metals were present at low concentrations. One hundred and fifty micrograms per kilogram of acetone was the highest detected concentration of all VOCs in sediments. Only six inorganic elements were detected at concentrations that exceeded the NYSDEC Sediment Lowest Effect Level criteria, however, none exceeded a criteria level by more than a factor of three. Radioactivity results indicate that no significant impacts have occurred to the sediments in the drainage swales in proximity to SEAD-63.

5.5 SEAD-64A

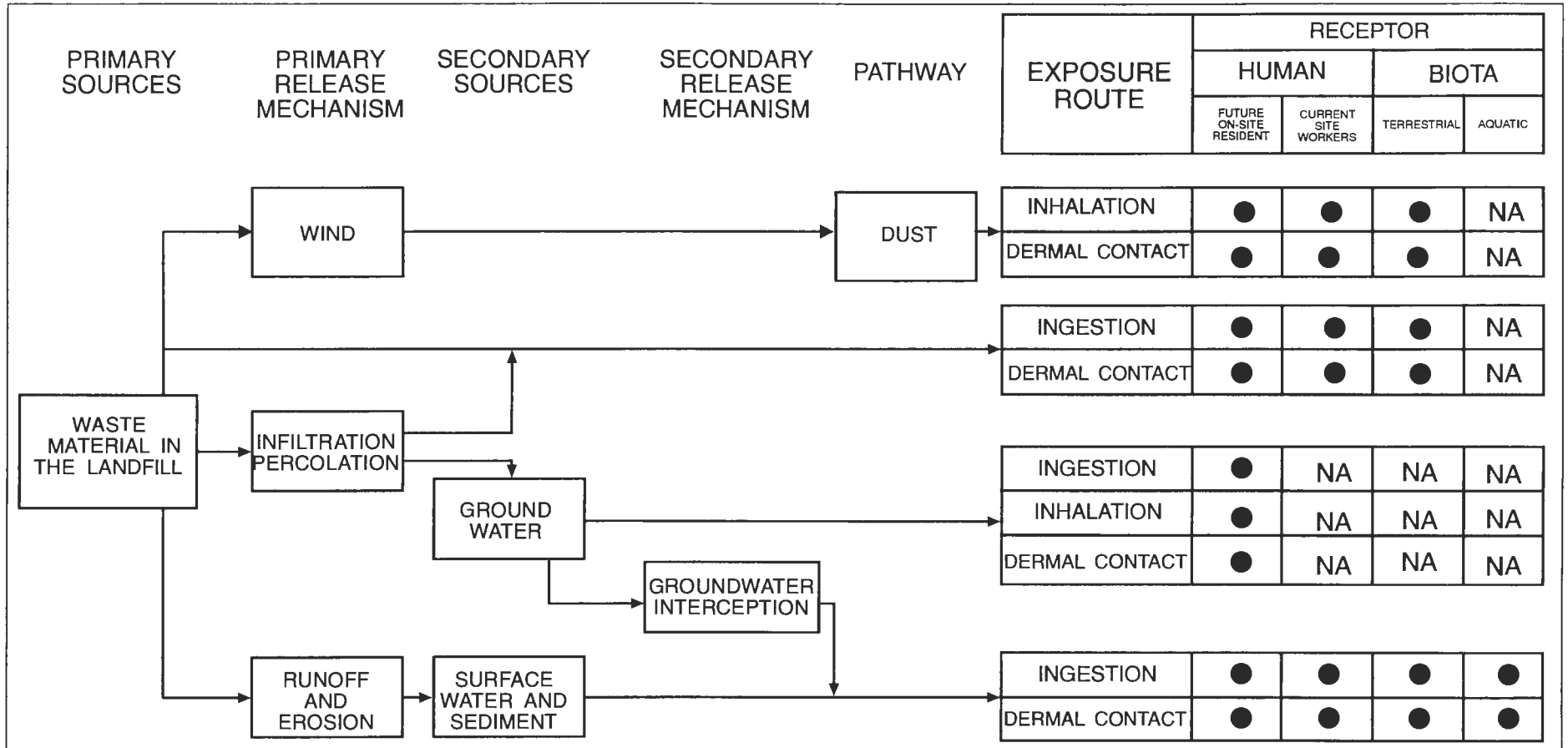
5.5.1 Potential Source Areas and Release Mechanisms

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.

5.5.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.5-1. The potential for human exposure is directly affected by the accessibility to



● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

PARSONS
PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE
SENECA ARMY DEPOT
EXPANDED SITE INSPECTION OF
7 LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING
DWG NO. 720518-01002

FIGURE 5.5-1
EXPOSURE PATHWAY SUMMARY
FOR SEAD-64A

SCALE NA
DATE APRIL 1996

H:\ENG\SENECA\7SWMU.LOW\64AEXP.CDR

the site. At SEDA, human and vehicular access to the site is restricted by a chain-link fence with a locking gate.

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

1. Future on-site residents;
2. SEDA personnel and visitors who may go on or near the site (because this is not an active site, these receptors are periodic); and
3. Terrestrial biota near the site.

Aquatic biota are not considered because there are no ponds or streams on or near the site. The exposure pathways and media of exposure are described below as they may affect the various receptors.

5.5.2.1 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.

5.5.2.2 Soil Ingestion and Dermal Contact

Ingestion of, and dermal contact with, soil is a potential exposure pathway for future on-site residents and terrestrial biota. Dermal contact with and ingestion of soil are also potential pathways for current site workers and visitors.

5.5.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-64A is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to on-site workers and visitors, terrestrial biota, and aquatic biota. All three pathways are potential routes of exposure to future on-site residents assuming on-site groundwater is used as their water supply.

Groundwater beneath the site flows generally to the west-southwest. There is little potential for groundwater contribution to the surface water (i.e., the drainage ditch) that could result in the exposures identified for surface water and sediments above.

5.5.2.4 Dust Inhalation and Dermal Contact

Inhalation of, and dermal contact with dust are considered to pose a potential risk for current on-site workers and terrestrial biota. This pathway is considered to pose a potential risk to future on-site residents.

5.5.3 Summary of Affected Media

The impacts to the site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at the site have been impacted primarily by semivolatile organic compounds, mostly PAHs. The elevated concentrations of the PAH compounds were found in surface samples from borings SB64A-1 and SB64A-2, which were located on the landfilled area. Other constituents that were detected include volatile organic compounds, pesticides, and metals. These constituents are present at low concentrations. None of the VOCs or pesticides were detected at concentrations that exceeded a TAGM value. Though metals were detected at concentrations that exceeded TAGM values, a review of the data indicated that only one sample (SB64A-2-00) had concentrations of antimony, copper, lead, and zinc that were significantly above those found in the site background samples.

Groundwater

Groundwater at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Heavy metals were the only constituents detected. Metals were considered to pose a limited risk because only iron and manganese were found at significantly elevated concentrations in the downgradient monitoring well, MW64A-2.

Surface Water

Surface water was not regarded as a significant exposure media for the site and thus no surface water samples were collected.

Sediment

Sediment was not regarded as a significant exposure media for the site, and thus no surface water samples were collected.

5.6 SEAD-64B

5.6.1 Potential Source Areas and Release Mechanisms

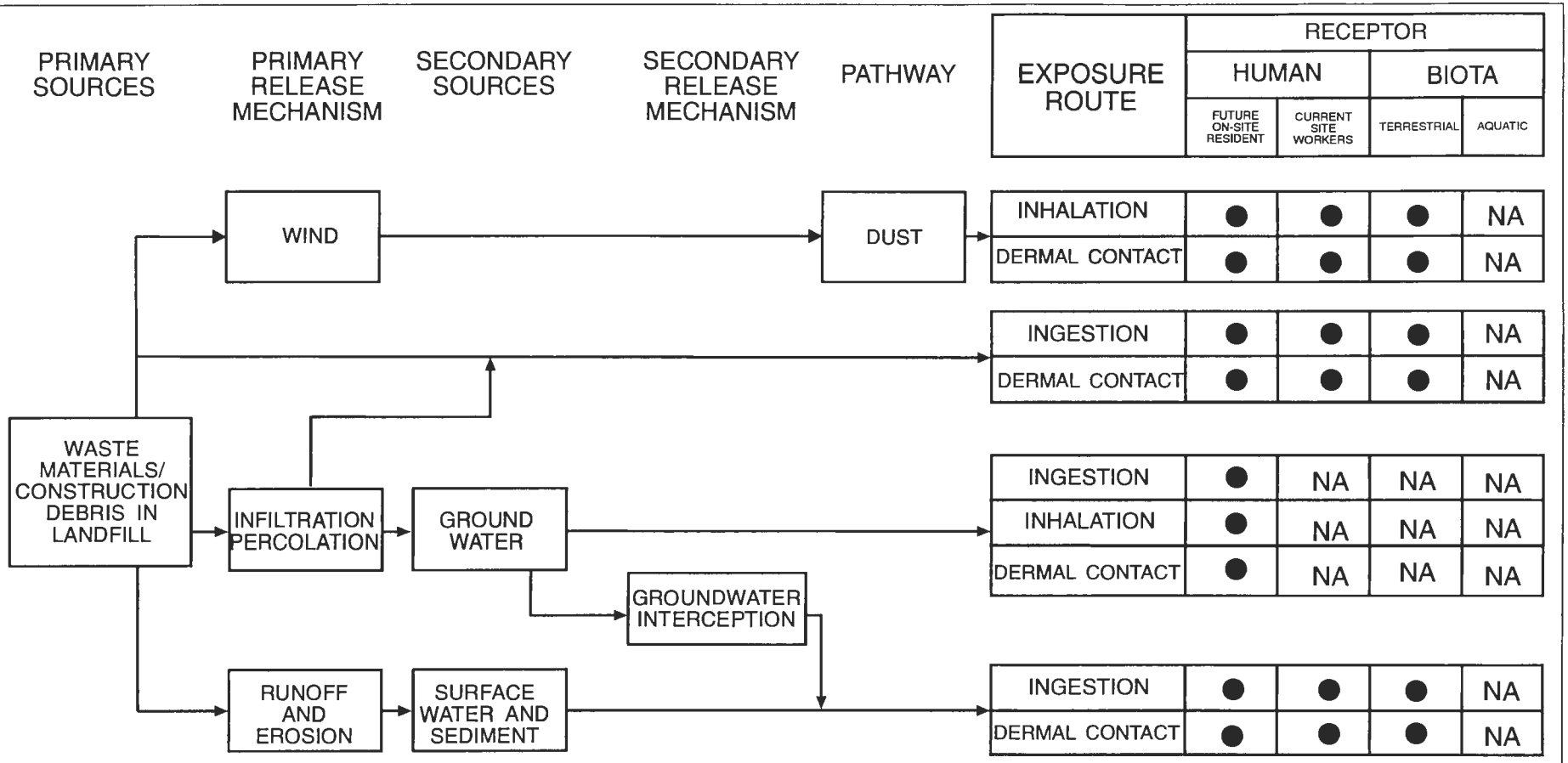
The suspected source is the waste material that comprises the filled area on the site. The primary release mechanism from the landfilled area is surface water runoff and erosion, and infiltration and percolation. If infiltration of precipitation occurs then groundwater and downgradient soils would be secondary sources. Soil, surface water and sediment are also secondary sources.

5.6.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.6-1. The potential for human exposure is directly affected by the accessibility to the site. At SEDA, human and vehicular access to the site is restricted by a chain-link fence with a locking gate. Since the site is located within the ammunition storage area, further access is restricted.

There are three primary receptor populations for potential releases of contaminants from SEAD-64B:

1. Future on-site residents;
2. SEDA personnel who might work on or near the site and visitors to the site (because this is not an active site, these receptors are periodic); and
3. Terrestrial biota on and near the site.



● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING

DWG NO. 720518-01002

FIGURE 5.10-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-70

SCALE NA

DATE APRIL 1996

H:\ENG\SENECA\7SWMU.LOW\70EXP.CDR

Aquatic biota are not considered because there are no ponds or streams on or near the site. The exposure pathways and media of exposure are described below as they may effect the various receptors.

5.6.2.1 Ingestion and Dermal Exposure to Surface Water Runoff and Sediment

Surface water run-off and overland flow on the site are controlled by the sloping topography and the drainage ditches that surround the site on the south, west and north. The southern and western ditches drain into a larger intermittent stream/wetland area located immediately adjacent to the northern portion of the site.

The ditches and the intermittent stream/wetland area are believed to be ephemeral, and any transport of impacted surface water and sediment to the ditches or intermittent steam/wetland would likely occur during precipitation or spring snow melt events via overland flow. Due to these events, the ditches may fill with water for extended periods of time.

The primary human receptors of the surface water and sediment impacts are site visitors, hunters and future residents. Visitors to the site are unlikely due to its undeveloped nature, although if present, visitors could experience dermal exposure from walking in the drainage ditches that may have been impacted. Hunters could be impacted by the same mechanism. They would be considered to have an unlikely risk of exposure from ingesting surface water or sediment. Future residents could come in contact with surface water and sediment.

The primary environmental receptors of any impacted surface water and sediment are the biota of the drainage ditches. Organisms which feed on the biota may be affected due to bioaccumulation of pollutants from the water and sediment. Terrestrial biota that drink from impacted surface water bodies (e.g., water-filled drainage ditches) may also be affected.

5.6.2.2 Soil Ingestion and Dermal Contact

Ingestion of and dermal contact with soil is a potential exposure pathway for future on-site residents and terrestrial biota. Dermal contact with and incidental ingestion of soil are also potential pathways for current site workers and visitors.

5.6.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-64B is not used as a drinking water source and connection to other potable groundwater aquifers is unlikely since no private drinking water wells are known to exist within the confines of the facility. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to on-site workers and visitors and terrestrial biota. All three pathways are potential routes of exposure to future on-site residents assuming on-site groundwater is used as their water supply.

5.6.2.4 Dust Inhalation and Dermal Contact

Inhalation of and dermal contact with dust are considered to pose a potential, yet unlikely, risk for current on-site workers and terrestrial biota. This pathway is considered to pose a potential risk to future on-site residents.

5.6.3 Summary of Affected Media

The impacts to the site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at the site have not been significantly impacted by any of the constituents analyzed for during the investigation. Constituents that were detected, but are considered to pose an unlikely risk to receptors, include volatile organic compounds, semivolatile organic compounds, pesticides and metals. These constituents are present at low concentrations and none of the organic compounds were detected at concentrations that exceeded their respective TAGMs. A review of the metals data showed that, with the exception of potassium, the landfill samples have the same concentrations of inorganic elements as the site background samples. Potassium was detected at higher concentration in the landfill soil samples.

Groundwater

Groundwater at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Metals were the only constituents detected. Aluminum, iron and manganese were the only metals found above their respective criteria and they are considered to pose an unlikely risk to receptors because they were found slightly above the TAGM in one sample and significantly elevated in another (MW64B-3), a result most likely due to the high turbidity of the latter sample.

Surface Water

Surface water at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Constituents that were detected include volatile organic compounds and metals. These constituents are considered to pose an unlikely risk to receptors because the single VOC detected (carbon disulfide) was present at a low concentration and only iron exceeded its respective NYS Class C guideline value by a factor of 1.1 in one sample.

Sediment

Sediment at the site has not been significantly impacted by any of the constituents analyzed for during the investigation of the site. Constituents that were detected include volatile organic compounds, semivolatile organic compounds, pesticides and metals. These constituents are present at low concentrations. Only 3 PAHs were detected in the downstream sample at concentrations that are equal to or less than 3 times their respective criteria values. Though found at concentrations that did not exceed 3.3 μg/Kg, three pesticides were found at concentrations that exceeded their respective criteria values by up to 3 orders of magnitude. Six metals were detected in the downstream sediment sample at concentrations that exceeded their respective criteria values.

5.7 SEAD-64C

5.7.1 Potential Source Areas and Release Mechanisms

The suspected source is waste materials that may have been disposed of at the site. While the site was proposed as a landfill in the past, the field data indicate that no waste materials

were landfilled at the site. The primary release mechanisms from the site are surface water runoff and infiltration of precipitation. If infiltration of precipitation occurs then groundwater and downgradient soils would be secondary sources. Soil, surface water and sediment are also secondary sources.

5.7.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.7-1. The potential for human exposure is directly affected by the accessibility to the site. At SEDA, human and vehicular access to the site is restricted by a locked chain-link fence.

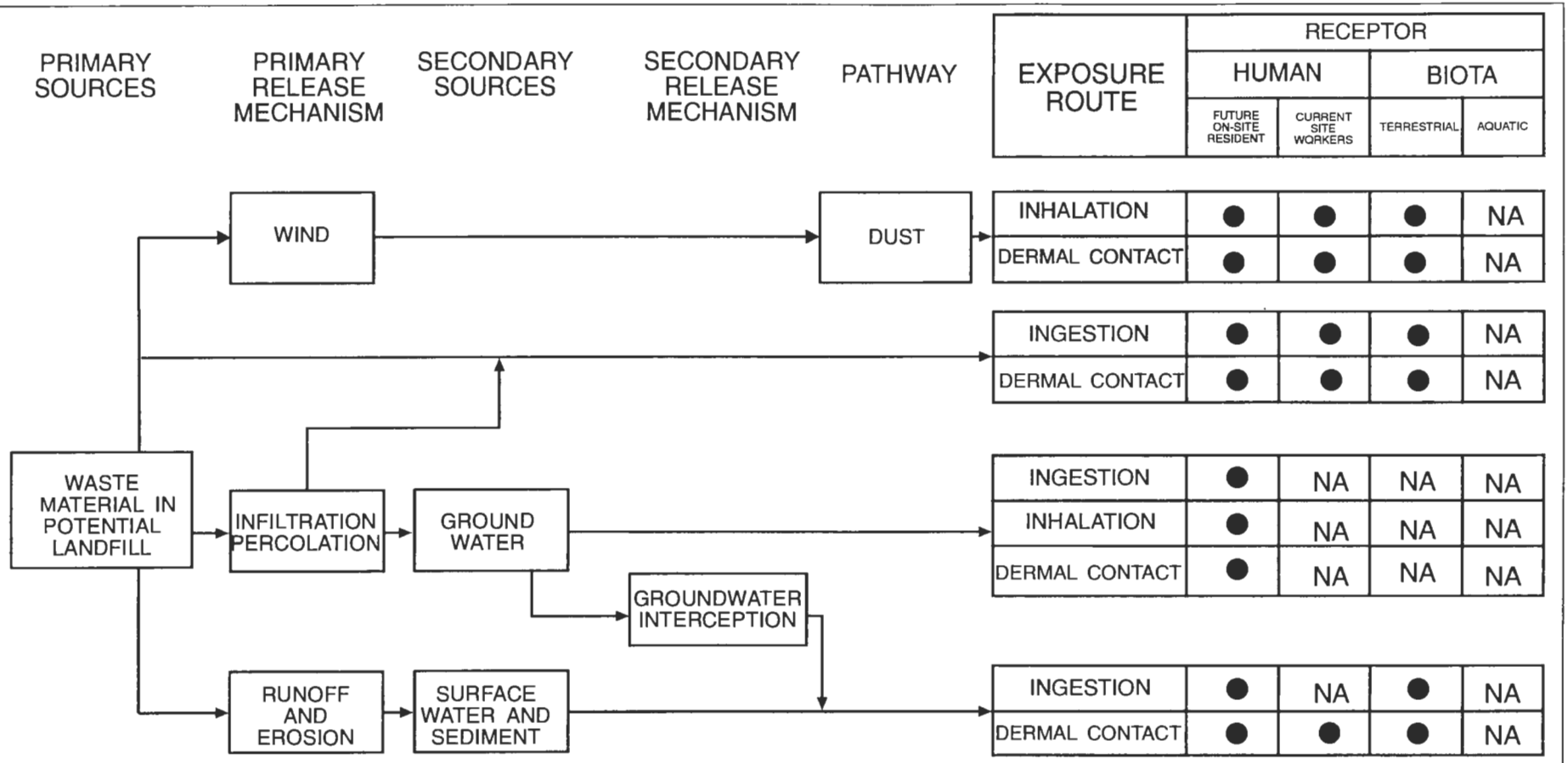
There are three primary receptor populations for potential releases of contaminants from SEAD-64C:

1. Future on-site residents;
2. SEDA personnel and visitors who may visit the site (because this is not an active site, these receptors are periodic); and
3. Terrestrial biota on or near the site.

Aquatic biota are not considered because there are no ponds or streams on or near the site. The exposure pathways and media of exposure are described below as they may affect the various receptors.

5.7.2.1 Ingestion and Dermal Exposure to Surface Water Runoff and Sediment

Surface water run-off from the site is controlled by the west-sloping topography and drainage ditches that bound the site on the north, east and south. The southern and northern ditches drain to the west and both originate at the intersection of South Patrol Road and East Patrol Road in the southeastern portion of the site. Another small ditch, originating at South Patrol Road traverses the site to the northwest. These ditch areas are believed to be ephemeral and any transport of impacted surface water and sediment to the ditches would likely occur during precipitation or spring snow melt events via overland flow. Due to these events, the ditches may fill with water for extended periods of time.



EXPOSURE ROUTE	RECEPTOR			
	HUMAN		BIOTA	
	FUTURE ON-SITE RESIDENT	CURRENT SITE WORKERS	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	●	NA	●	NA
DERMAL CONTACT	●	●	●	NA

● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 720518-01002

FIGURE 5.7-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-64C

SCALE NA | DATE APRIL 1996

H:\ENG\SENECA\7SWMU.LOW\64CEXP.CDR

The primary human receptors of the surface water and sediment impacts are site visitors, hunters and future residents. Visitors to the site are unlikely due to its undeveloped nature, although if present, visitors could experience dermal exposure from walking in the drainage ditches that may have been impacted. Hunters could be impacted by the same mechanism. These receptors would be considered to have an unlikely risk of exposure from ingesting surface water or sediment. Future residents could come in contact with surface water and sediment.

The primary environmental receptors of any impacted surface water and sediment are the biota of the drainage ditches. Organisms which feed on the biota may be affected due to bioaccumulation of pollutants from the water and sediment. Terrestrial biota that drink from impacted surface water bodies (e.g., water-filled drainage ditches) may also be affected.

5.7.2.2 Soil Ingestion and Dermal Contact

Ingestion of and dermal contact with soil is a potential exposure pathway for future on-site residents and terrestrial biota. Dermal contact with and ingestion of soil are also potential pathways for current site workers and visitors.

5.7.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-64C is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to on-site workers and visitors and terrestrial biota. All three pathways are potential routes of exposure to future on-site residents assuming on-site groundwater is used as their water supply.

5.7.2.4 Dust Inhalation and Dermal Contact

Inhalation of and dermal contact with dust is an unlikely, yet potential, scenario as the site is completely vegetated. Current site workers, terrestrial biota and future site residents may inhale or come in contact with impacted dust and were therefore considered as potential pathway receptors.

5.7.3 Summary of Affected Media

The impacts to the site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at the site have not been significantly impacted by any of the constituents analyzed for during the investigation. Constituents that were detected, but are considered to pose an unlikely risk to receptors, include semivolatile organic compounds, pesticides and metals. These constituents are present at low concentrations and only a small number of metals samples were found at concentration slightly above their respective TAGMs. A review of the data indicates that there is no major difference in the constituent concentrations between the surface soil samples, the test pit samples and soil boring samples. These findings are consistent with not finding fill or waste material at this AOC.

Groundwater

Groundwater at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Constituents that were detected include two semivolatile organic compounds and heavy metals. The organic constituents were considered to pose an unlikely risk to receptors because they are present at low concentrations and only phenol exceeded its respective criteria value by a factor of two in one groundwater sample. Five metals were detected at concentrations that exceeded their respective criteria values. Most exceeded their criteria values by less than a factor of two although iron was detected in one well at a concentration that was 8 times higher than its criteria value. .

Surface Water

Surface water was not regarded as a significant exposure media for the site and thus no surface water samples were collected.

Sediment

Sediment was not regarded as a significant exposure media for the site, and thus no surface water samples were collected.

5.8 SEAD-64D

5.8.1 Potential Source Areas and Release Mechanisms

The primary source areas identified during the ESI are the waste material located in the east-central area and at the south end of SEAD-64D and the surface soils across the site. The constituents of concern for these sources are SVOs and heavy metals.

The primary release mechanisms from the waste material and the surface soils 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.

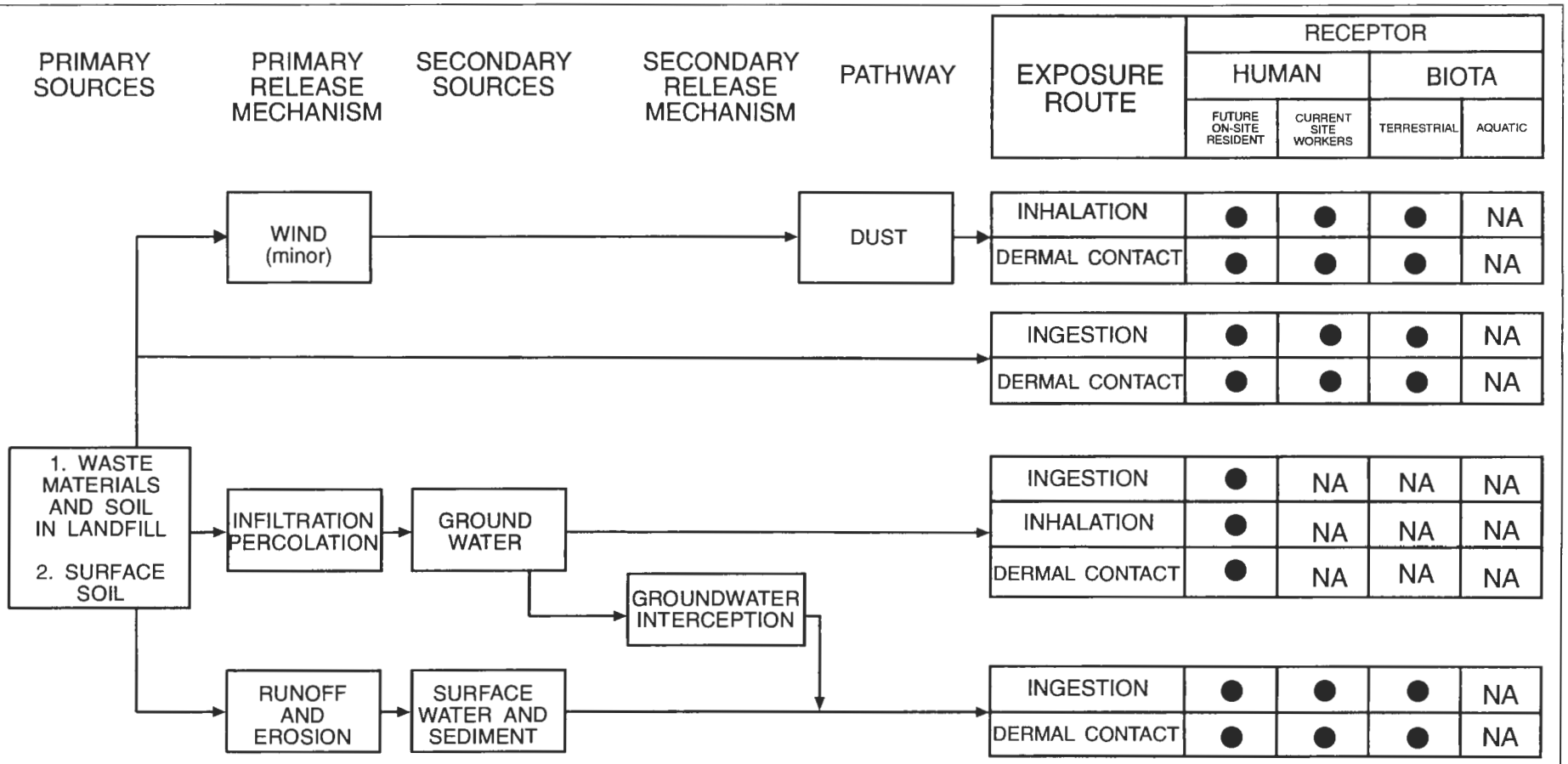
5.8.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.8-1. At SEDA, vehicular access to the site is restricted by a chain-link fence.

There are three primary receptor populations for potential releases of contaminants from SEAD-64D:

1. Future on-site residents;
2. SEDA personnel and visitors who may visit the site (because this is not an active site, these receptors are periodic); and
3. Terrestrial biota on or near the site.

Aquatic biota are not considered because there are no ponds or streams on or near the site. The exposure pathways and media of exposure are described below as they may affect the various receptors.



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO 720518-01002

FIGURE 5.8-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-64D

SCALE NA | DATE APRIL 1996

H:\ENG\SENECA\7SWMU.LOW\64DEXP.CDR

5.8.2.1 Ingestion and Dermal Exposure Due to Surface Water and Sediment

Surface water run-off from the site is controlled by the west-sloping topography, an intermittent stream that traverses the southern portion of the site and drainage ditches along the western boundary of the site.

The ditches and the intermittent stream area are believed to be ephemeral, and any transport of impacted surface water and sediment to the ditches and stream would likely occur during precipitation or spring snow melt events via overland flow. Due to these events, the ditches may fill with water for extended periods of time.

The primary human receptors of the surface water and sediment impacts are site visitors, hunters and future residents. Visitors to the site are unlikely due to its undeveloped nature, although if present, visitors could experience dermal exposure from walking in the drainage ditches that have been impacted. Hunters could be impacted by the same mechanism. These receptors would be considered to have a potential, yet unlikely, risk of exposure from ingesting surface water or sediment. Future residents could come in contact with surface water and sediment.

The primary environmental receptors of any impacted surface water and sediment are the biota of the intermittent stream and drainage ditches. Organisms which feed on the biota may be affected due to bioaccumulation of pollutants from the water and sediment. Terrestrial biota that drink from impacted surface water bodies (e.g., water-filled drainage ditches/intermittent stream) may also be affected.

5.8.2.2 Soil Ingestion and Dermal Contact

Ingestion of and dermal contact with soil is a potential exposure pathway for future on-site residents and terrestrial biota. Dermal contact with and ingestion of soil are also potential pathways for current site workers and visitors.

5.8.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-64D is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to on-site workers and visitors and terrestrial biota. All three pathways are potential routes of exposure

to future on-site residents assuming on-site groundwater is used as their water supply.

Groundwater beneath the site flows to the west; it has the potential to recharge the intermittent stream and drainage ditches during periods of high water. The potential groundwater contribution to the surface water could result in the exposures identified for surface water and sediments above.

5.8.2.4 Dust Inhalation and Dermal Contact

Inhalation of and dermal contact with dust is a potential, yet unlikely scenario as the site is completely vegetated. Current site workers and visitors, terrestrial biota, and future site residents may inhale or come in contact with impacted dust and were considered as potential exposure pathway receptors.

5.8.3 Summary of Affected Media

The impacts to the site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at the site have been impacted by a limited number of PAH compounds and inorganic elements. Other constituents that were detected include volatile organic compounds, and phthalate semivolatile organic compounds. These constituents are generally present at low concentrations; only a small number of samples exceeded their respective TAGMs. Most exceedances were limited to the surface soil samples collected in the waste disposal areas.

Groundwater

Groundwater at the site has been significantly impacted by inorganic elements in the area of MW64D-5 (hydraulically downgradient of an area with buried debris). Aluminum, iron, lead manganese, nickel, thallium and zinc were the only metals found in the MW64D-5 groundwater sample. Aluminum, iron and manganese were detected in this sample at concentrations that were at least an order of magnitude above their criteria. Heavy metals were present at low concentrations in the 4 remaining groundwater samples. Iron and

manganese were found in these samples at concentrations which were slightly above their respective criteria values.

Surface Water

Surface water was not regarded as a significant exposure media for SEAD-64D and thus no surface water samples were collected.

Sediment

Sediment was not regarded as a significant exposure media for SEAD-64D, and thus no surface water samples were collected.

5.9 SEAD-67

5.9.1 Potential Source Areas and Release Mechanisms

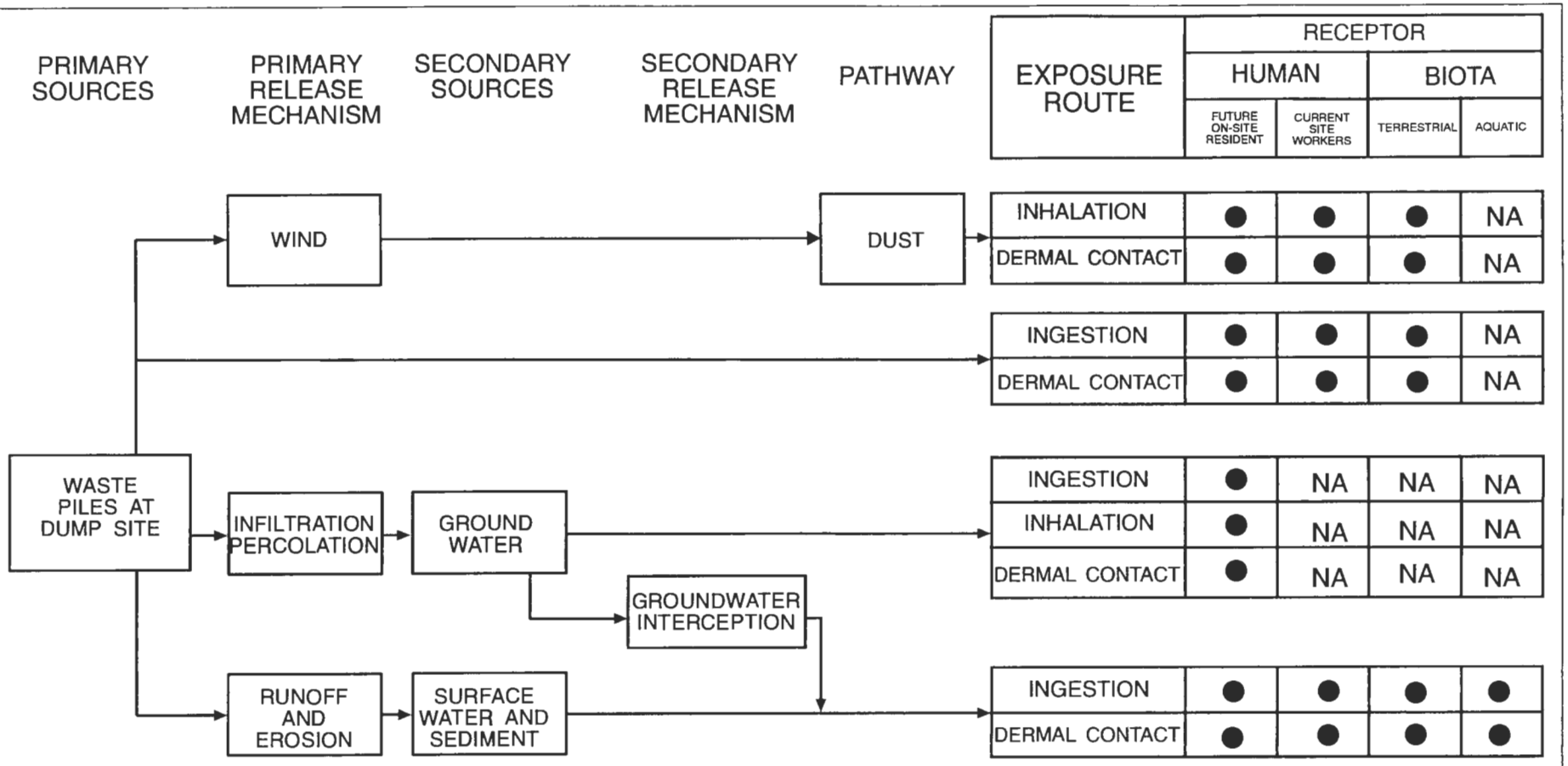
The suspected sources are several debris piles that may contain waste materials. The primary release mechanisms are infiltration and percolation and surface water runoff and erosion. If infiltration of precipitation occurs then groundwater and downgradient soils would be secondary sources. Soil, sediment, and to a lesser extent surface water, are also secondary sources.

5.9.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.9-1. At SEDA, vehicular access to the site is restricted by a chain-link fence.

There are three primary receptor populations for potential releases of contaminants from SEAD-67:

1. Future on-site residents;
2. SEDA personnel and visitors who may visit the site (because this is not an active site, these receptors are periodic); and
3. Aquatic and/or terrestrial biota on or near the site.



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 720518-01002

FIGURE 5.9-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-67

SCALE NA | DATE APRIL 1996

H:\ENG\SENECA\7SWMU.LOW\67EXP.CDR

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

5.9.2.1 Ingestion and Dermal Exposure Due to Surface Water and Sediment

Surface water run-off from the site is controlled by the west-sloping topography, a small stream that bounds the western portion of the site. The small stream is believed to be characterized by year round flow as it was observed to contain water during in the late summer when the saturated thickness of the overburden aquifer at SEDA (the ground water data is from another area of SEDA, the Ash Landfill) is near its minimum for the year. The late summer would correspond to the minimum baseflow for the stream. This stream would likely receive influxes of surface water and sediment via overland flow during precipitation or spring snow melt events. Overland flow that does not percolate into the shallow aquifer would likely be collected by the stream, which discharges into the wetland area north of West Romulus Road. There are no well developed drainage ditches on the site. The stream is also likely to receive some discharge from sewage treatment plant No. 4, southwest of the site.

The primary human receptors of the surface water and sediment impacts are site visitors, hunters and future residents. Visitors to the site are unlikely due to its undeveloped nature, although if present, visitors could experience dermal exposure from wading in impacted surface water or sediment in the stream. Hunters could be impacted by the same mechanism. These receptors would be considered to have a potential, yet unlikely, risk of exposure from ingesting surface water or sediment. Future residents could come in contact with surface water and sediment.

The primary environmental receptors of any impacted surface water and sediment are the aquatic biota of the stream. Organisms which feed on the biota may be affected due to bioaccumulation of pollutants from the water and sediment. Terrestrial biota that drink from the impacted stream or eat aquatic biota may also be affected.

5.9.2.2 Soil Ingestion and Dermal Contact

Ingestion of and dermal contact with soil is a potential exposure pathway for future on-site residents and terrestrial biota. Dermal contact with and ingestion of soil are also potential pathways for current site workers and visitors.

5.9.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-67 is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to on-site workers and visitors and terrestrial biota. All three pathways are potential routes of exposure to future on-site residents assuming on-site groundwater is used as their water supply.

Groundwater beneath the site flows to the west and northwest and likely provides recharge for both the stream and the wetland area north of West Patrol Road. The potential groundwater contribution to the surface water could result in the exposures identified for surface water and sediments above.

5.9.2.4 Dust Inhalation and Dermal Contact

Inhalation of and dermal contact with dust is a potential scenario for current site workers and terrestrial biota. Under future site conditions, site residents may inhale or come in contact with impacted dust.

5.9.3 Summary of Affected Media

The impacts to the site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

Soils at the site have been impacted by semivolatile organic compounds, predominantly PAHs, and one metal (mercury). Exceedances of TAGMs for PAHs were found mostly in four of the five waste piles and none were found in the background samples. Mercury was found at an elevated concentration (40 times the TAGM) in one waste pile sample (TP67-1). TAGM exceedences for the other metals were generally evenly distributed throughout the waste piles and background samples. Other constituents that were detected, include pesticides and PCBs. Pesticides and PCBs are present at low concentrations and all of the samples with reported concentrations of these constituents are found below their respective TAGMs.

Groundwater

Groundwater at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Metals were the only constituents detected.

Surface Water

Surface water at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Metals were the only constituents that were detected. The metals were considered to pose an unlikely risk to receptors because they are present at low concentrations and only iron was detected in one sample that exceeded its criteria value by a factor of 1.2.

Sediment

Sediment at the site has been impacted by semivolatile organic compounds (mostly PAHs) and pesticides. PAHs were found above the TAGM in both sediment samples from the stream, however, the most downstream sample contained highest concentration of PAHs. The pesticide endosulfan was found at 66 times the TAGM in the most downstream surface water sample. Metals were the only other constituents that were detected, but they are considered to pose an unlikely risk to receptors because they are present at low concentrations and none exceeded their respective criteria values by more than a factor of three.

5.10 SEAD-70

5.10.1 Potential Source Areas and Release Mechanisms

The suspected source is waste material and construction debris that may have been buried in the landfill or comprise the piles to the west and south of the landfill. The primary release mechanisms are infiltration and percolation, and surface water runoff and erosion. If infiltration of precipitation occurs then groundwater would be a secondary source. Soil, sediment, and to a lesser extent surface water, are also secondary sources.

5.10.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.10-1. Within SEDA, vehicular access to the site is restricted by a chain-link fence.

There are three primary receptor populations for potential releases of contaminants from SEAD-70:

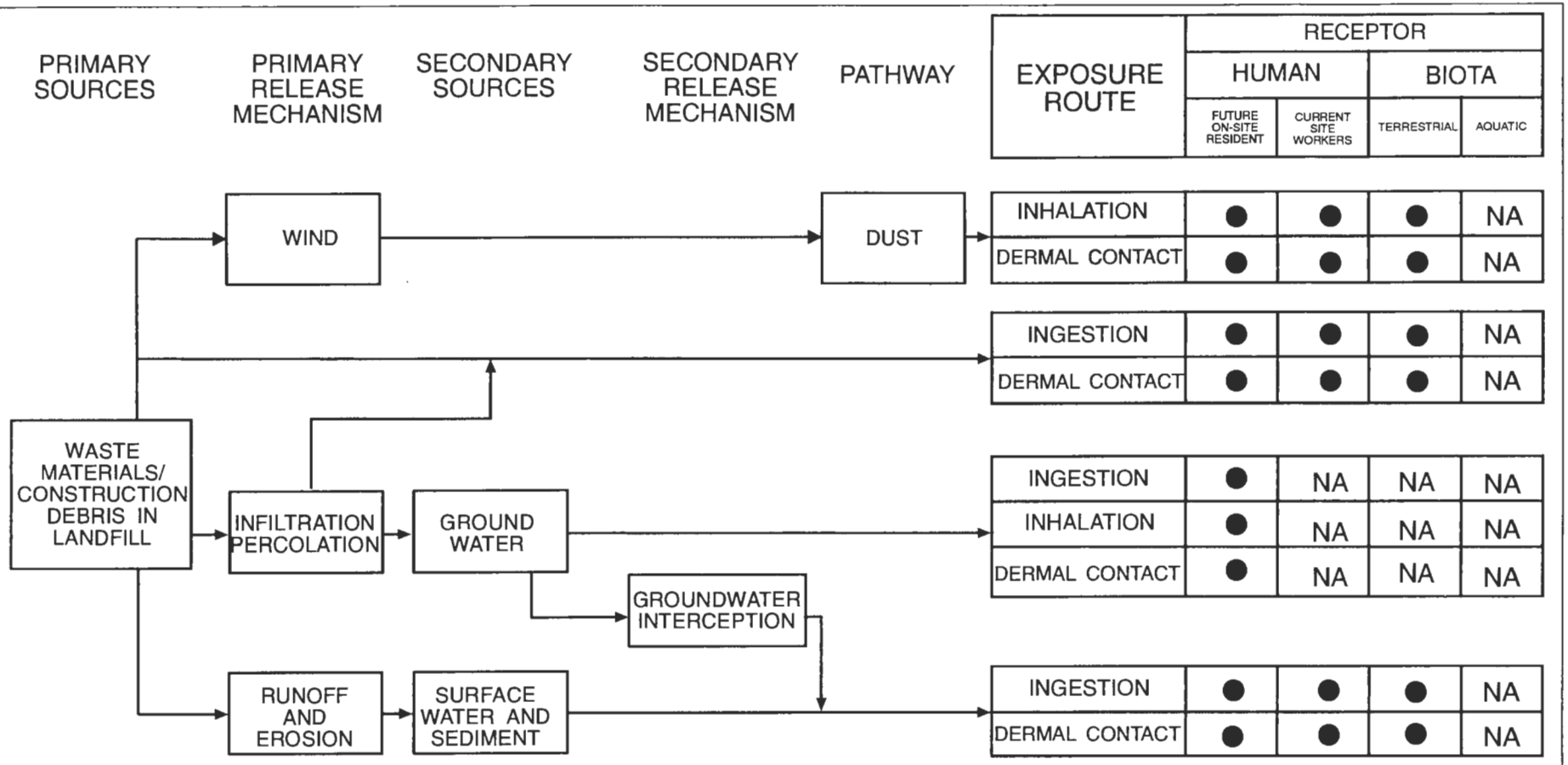
1. Future on-site residents;
2. SEDA personnel and visitors who may visit the site (because this is not an active site, these receptors are periodic); and
3. Terrestrial biota on or near the site.

Aquatic biota are not considered because there are no ponds or streams on or near the site. The exposure pathways and media of exposure are described below as they may affect the various receptors.

5.10.2.1 Ingestion and Dermal Exposure Due to Surface Water and Sediment

Surface water run-off from the site is controlled by the topography of the filled portion of the site and drainage ditches that are present to the north and east of the site. However no drainage ditches have formed on the landfill itself. The ditches are believed to be ephemeral, and any transport of impacted surface water and sediment to the ditches would likely occur during precipitation or spring snow melt events via overland flow. Due to these events, the ditches may fill with water for extended periods of time. Low areas immediately east of the landfill were observed to be wet and are likely to receive surface water from the landfill and the surrounding land.

The primary human receptors of the surface water and sediment impacts are site workers and visitors, hunters and future residents. Visitors to the site are unlikely due to it's undeveloped nature, although if present, visitors could experience dermal exposure from walking in the drainage ditches that have been impacted. Hunters could be impacted by the same mechanism. These receptors would be considered to have a potential risk of exposure from ingesting surface water or sediment. Future residents could come in contact with surface water and sediment.



● PATHWAY CONSIDERED TO POSE POTENTIAL RISK

NA NOT APPLICABLE RECEPTOR

PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA army DEPOT

EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING

DWG NO. 720518-01002

FIGURE 5.10-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-70

SCALE NA

DATE APRIL 1996

H:\ENG\SENECA\7SWMU.LOW\70EXP.CDR

The primary environmental receptors of any impacted surface water and sediment are the biota of the drainage ditches. Organisms which feed on the biota may be affected due to bioaccumulation of pollutants from the water and sediment. Terrestrial biota that drink from impacted surface water bodies (e.g., water-filled drainage ditches) or eat aquatic biota may also be affected.

5.10.2.2 Soil Ingestion and Dermal Contact

Ingestion of and dermal contact with soil is a potential exposure pathway for future on-site residents and terrestrial biota. Dermal contact with and ingestion of soil are also potential pathways for current site workers and visitors.

5.10.2.3 Groundwater Ingestion, Inhalation, and Dermal Contact

The groundwater beneath SEAD-70 is not used as a drinking water source and connection to other potable groundwater aquifers has not been demonstrated. It is not anticipated that there will be direct exposure to the groundwater from the site under current uses to on-site workers and visitors and terrestrial biota. All three pathways are potential routes of exposure to future on-site residents assuming on-site groundwater is used as their water supply.

Groundwater beneath the site flows to the northwest; it has the potential to recharge the drainage ditches during periods of high water. The potential groundwater contribution to the surface water could result in the exposures identified for surface water and sediments above.

5.10.2.4 Dust Inhalation and Dermal Contact

Inhalation of and dermal contact with dust is a potential scenario for current site workers and visitors, terrestrial biota, and future side residents.

5.10.3 Summary of Affected Media

The impacts to the site media (soil, groundwater, surface water and sediment) are summarized below. Detailed descriptions of the individual constituents and their concentrations (including any TAGM exceedences) were presented in Section 4.0.

Soils

One soil sample at the site has been impacted by metals, specifically arsenic. The concentration of arsenic in the surface sample from SB70-2 was 10 times the TAGM value. TAGM exceedances for the remaining metals were minor and widespread in the samples. Other constituents that were detected, but are considered to pose little impact, include volatile organic compounds and semivolatile organic compounds. These constituents are present at low concentrations and all were found at concentrations that were below their respective TAGMs.

Groundwater

Groundwater at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Metals and the volatile compound acetone were the only constituents detected.

Surface Water

Surface water at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Metals were the only constituents that were detected. The metals were considered to pose little impact because only iron was found at a concentration which exceeded the criteria for NYS Class D surface water.

Sediment

Sediment at the site has been impacted by five semivolatile organic compounds. However only two PAHs were detected at concentrations which are above their TAGMs and both exceedances were found in surface water sample SD70-2. Metals were the only other constituents detected. Metals are considered to pose little risk because they are present at low concentrations and only four elements were found at concentrations which slightly exceed their respective TAGMs.

5.11 SEAD-71

5.11.1 Potential Source Areas and Release Mechanisms

The suspected source area is waste material buried in disposal pits. The primary release mechanisms from the buried waste and soil that comprise the pits are infiltration and percolation of precipitation, and surface water runoff and erosion. Wind is also a release mechanism from impacted soil, although this is not expected to be significant because the site is vegetated. Groundwater, surface water, and sediment are secondary sources. Groundwater interception of surface water is a secondary release mechanism.

5.11.2 Potential Exposure Pathways and Receptors

The complete potential exposure pathways from sources to receptors are shown schematically in Figure 5.11-1. Within SEDA, vehicular access to the site is restricted by a chain-link fence.

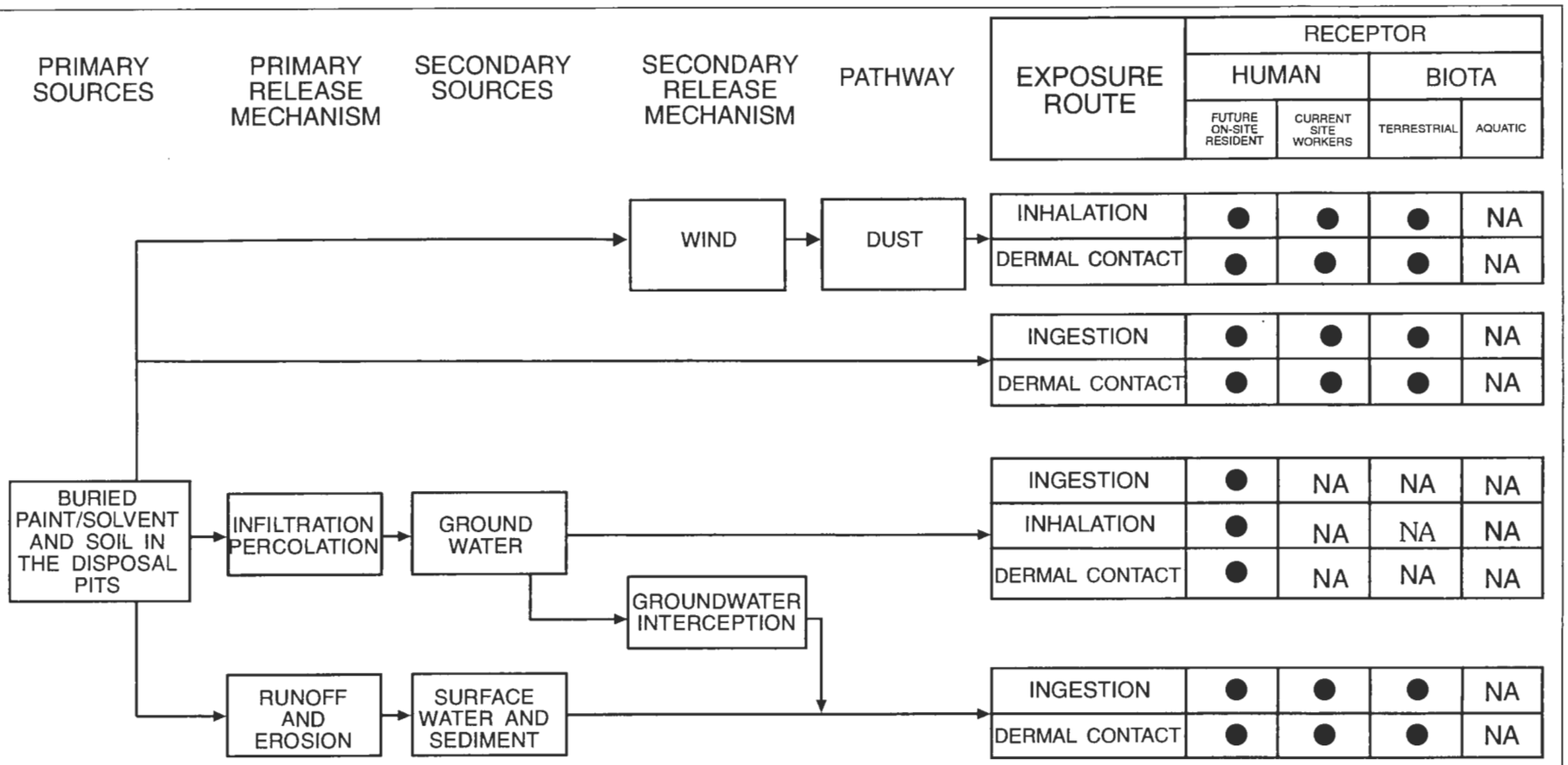
There are three primary receptor populations for potential releases of contaminants from SEAD-71:

1. Future on-site residents;
2. SEDA personnel and visitors who may visit the site (because this is not an active site, these receptors are periodic); and
3. Terrestrial biota on or near the site.

Aquatic biota are not considered because there are no ponds or streams on or near the site. The exposure pathways and media of exposure are described below as they may affect the various receptors.

5.11.2.1 Ingestion and Dermal Exposure Due to Surface Water and Sediment

The likelihood of ingestion and dermal exposure to surface water and sediment is low as these media are not well defined on-site. Any surface water run-off from the site is controlled by the gently southwest-sloping topography. Based on the topographic expression on the site, overland flow would likely be directed toward the low area immediately south of the site and occupied by railroad tracks. There are no well defined drainage ditches on the site. Human receptors of impacted surface water and sediment include current site workers, who may



PARSONS

PARSONS ENGINEERING SCIENCE, INC.

CLIENT/PROJECT TITLE

SENECA ARMY DEPOT

EXPANDED SITE INSPECTION OF 7 LOW PRIORITY AOCs

DEPT. ENVIRONMENTAL ENGINEERING | DWG NO. 720518-01002

FIGURE 5.11-1

EXPOSURE PATHWAY SUMMARY FOR SEAD-71

SCALE NA | DATE APRIL 1996

H:\ENG\SENECA\7SWMU.LOW\71EXP.CDR

Soils

Soils at the site have been impacted by semivolatile organic compounds, mostly PAHs. Other organic constituents that were detected, but are considered to pose little impact, include volatile organic compounds and pesticides. These constituents are present at low concentrations and none were found at concentrations that exceeded their respective TAGM values. Metals were detected at elevated concentrations in all of the soil samples, however, none were found at concentrations that exceeded their respective TAGM values by more than a factor of three.

Groundwater

Groundwater at the site has not been significantly impacted by any of the constituents analyzed for during the investigation. Metals were the only constituents detected. Iron and manganese were the only metals found above their TAGMs.

Surface Water

Surface water was not regarded as a significant exposure media for the site and thus no surface water samples were collected.

Sediment

Sediment was not regarded as a significant exposure media for the site, and thus no surface water samples were collected.

6.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

6.1 CHEMICAL DATA QUALITY

Completeness

Completeness is defined as the percentage of measurements that have been judged to be valid measurements. Completeness of the chemical data was evaluated by comparing the sum of analysis results that were considered to be valid to the total number of analyses results that were performed. For this analysis each datapoint was considered to comprise one measurement. The total number of measurements was obtained as the product of the number of analytes and the number of samples. The percentage of completeness ranged from 99.1 to 100 percent at the seven low priority AOCs. This exceeded the QA objective established in the workplan of 90 percent.

Representativeness

The samples were representative of conditions at upgradient and downgradient locations for surface soil, groundwater, surface water, and sediment. Test pits and borings were installed at locations that had the greatest potential to be sources of contamination. The representativeness of all the samples was maintained by following the sampling protocols described in the workplan, decontaminating equipment between samples, and collecting the appropriate QC field samples. To evaluate representativeness, several of the completed field forms were audited. The work recorded on the forms complied with the protocol. The rinsate sample results indicate the sampling equipment was being decontaminated. Ten rinsates and 11 duplicates were obtained for the ESIs at the seven AOCs which represents 5 and 6 percent of the total samples, respectively. This exceeded the QA objective of 5 percent for rinsates and duplicates. One VOC trip blank was sent with each cooler that contained samples for VOC analysis which met the QA objective.

Accuracy

A measurement's accuracy is evaluated by comparing the measured value to an accepted reference or true value. The accuracy is dependent on the matrix, method of analysis, and the compound or element being analyzed. Accuracy, expressed as percent recovery, was evaluated by comparing the results of a sample and a matrix spike sample analysis. Accuracy was also evaluated using recoveries of surrogate compounds spiked into the samples.

Accuracy evaluations were performed during the data validation process for the TCL compounds in accordance with the standard procedures for validation in Standard Operating Procedure No. HW-6 (Revision No. 8) titled CLP Organics Data Review and Preliminary Review. The QC limits for the TCL compounds were from the NYSDEC CLP Analytical Services Protocol, December 1991 with updates. The QC limits for herbicides and explosives analyses were from Methods 8150 and 8330, respectively as described in SW-846. Accuracy of the TAL elements and compounds were evaluated by comparing the spiked sample recoveries to the QC limits in the NYSDEC CLP Analytical Services Protocol, December 1991 with updates and using the data validation procedures in Standard Operating Procedure No. HW-2 (Revision No. 11) titled Evaluation of Metals Data for the Contract Laboratory Program (CLP).

Precision

Precision was measured by analyzing field duplicates and laboratory duplicates such as sample duplicates, matrix spike duplicates, and laboratory blank duplicates. Precision was most frequently expressed as relative percent difference (RPD).

The evaluation of precision was incorporated into the data validation process by following the data validation procedures in HW-2 and HW-6 for duplicates of samples, matrix spike samples, and blanks prepared by the laboratory.

Sample duplicates prepared in the field were evaluated using criteria from the validation procedures for EPA Region I, titled Laboratory Data Validation, Functional Guidelines for Evaluating Organics Analyses, February 1, 1988. The QC limits for duplicate analyses of organic compounds were 30 percent for aqueous samples and 50 percent for solid samples. The QC limits for inorganic compounds (metals and cyanide) were 50 percent for aqueous samples and 100 percent for solid samples.

RPDs of duplicate analyses that did not meet the criteria caused the analytical result for a sample and its duplicate to be qualified as an estimated value (J qualifier).

The precision of the organics data was very good based on a comparison of the field duplicates. Metals data that did not meet the criteria were more prevalent, probably due to soil matrix effects.

Comparability

The data are comparable because similar methodologies were used for sampling, chemical analysis, data validation, and reporting units of concentration. All the chemical analysis data for these investigations have been analyzed by Aquatec Laboratories, Inc. using NYSDEC Contract Laboratory Protocols for Level III and IV data. All the soils data are reported on a dry weight basis.

Traceability

The quality of the chemical data can be substantiated by linking the results to authoritative standards and describing the history of each sample from collection to analysis.

Aquatec used calibration standards obtained from AccuStandard, Inc., Restek, Supelco, and Ultrascientific. These companies can trace their standards back to standards from the National Institute of Standards and Technology. The laboratory keeps on file data packages of certificate for all standards purchased from these companies. Aquatec also purchases pure compounds from Aldrich, Chemserve, and the Department of the Navy to prepare their own standards.

When Aquatec used these standards to prepare working standards, the supplier, lot number, and expiration data of the calibration standards were recorded in a logbook along with information on the preparation and concentration of each working standard.

Parsons ES recorded field data on forms and in notebooks and completed Chain-of-Custody forms for all the samples sent to Aquatec. ES recorded the following types of information: soil boring logs, well installation details, well development data, equipment calibration, groundwater sampling data, and data on sampling of soil, surface water, and sediment. Parsons ES maintained a Chain-of-Custody form for every sample sent to Aquatec. The airbill receipts were also kept on record in a file.

When Aquatec received samples, they were logged into the laboratory management system where an internal chain-of-custody record was maintained.

As part of the data validation process, all the samples were traced from sample collection to report analysis by the laboratory. This ensured that all the samples obtained in the field were received by Aquatec, analyzed, reported, and validated.

6.2 DATA QUALITY OBJECTIVES

Field Work

The amount of field work proposed in the workplan and performed at each of the seven low priority AOCs for the Expanded Site Inspections are presented in Table 6.2-1. This section describes why changes were made to the field program presented in the workplan.

The workplan stated that each seismic refraction profile would be 120 feet long resulting in 480 feet of profiles per SEAD. Each profile was actually 115 feet long for a total length of 460 feet per SEAD.

More linear feet of geophysical surveys using EM-31 and GPR were used at SEADs-64A, 64B, and 64C, and SEADs-67, 70, and 71. At SEAD-64A, extra GPR surveys were performed at EM-31 anomalies. At SEAD-64B, EM-31 surveys were performed over a larger area then presented in the Work Plan and extra GPR surveys were performed at EM-31 anomalies. At SEAD-64C, the concrete pad and potential dumping area were 1600 feet east of the area shown in the Work Plan. Therefore, geophysical surveys, both EM-31 and GPR, were performed over an area that encompassed the actual pad location and the area shown in the Work Plan. At SEAD-64D, the survey area was extended approximately 1000 feet north to the north side of the Ash Landfill. The linear footage of surveys remained approximately the same by varying the spacings between survey lines. The decision to vary the spacings was made in the field based on the features encountered. At SEAD-67, the area surveyed was expanded from a 150 by 150 foot area as defined in the Work Plan to a 250 by 250 foot area. At SEAD-70, the area surveyed was expanded from a 200 by 200 foot area as defined in the Work Plan to a 350 by 450 foot area. At SEAD-71, the area of investigation was expanded to include a 150 by 200 foot area immediately west of the storage compound.

The purpose of the seismic refraction surveys was to estimate the direction of groundwater flow through each SEAD under investigation. The location of the monitoring wells would then be adjusted in the field so that there would be an upgradient and a downgradient monitoring well at each SEAD. Monitoring well locations were changed at the following sites: SEADs-62, 64B, 67, and 70.

TABLE 6.2-1
COMPARISON OF PROPOSED FIELD WORK TO ACTUAL FIELD WORK

SENECA ARMY DEPOT
7 LOW PRIORITY AOC's

	SEAD-60	SEAD-62	SEAD-63	SEAD-64A	SEAD-64B	SEAD-64C	SEAD-64D	SEAD-67	SEAD-70	SEAD-71
Geophysic Surveys										
Seismic Refraction	-	480/460	480/460	480/460	480/460	-	480/460	480/460 .	480/460	480/460
EM-31	-	77,000/ 73,600	9000/9120	4550/5370	3850/5240	3250/26,000	123,200/ 115,890	1200/3250	2200/8220	0/1200
GPR	-	NS/34,650	4000/5390	2100/4595	1750/3310	1500/6370	50,600/57,200	600/1875	1000/2395	NS/3450
Soil Gas Survey	-	-	-	-	-	-	200/176	-	-	-
Explorations										
Soil Borings	3/3	-	3/0	3/3	3/3	-	10/10	-	3/3	-
Test Pits	-	3/3	3/12	3/3	3/3	3/3	3/3	5/5	3/3	2/2
Monitoring Wells	3/3	3/3	3/3	3/4	3/3	1/1	5/5	3/3	4/4	3/3
Samples Analyzed										
Surface Soil	-	-	-	-	-	3/3	5/5	-	-	-
Subsurface Soil from Borings	9/9	-	9/0	9/9	9/9	-	30/30	-	9/9	-
Subsurface Soil from Test Pits	-	3/3	3/12	-	-	6/6	-	5/5	-	8/8
Subsurface Soil from Monitoring Wells	-	-	3/0	3/3	3/3	-	-	3/3	-	-

TABLE 6.2-1
COMPARISON OF PROPOSED FIELD WORK TO ACTUAL FIELD WORK

SENECA ARMY DEPOT
7 LOW PRIORITY AOC's
(Cont.)

	SEAD-60	SEAD-62	SEAD-63	SEAD-64A	SEAD-64B	SEAD-64C	SEAD-64D	SEAD-67	SEAD-70	SEAD-71
Samples Analyzed (Cont.)										
Groundwater	3/3	3/3	3/3	3/3	3/3	5/5	5/5	3/3	4/4	3/2
Surface Water	3/3	-	4/4	-	3/3	-	-	2/2	2/2	-
Sediment	3/3	-	4/4	-	3/3	-	-	2/2	2/2	-

NOTES:

1. NS stands for not specified in the Work Plan.
2. The data in the body of the table, such as "14/10",represent "proposed/actual" numbers. The proposed numbers are from the Work Plan.

The sampling plan for SEAD-63 was amended due to the detection of large quantities of buried metallic objects by geophysical surveys. Therefore, the three soil borings and three test pits were replaced with 12 test pits. Soil samples from the borings and background monitoring well would be replaced by 12 soil samples from test pits.

At SEAD-64A, an upgradient monitoring well, labelled MW64A-1A, was unintentionally placed on the southern perimeter of the site.

At SEAD-71, MW71-2, the background well, was dry and could not be sampled.

The turbidity of the groundwater samples analyzed for metals was greater than 200 NTUs for 5 wells, greater than 100 and less than 200 NTUs for 14 wells, and less than 50 NTUs for 14 wells. Review of the well installation details, well development data, and sampling data for the five wells with turbidities greater than 200 NTUs indicate they were installed, developed, and sampled in accordance with the Work Plan. The protective casing at MW70-2 had been struck between being developed and sampled. The protective casing and riser pipe had been bent, but not broken or pulled up. The increased turbidity in this well was probably caused by disturbing the water in the well with the bailer after it was forced around the bend in the pipe.

Sample Analyses

Analysis Methods

The analysis methods proposed in the Work Plan were used to analyze the samples.

Analyses Performed

The types of analysis performed on the samples from each SEAD did not vary from the Work Plan.

Quantitation Limits

The determination of an analytical quantitation limit is established by NYSDEC in the Analytical Services Protocol (ASP) which is routinely updated. As more information is obtained, the quantitation limits are re-established based upon statistical analyses of this data.

During the performance of this project, quantitation limits were updated and there are some slight differences between the Contract Required Quantitation Limits (CRQLs) in the Work Plan and the detection limits reported in the chemical analysis data sheets.

The updated reporting limits and CRQLs are presented in Appendix G of this report. The slight variations between the detection limits and CRQLs result from the detection limits being reported on a wet weight basis, i.e., "as received" and CRQLs are based on a dry weight basis. When the reporting limits are corrected to a dry weight basis, the volatiles, semivolatiles, pesticides, PCBs, and herbicides generally met or were lower than the CRQLs. In the few instances where the reporting limit, corrected to dry weight, exceeded the CRQL, either the sample size was less than the recommended amount of sample in the analysis or interferences occurred due to other analytes or other materials in the sample matrix.

7.0 RECOMMENDATIONS FOR FUTURE ACTION

7.1 INTRODUCTION

The expanded site inspections completed at the 7 low priority AOCs provide information on the nature and extent of impacts present at each of the sites. This section is designed to provide a brief overview of the findings and to propose recommendations for future action at these sites.

7.2 SEAD-60: Oil Discharge Adjacent to Building 609

The ESI conducted at SEAD-60 identified an area that had been impacted by a release of fuel oil to the ground surface immediately west of Building 609. The surface soils in this area have been impacted primarily by petroleum hydrocarbons and PAHs, and to a lesser extent by PCB compounds. At the location of the oil release, surface soils (0 to 0.2 feet) are the most significantly impacted media. TPH concentrations of 218,000 mg/kg and 50,900 mg/kg were found in the area of the oil-stained soil. Concentrations of PAHs (up to 18,000 μg/kg) correlated spatially with the elevated TPH concentrations in the surface soils. TAGM exceedances for PAHs were more numerous in the surface soil samples. At depth, the concentrations of these constituents in soil was reduced; only one subsurface sample contained a TAGM exceedance for an individual PAH compound. While the concentrations of VOCs, pesticides, and PCBs present in the 2 surface soil samples from the release area were generally below TAGM values, 2 PCBs (Aroclor 1248 and Aroclor 1260) were found at concentrations above their TAGM values. Heavy metals concentrations above TAGM values were present in all of the samples. While the surface soil samples from the two soil borings located near the oil release area generally had more TAGM exceedances for heavy metals; no consistent pattern in the spacial distribution of these exceedances was evident.

Sediment at SEAD-60 has also been impacted by the release of the fuel oil. Concentrations of semivolatile organic compounds (primarily PAHs) and TPH were reported in the analysis results of the 2 sediment samples collected down slope of the oil-stained soil. The concentrations of several semivolatile organic compounds exceed their respective TAGMs.

The analytical results indicate that TPH has impacted the groundwater beneath the oil release area, even though the concentrations of TPH in soil were dramatically reduced at depth. A TPH concentration of 1.22 mg/L was detected in the monitoring well (MW60-2) located hydraulically downgradient of the oil release area. Monitoring well MW60-1, located approximately 130 feet east of the Building 609 and hydraulically upgradient of the oil release area, also contained TPH at a concentration of 2.2 mg/L. TAGM and Federal Drinking Water criteria exceedances for benzene and

four metals (aluminum, iron, manganese, and sodium) were also detected in the groundwater samples.

Surface water at the site has not been significantly impacted by any of the constituents that were analyzed for during the investigation.

These results indicate that a significant release of TPH and PAHs in the near surface soils has occurred at SEAD-60. These results also suggest that the impacted media have the potential to impact the receptors identified in Section 5.0. It is recommended that a remedial investigation and feasibility study program be initiated to fully delineate the extent of the petroleum impacted soils and groundwater at SEAD-60.

7.3 SEAD-62: NICOTINE SULFATE DISPOSAL AREA NEAR BUILDINGS 606 and 612.

The ESI conducted at SEAD-62 did not identify areas that were used for the disposal of nicotine sulfate nor were there any areas which have been significantly impacted by a release of oil or other hazardous materials.

Soil and groundwater at the site have not been significantly impacted by any of the constituents analyzed for during the investigation. Based on the sites conceptual model, surface water and sediment were not regarded as a significant exposure media for the site. Therefore, it is recommended that a mini-risk assessment and a completion report be performed to support a Record of Decision (ROD) for SEAD-62.

7.4 SEAD-63: MISCELLANEOUS COMPONENTS BURIAL SITE

The ESI conducted at SEAD-63 identified numerous burial pits which were shown to contain miscellaneous military components. The media which were investigated at SEAD-63 included surface and subsurface soils, groundwater, surface water, and surface sediment. All were found to have been impacted by one or more of the following constituents: organic compounds, inorganic elements (heavy metals), and radionuclides.

The soils at SEAD-63 have been significantly impacted by PAHs, cadmium, and radionuclides. Radionuclides were detected in all of the soil samples and sediment samples at SEAD-63. They were found in each sample at concentrations which were only slightly above the concentrations occurring in the background samples collected at MW12A-1. However, the annual radiation dose associated to the radionuclide concentrations from each of the test pit samples at SEAD-63 (between 114 and 160

mrem/yr.) exceeded the calculated preliminary background dose of 87 mrem/year which was established as the TAGM value during this ESI. The radiation dose associated with each of the four sediment samples was below the TAGM value of 87 mrem/year.

The radiochemical results of the groundwater and surface water samples indicate that only alpha and beta radiation are impacting the quality of these waters at SEAD-63. The gross alpha and gross beta radiation detected in one groundwater sample was an order of magnitude greater than criteria values. Although the no criteria could be determined for surface water, one surface water sample contained gross alpha and gross beta radiation which was an order of magnitude greater than the remaining samples.

These results indicate that the soils of SEAD-63 have been impacted by cadmium, PAHs, and radionuclides, the latter of which are present in concentrations which are slightly above current average background values. The results also suggest that gross alpha and gross beta radiation are impacting the surface and groundwater water quality. Therefore, it is recommended that a remedial investigation and feasibility study be performed in order to fully delineate the extent of impacted media at SEAD-63.

7.5 SEAD-64A: GARBAGE DISPOSAL AREA

The results of the ESI conducted at SEAD-64A indicate that significant impacts to the soil have occurred at this site. A small (350 feet by 200 feet) landfill was also discovered on-site. In addition, leaching of several inorganic elements appear to be impacting the quality of the groundwater beneath and hydraulically downgradient of SEAD-64A.

The soils have been impacted by the waste material that was landfilled on site. The fill material (typically 2 to 3 feet in thickness) contains polynuclear aromatic hydrocarbons which are present at concentrations above their TAGMs. Concentrations of heavy metals above their TAGM values were present in all of the samples, though no consistent pattern in their occurrences was evident.

The analytical results indicate that several inorganic elements, primarily aluminum, iron and manganese, are impacting the groundwater at SEAD-64A. The three mentioned were the only heavy metals that were found at concentrations above their respective TAGMS. No organic compounds analyzed for were detected.

These results indicate that a release of PAHs has occurred in the landfilled area of SEAD-64A. It is

recommended that a remedial investigation and feasibility study be performed at SEAD-64A to fully delineate the extent of impacted soils and groundwater.

7.6 SEAD-64B: GARBAGE DISPOSAL AREA

The results of the ESI conducted at SEAD-64B indicate that minimal impacts to the soil, groundwater, surface water, and sediment have occurred at this site.

The soils have been impacted by the waste material that was landfilled on site. The fill material contains polynuclear aromatic hydrocarbons at concentrations lower than the TAGMs. Heavy metals concentrations above the TAGM were present in all of the samples, including the soil samples form the background monitoring well location, though no consistent pattern in the occurrences of these exceedances was evident. When the heavy metals concentrations in the background soil samples were compared to those in the other samples, only potassium had higher concentrations in the landfill soil samples. The landfill is having a limited impact on the sediment quality in the drainage swales adjacent to SEAD-64B. Criteria were exceeded for 3 polynuclear aromatic hydrocarbons, 3 pesticides, and 6 metals in the sediment sample down stream of the landfill. Most of the maximum metals concentrations also occurred in the downstream sample. The sediment samples obtained upstream and adjacent to the landfill had similar concentrations of the analytes detected.

The analytical results indicate that only inorganic elements were present in concentrations which exceed criteria values in the groundwater and surface water samples. The maximum metals concentrations occurred in the monitoring well located downgradient from the landfill and in the surface water sample located adjacent to the landfill. No organic compounds analyzed for were detected, except for a trace amount of carbon disulfide in one surface water sample.

The landfill is approximately 450 by 150 feet in area and is generally 1 to 8 feet thick. The fill is composed predominantly of soil, which is likely to be the only media that has been impacted at SEAD-64B. It is recommended that a mini-risk assessment and a Completion Report be completed and finalized in a Record of Decision (ROD) for SEAD-64B.

7.7 SEAD-64C: GARBAGE DISPOSAL AREA

The results of the ESI conducted at SEAD-64C indicate that no impacts have occurred at this site. Other than an area that contains buried constantine wire, no pits or fill material were observed during the ESI at this site. Thus, there is no evidence to indicate that dumping of debris or waste material

at the planned landfill occurred. Soil and groundwater at the site have not been significantly impacted by any of the constituents analyzed for during the investigation. Based on the site's conceptual model, surface water and sediment were not regarded as a significant exposure media for the site.

These results suggests that there have been no significant impacts to the media investigated at the site with regard to the conceptual model for the site and the receptors identified in Section 5.0 of this report. Therefore, it is recommended that a mini-risk assessment and a Completion Report be performed and finalized in a Record of Decision (ROD) for SEAD-64C.

7.8 SEAD-64D: GARBAGE DISPOSAL AREA

The results of the ESI conducted at SEAD-64D identified one large debris pile in the southwestern portion of SEAD-64D that appears to be impacting the soils and groundwater locally. Two surface debris areas also were identified at SEAD-64D. Both were characterized as small, isolated areas having farm wastes (including empty 55-gallon drums) and domestic wastes. TAGMs for PAHs were exceeded in several surface soil samples, and most soil samples had at least one TAGM exceedance for a heavy metal. The groundwater sample collected from MW64D-5 revealed a high concentration of heavy metals, several of which were orders of magnitude above their respective criteria.

The results of the surface water and sediment samples indicate that these media are not being significantly impacted by the releases associated with the landfill and surface debris areas.

These results suggest that there have been several localized impacts to the soil and groundwater at SEAD-64D which can pose a risk to the receptors identified in Section 5.0 of this report. Therefore, it is recommended that a remedial investigation and a feasibility study be performed at SEAD-64D in order to fully delineate the extent of the impacted soil and groundwater surrounding the affected areas.

7.9 SEAD-67: DUMP SITE EAST OF SEWAGE TREATMENT PLANT NO.4

The ESI conducted at SEAD-67 identified soils and sediment that have been impacted predominantly by PAHs and mercury.

Soils at the site have been impacted by semivolatile organic compounds, predominantly PAHs, and 1 metal (mercury). Exceedances of TAGMs for PAHs were found mostly in 4 of the 5 waste piles and none were found in the background samples. Mercury was found at an elevated concentration

(40 times the TAGM) in 1 waste pile sample (TP67-1). TAGM exceedances for the other metals were generally evenly distributed throughout the waste pile and background samples. The findings of the test pitting program also showed that no waste materials were burined below the ground surface. All of the waste pile materials were only dumped on the ground surface.

Sediment at the site has been impacted by semivolatile organic compounds (mostly PAHs) and pesticides. PAHs were found above the TAGM in both surface water samples from the stream, however, the most downstream sample contained the highest concentration of PAHs. The pesticide endosulfan was found at 66 times the TAGM in the most downstream surface water sample.

Groundwater and surface water at the site have not been significantly impacted by any of the constituents analyzed for during the investigation.

These results suggest that the presence of PAHs and mercury in the soils comprising the waste piles and stream sediments, and the endosulfan in the stream sediment, has the potential to impact the receptors identified in Section 5.0 of this report. Therefore, it is recommended that a decision document be prepared that outlines a removal action and a limited sampling program of the piles at SEAD-67 and a limited sampling plan of the sediments in and around SEAD-67. Removal of the piles at this site, followed by a limited sampling program to demonstrate the attainment of cleanup standards, is believed to be the most economical course of action for this site because the piles are small discrete surface sources that can be effectively excavated and contained with little or no dispersion of the affected media. The additional sediment samples are recommended because the data collected during the ESI indicate that the pesticides in the sediments may not originate from the piles at SEAD-67. Two of the three pesticides that were detected in the sediment samples were found only at the more downgradient sample location. The limited sediment sampling plan will provide a more complete understanding of the nature and extent of the sediment pesticide concentrations that were found in the SEAD-67 ESI sediment samples.

Subsequent to these actions, a Completion Report should be prepared to support a Record of Decision (ROD) at SEAD-67.

7.10 SEAD-70: FILLED AREA AT BUILDING 2110

The ESI conducted at SEAD-70 identified surface soils from the landfill and sediment from the wetlands surrounding the landfill that have been minimally impacted by metals and PAHs.
One soil sample at the site has been significantly impacted by arsenic. In the surface sample from

boring SB70-2, an arsenic concentration of approximately 10 times the TAGM was found. TAGM exceedances for the remaining metals were minor and widespread in the samples. Sediment at the site has been impacted by 5 semivolatile organic compounds. Only 2 PAHs were found at concentrations which exceeded their respective TAGMS and both occurred in the sediment sample SD70-2.

Groundwater and surface water at the site have not been significantly impacted by any of the constituents analyzed for during the investigation.

These results suggest that the sediment in the wetland surrounding SEAD-70 and the soils which comprise the landfill material at SEAD-70 have been impacted by moderate releases of PAHs (in the sediment) and arsenic (in the soil). Therefore, it is recommended that a mini-risk assessment be performed at SEAD-70. The few constituents that were detected at significant levels (arsenic in one soil sample and benzo(a)anthracene and chrysene in one sediment sample) should be reviewed when preparing the mini-risk assessment scope of work to identify the numbers and locations of additional samples that may be required to complete the mini risk assessment.

A second recommendation was presented by the NYSDEC following their review of this report. The NYSDEC recommendation is to perform a removal action followed by a mini risk assessment. This course of action would specifically address the high arsenic concentrations found in the landfill soils.

Following the completion of one of the recomendations described above, a completion report should be performed to support a Record of Decision (ROD) for SEAD-70.

7.11 SEAD-71: RUMORED PAINT AND SOLVENT BURIAL PIT

The ESI conducted at SEAD-71 did not uncover a burial pit for paint and solvents, though it did indicate the soils at SEAD-71 have been impacted by former activities on site.

The soils have been impacted by the waste materials which have been disposed in at least one disposal pit on site. At one location, PAHs were present above their TAGMs along with construction debris. At another test pit, PAHs, possibly associated with a nearby oil spill on the ground surface, were present in the soil above their TAGMs (up to 610 μg/kg for individual PAHs). Heavy metals concentrations above the TAGM also were present in all of the samples, though no consistent pattern in their occurrences was evident.

Groundwater at the site has not been significantly impacted by any of the constituents analyzed for during the investigation.

These results suggest that the presence of PAHs in the near surface soil has the potential to impact the receptors identified in Section 5.0 of this report. Therefore, it is recommended that remedial investigation and a feasibility study be performed at SEAD-71 in order to fully delineate the extent of impacted media within and surrounding SEAD-71.