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File SEAD 12

May 2, 2003

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Ms. Alicia Thorne
New York State Department of Environmental Conservation (NYSDEC)
Bureau of Eastern Remedial Action
Division of Hazardous Waste Remediation
625 Broadway 11th Floor
Albany, NY 12233-7015

SUBJECT: Workplan for Contract No. DACA87-02-D-0005, for Supplemental Remedial Investigations at the Radioactive Waste Burial Sites (SEAD 12), Seneca Army Depot Activity, Romulus, New York

Dear Mr. Vazquez and Ms. Thorne:

As a result of comments received on the Draft SEAD-12 Feasibility Study, the Army is proposing additional work in the area of Buildings 813 and 814 to further investigate the presence of trichloroethene in groundwater. In addition, samples from EM-5 and the Class III area will be collected and analyzed for certain radiological parameters. The plan for executing this supplemental remedial investigation work is outlined in the letter workplan below.

1.0 INTRODUCTION

Parsons is submitting this Workplan, Delivery Order 11 under contract number DACA87-02-D0005, for performing a supplemental remedial investigation (RI) at the Radiological Waste Burial Sites (SEAD-12) that is located at Seneca Army Depot Activity (SEDA) in Romulus, New York. Additional field activities are required in order to achieve the following objectives:

- delineate the volatile organic compound (VOC) contamination in the vicinity of Building 813 and 814;
- determine the source of TCE contamination in the groundwater;
- determine levels of natural attenuation parameters to better evaluate potential remedies for the area outside of Building 813 and 814; and,
- collect additional information on radiological parameters in soils from background, the EM-5 area and the Class III area in response to issues raised by NYSDEC.

The work proposed in this report will be performed as part of the United States Army Corp of Engineers (USACOE) remedial response activities under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). It will follow the requirements of the New York State Department of Environmental Conservation (NYSDEC), the United States Environmental Protection Agency, Region II (USEPA), and the Interagency Agreement (IAG).

The soil gas survey results, groundwater, surface water, and sediment chemistry, and the geophysical results obtained in the primary RI is presented in **Section 2.0** of this report. **Section 3.0** presents the task plan for the supplemental RI; this includes the installation and sampling of additional temporary and permanent monitoring wells, surveying the new temporary and permanent monitoring well locations, collecting surface water samples, and collecting additional soil samples. **Section 4.0** outlines the data quality objectives (DQOs) to be used in obtaining and evaluating the supplemental data to be collected. The schedule and staffing for the Supplemental RI is presented in **Section 5.0** and **Section 6.0**, respectively.

2.0 PREVIOUS RI RESULTS

The Revised Final RI Report at the Radiological Waste Burial Sites (SEAD-12; Parsons August 2002) presents the results of several different investigations designed to characterize the nature and extent of risks posed by the conditions at SEAD-12. Based on the results of the RI, the Draft Feasibility Study (FS) Report for the Radioactive Waste Burial Sites (SEAD-12; Parsons, May 2002) was prepared. As indicated in the RI and FS report, there are two issues within SEAD-12 that require additional investigation: the VOC contamination in the vicinity of Building 813 and 814, where former painting operations took place, and the concentrations of radionuclides in the soil at EM-5 in the Class III area. The following summarizes the results of several of the previous investigations related to the two issues to be addressed in the Supplemental RI.

2.1 VOC Concentrations Proximate to Buildings 813 and 814

Building Descriptions

Buildings 813 and 814 were primarily used for painting operations that took place in SEAD-12. The buildings were originally constructed in the 1950s, and additions were made to both over time. Building 813 originally contained a number of small offices and equipment rooms along with one large, open room. This room contained the paint booth, which was a completely, self-contained, pre-fabricated room that was replaced at least once during the period the building was used. An addition to this building was completed in the late 1980s and included a new sand blasting room. This addition covered what was once an open area between Building 813 and Building 814.

Building 814 originally contained one furnace room and a large, open room. The building was lengthened in the late 1960s, at which point an office was constructed in the southeast corner of the building. Two storage rooms were constructed inside the main room of the building and two other rooms were added to the building's exterior between 1970 and 1990, however, the exact timeframe of these modifications is not known. The basic layouts of the buildings are shown in **Figure 1**.

Soil Gas Survey Results

As part of the RI, 39 soil gas survey samples were collected in and around Buildings 813 and 814 to determine if this area had been impacted by VOCs (**Figure 2**). Former painting operations took place within these two buildings. The soil gas samples collected were analyzed for benzene, toluene, and p-xylenes (three of the four components of BTEX) as well as 1,2-dichloroethene (DCE), trichloroethene (TCE), and total VOCs. A number of locations around the buildings were identified as having elevated concentrations of VOCs. The two highest concentrations of total VOCs were detected in soil gas samples SG12-130 and SG12-134 at 10 ppm; these locations are both inside of Building 813, beneath the floor slab of the addition completed in the late 80s. The next highest total VOC concentrations were detected at soil gas samples SG12-137 and SG12-122 at 8.5 ppm; soil gas sample SG12-137 is also located inside Building 813 near the two locations with 10 ppm concentrations, and soil gas sample SG12-122 is approximately 70 feet to the west of Building 813. Five other soil gas sample locations had concentrations of total VOC ranging from 6.0 to 6.5 ppm. The results of the total VOC analysis of the soil gas samples are shown on **Figure 3**.

Analysis of the soil gas samples for individual VOCs typically showed that TCE concentrations were highest. Two of the sample locations contained concentrations of TCE over 1,000 ppb. Soil gas sample SG12-147, located immediately adjacent to the east side of Building 814, had a measured concentration of 2,407 ppb TCE; and soil gas sample SG12-121, located at the northeast corner of Building 813, had a measured concentration of 1,708 ppb TCE (**Figure 4**). Elevated BTEX concentrations were also detected in a number of locations, with concentrations exceeding 500 ppb at soil gas points SG12-126 and SG12-137 (**Figure 5**). Of the BTEX components, toluene was typically detected in the highest concentrations. The complete survey results are presented in **Table 1**.

Groundwater Chemistry

In the area of Buildings 813 and 814, four (4) overburden monitoring wells (**Figure 2**) were installed; the locations of these wells were primarily based on the soil gas survey results. Monitoring well location MW12-37 was placed approximately 10 feet from the northeast corner of Building 813 to further investigate the elevated soil gas TCE concentrations detected in that location. Monitoring well locations MW12-38 and MW12-39 were placed in approximately the same locations as soil gas sample locations SG12-122 and SG12-148, respectively, in order to investigate the elevated total VOC concentrations detected in those locations. Monitoring well location MW12-38 is also in the suspected downgradient direction of the highest TCE detection at soil gas sample location SG12-147. The fourth monitoring well location, MW12-40, was placed approximately 300 feet downgradient of Buildings 813 and 814 to determine the extent of VOC contamination in the area.

The results of the groundwater sampling program during the RI at SEAD-12 indicate that VOCs were present in groundwater at two of these four wells. The samples collected at monitoring well MW12-37, located at the northeast corner of Building 813, contained a concentration of 1,600 ug/L of TCE during both of the two sampling events conducted; the NYSDEC Class GA Standard for groundwater is 5 ug/L. The groundwater samples collected during the second sampling event also showed an estimated DCE concentration of 30 ug/L, which also exceeds the NYSDEC Class GA Standard, which is 5 ug/L. The sample collected during the second event at MW12-40 also showed a TCE concentration of 1.7 ug/L, however, this does not exceed the Standard.

Surface Water/Sediment Chemistry

As part of the RI, surface water and sediment samples were collected from three locations within a ditch that runs adjacent to Buildings 813 and 814 on the north, east, and south sides, as indicated in **Figure 2**.

In the surface water samples, only metals were detected; and of the metals detected, only concentrations of iron and aluminum exceeded NYS AWQS Class C Standards. Surface water sample SW12-30 had a concentration of 610 ug/L for iron and an estimated concentration of 633 ug/L for aluminum. The SW12-30 sample also contained a concentration of 1 ug/L of TCE, which is below the Class C Standards.

Each of the three sediment samples, which were collocated with the surface water sample locations, contained detectable concentrations of VOCs, SVOCs, pesticides/PCBs, and metals. None of the VOCs detected in the sediment exceeded NYSDEC Human Health Accumulation or Benthic Aquatic Chronic Criteria. However, each of the sediment samples contained concentrations of SVOCs, all of which were PAHs, which exceeded the above criteria. The above criteria were exceeded for at least one pesticide or PCB constituent in each of the sediment samples. Sediment sample locations SD12-30 and SD12-32 exceed the above criteria for various metals.

Soil Chemistry

Both surface and subsurface soil samples were collected in the vicinity of Buildings 813 and 814 during the RI (**Figure 2**). Three surface soil samples, SS12-66, SS12-67, and SS12-68, were collected to the northwest of the Buildings 813 and 814, near monitoring well MW12-40. The subsurface soil samples were collected during the installation of the four monitoring wells, MW12-37, MW12-38, MW12-39, and MW12-40, to the north and west of the Buildings 813 and 814. The results of the analysis of the surface and subsurface soil samples indicate that there were metals that exceeded TAGM values at these locations. However, none of the VOC or SVOC detections in the surface or subsurface soils exceeded their respective TAGM values.

2.2 Investigation of Radionuclides at EM-5

Geophysical and Test Pitting Results

As part of the geophysical investigation of the RI, an EM-31 survey was conducted. Test pits were excavated at a number of locations in SEAD-12 based on results of this survey. Two test pits dug in the location of anomaly EM-5 uncovered debris that was apparently associated with an original farmstead that predated SEDA. Item such as horseshoes, square nails, and broken glass were recovered from the EM-5 test pits. None of the debris recovered appeared to be related to military activities. All soil and debris removed from both test pits were scanned with field instruments, with no elevated areas of VOCs or radioactivity detected.

Radionuclide Soil Sampling

A total of 30 surface soil and subsurface soil samples were collected and analyzed for radionuclides from EM-5, as indicated in **Figure 6**. Using the Wilcoxon Rank Sum statistical analysis, the EM-5 soils were compared to a background data set to determine if there were any radionuclides that exceeded background concentrations. For the radionuclides distinguishable from background at EM-5, both the residential and worker $DCGL_{WS}$ were added to the background dataset as described in MARSSIM (NRC, 2000) and in Section 4.1.2.3 of the RI (Parsons, August 2002). When compared to the worker DCGLs, Lead-210 exceeded DCGLs; Lead-210 is part of the Radium-226 decay series.

2.3 Investigation of Radionuclides in Background and Class III

Geophysical and Test Pitting Results

As part of the geophysical investigation of the RI, an EM-31 survey was conducted. Eight test pits were excavated in Class III areas to investigate EM anomalies. Three test pits contained debris (brick, glass, steel pipe and wire, plastic sheeting, empty ammo boxes, and iron stakes) interpreted to be military-related. No elevated areas of radioactivity or VOCs were detected during the scanning of soil or debris removed from the test pits.

Radionuclide Soil Sampling

A total of 103 surface and subsurface soil samples were analyzed for radionuclides. Summary statistics comparing the Class III areas radionuclide data in soils to background radionuclide data are presented in **Table 2**. Using the Wilcoxon Rank Sum statistical analysis, the Class III soils were compared to a background data set to determine if there were any radionuclides that exceeded background concentrations. For the eleven radionuclides distinguishable from background at Class III, both the residential and worker $DCGL_{WS}$ were added to the background dataset as described in MARSSIM (NRC, 2000) and in Section 4.1.2.3 of the RI (Parsons, August 2002). When compared to residential DCGLs, Bi-214, Pb-210, Pb-211, and Ra-226 exceeded DCGLS. When compared to worker DCGLs, no radionuclides exceeded DCGLs.

3.0 TASK PLAN FOR SUPPLEMENTAL RI

3.1 Installation of Temporary Monitoring Wells

Fifteen temporary monitoring wells will be installed in the vicinity of Buildings 813 and 814 using a drill rig equipped with a small diameter, hollow-stem auger. The proposed locations for these wells are shown in **Figure 7**. Of the 21 wells shown on the figure, the nine in green will be installed first. Four of these nine wells will be located to the north and northwest of monitoring well MW12-37 to further delineate the VOC plume that is believed to be extending downgradient of this well. The other five initial wells will be installed in areas that exhibited elevated soil gas VOC concentrations in the RI samples. Following the analysis of samples collected in the initial nine wells, six more temporary wells will be installed to further examine detections in these areas. These six wells will be chosen from the remaining twelve wells shown in red on **Figure 7**. The rationale behind the proposed placement and installation of each temporary well is discussed further in **Table 3**.

It is anticipated that the temporary wells will be installed in two phases to ensure that the outer boundaries of any VOC plumes are defined. The wells shown in green on **Figure 7**, TW12-1 to TW12-9, will be installed and sampled during phase I. The samples will then be analyzed for VOCs to determine whether any contaminant plumes have migrated past these locations. The remaining six temporary wells to be installed will be chosen from locations TW12-10 through TW12-21 based on the results of the analysis of the phase I samples. If the criteria indicated on **Table 3** for a location to be chosen are met for more than six wells, precedence will be given to those locations closest to higher VOC concentrations.

The temporary monitoring wells will be installed according to the procedures outlined in the Field Sampling and Analysis Plan of the *Generic RI/FS Workplan* (Parsons, August 1995), with the exception that the temporary wells will not be finished with ballards, casings, or concrete collars. The soil borings in which the monitoring wells will be installed will be advanced to auger refusal, which will represent the depth of the competent bedrock. All drill cuttings removed from the boring during drilling operations will be scanned with a PID. A monitoring well will be installed in the completed soil boring and screened over the entire depth of the overburden aquifer to a maximum screen length of 10 feet. Each of the temporary wells will be constructed of PVC, which will be removed from the ground if the temporary well point is not converted to a permanent well point. The abandoning of any temporary wells will also be accomplished according to the procedures in the Field Sampling and Analysis Plan.

3.2 Groundwater Sampling of Temporary Wells

Groundwater samples will be collected at each of the temporary monitoring wells installed during this program. As stated in Section 3.1, the sampling of these wells will take place in two phases to ensure the any VOC plumes are accurately defined. Phase I samples will be collected from the first ten temporary wells installed. These samples will be analyzed for VOCs, and the results of this analysis used to position the next five temporary wells. The last five wells will also be sampled and analyzed for VOCs following installation.

All of the temporary well samples will be collected in accordance with procedures specified in the US EPA SOP titled *Groundwater Sampling Procedure, Low Flow Pump Purging and Sampling* (EPA, March 20, 1998). In general, each well will be purged and sampled using a bladder pump. Samples will only be collected after water quality indicator parameters including turbidity, temperature, specific conductivity, pH, dissolved oxygen content (DO), and oxidation-reduction potential (ORP), have stabilized in the well (i.e. are constant for three consecutive readings).

All groundwater samples collected will be submitted to a NYSDEC-certified laboratory for VOC analysis using EPA Method 8260B. Two duplicate and two rinse blank samples will also be collected and submitted to the lab for quality control (QC) purposes. The results of the analysis of the temporary well samples will be used to determine the locations of 7 permanent wells to be installed on site. The sampling plan for the temporary wells is contained in **Table 4**.

3.3 Installation of Permanent Wells

A total of seven (7) overburden monitoring wells will be installed based on the results of the temporary well VOC analysis. These permanent wells will be used to confirm the results of the temporary well VOC survey and to monitor the horizontal and vertical extent of groundwater impacts. As currently planed, five of the overburden wells will be installed downgradient of the suspected source area near MW12-37. One overburden well will be installed upgradient of the suspected source area to provide background groundwater chemical concentrations. The elevated soil gas VOC concentrations around Building 814 may not necessarily indicate a significant impact to groundwater in this area.

The monitoring wells will be installed according to the procedures outlined in the Field Sampling and Analysis Plan of the *Generic RI/FS Workplan* (Parsons, August 1995). As with the temporary wells, the soil borings for the permanent wells will be advanced to bedrock and PVC wells will be installed. These wells, however, will be finished with protective casings, ballards, and concrete collars. The casings for the overburden wells will be driven 2-3 feet below ground surface and extend approximately the same distance above the ground surface. All monitoring wells will be developed as per NYSDEC, TAGM #HWR-88-4015. Development will be performed 2 to 7 days after well installation and at least 7 days before well sampling and water elevation activities.

3.4 Groundwater Sampling of Permanent Wells

Groundwater samples will be collected from each of the 11 permanent monitoring wells (4 existing, 7 proposed) in the vicinity of Buildings 813 and 814. Samples will be collected using the low-flow methods briefly described for the temporary wells, and they will be analyzed for VOCs +10 TICs using EPA Method 8260B. In addition, samples will be analyzed for Pesticides, PCBs and metals. Prior to the sampling event, groundwater elevations will be collected at each well and these data used to create a local groundwater contour map.

In order to assess the current potential for natural attenuation as an alternative in the FS, permanent well groundwater samples will also be analyzed for the following parameters in the laboratory: nitrate, sulfate, chloride, manganese, methane, ethane, ethene, TOC, BOD and COD. Parameters measured in the field will include H_2S and Fe (II) measured by colorimetric field methods, and CO_2 and alkalinity measured by field titration. The sampling plan for the permanent wells is shown on **Table 5**.

3.5 Land Survey of Temporary and Permanent Well Locations

A surveyor, licensed by the State of New York, will be contracted to determine the locations of all temporary and permanent monitoring wells installed during this program. Site surveys will be performed in accordance with good land surveying practices and will conform to all pertinent state, federal, and USCOE laws and regulations governing land surveying. The procedures are outlined in Section 3.13.1 of the Field Sampling and Analysis Plan of the *Generic RI/FS Workplan.*

3.6 Surface Water Sampling

Seven (7) surface water/sediment samples will be collected from two areas: (1) the drainage ditches northwest of the plume along Service Road No. 1 if it is confirmed that the plume has migrated in this direction and (2) the drainage ditches north, east, and south of Buildings 813 and 814. Samples along Service Road No. 1 will be collected to determine if VOCs are discharging to surface water in this area.

Three samples will be collected to the north and east of Building 813/814 to determine if VOCs are discharging to surface water from the building. The positioning of these samples is based on the location of a former fuel oil tank adjacent to the building and a drainpipe exiting the Building 813. Finally, two samples will be collected to the south of the buildings. One of these samples will re-examine SW/SD12-30, which showed a 1 ppb concentration of TCE during the RI; and the other sample will be collected approximately 75 feet upgradient of this location. **Figure 8** shows the proposed locations for the surface water/sediment samples.

Surface water samples and sediment samples will be collected according to the methods outlined in the Field Sampling and Analysis Plan. The surface water samples will be analyzed for VOCs, and the sediment samples will be analyzed for VOCs and TOC.

3.7 Additional Sampling at EM-5

Due to the high levels of Pb-210 detected at EM-5, soil samples will be re-collected at the location of elevated hits at EM-5 detected during the Remedial Investigation (RI) at SEAD-12. The results of the analysis of these samples will be used to supplement data collected during the RI, and a report of the findings of will be included as an addendum to the RI report. Eight surface soil and two subsurface soil samples will be collected from ten locations. **Figure 9** shows the proposed locations of surface and subsurface soil samples. These locations were selected from existing sample locations based on the highest detections of Pb-210 in the last round of soil sampling. All samples will be analyzed for Ra-226 (the parent of Pb-210) and its daughter products using Method HASL 300. One rinse blank sample, one duplicate, and one MS/MSD sample will be submitted to the lab for QC purposes.

3.8 Additional Analysis in Class III Locations

Soil samples will also be collected in the Class III Area. The results of the analysis of these samples will be used to supplement data collected during the RI, and a report of the findings will be included as an addendum to the RI report. In the Class III area, concentrations of Pb-210, Pb-211, and Tritium were detected well above their respective DCGLs, as well as background values. **Table 5** presents the rational for the selection of soil sampling locations. Eight surface soil samples and 5 subsurface soil samples will be collected at existing sampling locations. Two additional subsurface samples will be collected at a depth of one foot, at the location of existing surface soil locations (MW12-40 and SS12-35). Proposed surface soil and subsurface soil locations are presented in **Figures 10** and **11**, respectively. All fifteen samples will be analyzed for Tritium using EPA Method 906 and for Pb-210 and Pb-211 by Method HASL 300. One rinse blank sample, one duplicate, and one MS/MSD sample will be submitted to the lab for QC purposes.

3.9 Additional Analysis in Background Locations

During the original RI fieldwork, background samples were collected and analyzed for radionuclides. The reported data included background values for Pb-211 that were above expected background concentrations. To confirm the quality of the background data, the background soil samples, which have been stored, will be re-analyzed for Pb-210 and Pb-211. The analysis will include 15 samples using Method HASL 300. In addition, one rinse blank sample, one duplicate, and one MS/MSD sample will be submitted to the lab for QC purposes

4.0 DATA EVALUATION

4.1 Data Quality Objectives

The Data Quality Objectives (DQOs) are outlined in the *Generic RI/FS Workplan* (Parsons 1995); however, updates relating to DQOs presented in *Data Quality Objectives Process for Hazardous Waste Site Investigations QA/G-HW* (EPA 2000) are reflected in the section below. The RI/FS process requires decisions regarding future site remedial actions, including whether or not any actions are required. The RI serves as the mechanism for collecting and assessing data that will be used in the decision making process. During this portion of the overall process, data are collected and assembled to:

- characterize site conditions;
- determine the nature of the waste(s) or contaminant(s) present;
- assess the risk posed to human health and the environment by the identified waste(s) or contaminant(s); and
- perform testing to evaluate the potential performance and cost of treatment technologies that are being considered for use.

The FS provides the mechanism within which the alternative remedial actions are developed and scoped, assessed and evaluated. Ultimately, the output of the combined RI/FS process is a recommended alternative for remedial actions needed at the site that is based on the data that is developed during the RI/FS. Consequently, the collected data must be of sufficient quantity and quality to support defensible decision making.

The U.S. Environmental Protection Agency's (EPA's) Quality Assurance Management Staff (QAMS) developed the Data Quality Objectives (DQO) Process (US EPA, 1996) as a systematic planning tool for developing data collection designs that support defensible decision making in a resource-effective manner. Proper application and use of the EPA's recommended DQO Process can improve the effectiveness, efficiency and defensibility of data collection efforts used in the development and recommendation of potential remedial actions.

The DQO Process is an iterative process that consists of seven steps, as is shown in **Figure 12**. The output from each step influences the choices that may be made later in the Process, and may lead to reconsideration of prior decisions due to the development or discovery of new data that does not support prior decisions. The first six steps focus on the development and specification of decision performance criteria or the data quality objectives (DQOs) that will be used to develop the data collection design. Key components of each of these steps are highlighted below:

- State the Problem – Concisely describe the problem to be studied. Review existing information and data to serve as the basis of the problem definition.
- Identify the Decision – Identify what questions the investigation/study will attempt to resolve, and the actions that may result.
- Identify the Inputs to the Decision – What information/data needs to be obtained and collected to resolve the problem identified?
- Define the Study Boundaries – Specify the time periods and spatial area to which the decisions will apply. Determine where and when data should be collected.
- Develop a Decision Rule – Define the statistical parameter of interest, specify the action level, and integrate the previous DQO inputs into a single statement that describes the logical basis for choosing among the alternatives.
- Specify Tolerable Limits on Decision Errors – Define decision error rates based on the consideration of making an incorrect decision.

The last step of the DQO Process is the development and specification of the data collection design based on the DQOs. During this step, all of the data and information developed and collected during the prior steps of the process are evaluated and used to generate alternative data collection designs that could be applied to resolving the identified problem. Once the alternative data collection strategies are identified, the most resource-effective design that meets all the DQOs may be selected and implemented. For the supplemental work for SEAD-12, a nonprobabilistic sampling (judgmental sampling) design is developed since the Army has experience at the site from the original RI field investigation. However, when nonprobabilistic sampling approaches are used, quantitative statements about data quality are limited only to the measurement error component of total study error and the results cannot be extrapolated to the entire site unless the data are being used to support explicit scientific models.

Each of the first six steps of the DQO has been incorporated into the development and presentation of this work plan for the supplemental work for SEAD-12. This work plan presents the Army's recommended approach to conducting an investigation that will be used to prepare a Decision Document that will be used to justify the future disposition of the site.

4.2 Data Validation

Analytical data developed during this remedial investigation will be used to support final decisions relative to the final disposition of SEAD-12. Analyses proposed as part of the investigation of SEAD-12 include directed analysis of VOCs in soil, sediment, surface water and groundwater; pesticides/PCBs and metals in groundwater; and total organic carbon (TOC) analysis in soil and sediment. In addition, the following parameters will be collected in groundwater in order to assess the potential for natural attenuation: Nitrate, sulfate, chloride, methane/ethane/ethene, Biologic Oxygen Demand (BOD), and Chemical Oxygen Demand (COD). Sample analysis for each contaminant class will be will be performed in accordance with the EPA recommended procedures listed below:

- Volatile organic compounds by EPA SW-846 Method 8260B (low level procedure) for surface water and groundwater, and Method 8260B for sediment;
- Pesticides/Polychlorinated Biphenyls by EPA Method 8081A for groundwater;
- TAL Metals by EPA Method 6010B for groundwater;
- Nitrate (NO_3), sulfate (SO_4), and chloride (Cl_2) by EPA Method 300 for groundwater;
- Methane/ethane/ethene (M/E//E) by EPA Method 8015M for groundwater;
- Total Organic Carbon (TOC) by EPA Method 9060 for groundwater;
- Biologic Oxygen Demand (BOD) by EPA Method 405.1 for groundwater;
- Chemical Oxygen Demand (COD) by EPA Method 410.4 for groundwater;
- Radionuclides by HASL 300 in soil, and
- Tritium by EPA Method 906.

In order to meet the requirements of New York State, environmental samples will be collected and analyzed according to EPA and NYSDEC CLP protocols. Determinations of TOC levels will be completed using the Lloyd Kahn protocol for sediment.

Validation of analytical data resulting from analytical determinations in soil, "sediment," surface water, and groundwater will be performed in a manner that is generally consistent with procedures defined in the EPA's "National Functional Guidelines for Organic Data Review" and consistent with EPA Region 2's Standard Operating Procedures. Specific data validation procedures that will be followed include:

- HW-24, Validating Volatile Organic Compounds by SW-846 Method 8260B, Revision 1, June 1999;
- HW-29, Measurement of Purgeable Organic Compounds in Water by Gas Chromatography/Mass Spectrometry (GC/MS): Capillary Column, Acquired Using Method 524.2 (Revision 4.1, 1995), Revision 1, October 2001.

- HW-23B, Validating Pesticides/PCB Compounds by SW-846 Method 8082, Revision 1.0, May 2002 [The most current SOP for validating PCB data is HW-23B. However, until a Regional Data Validation SOP can be prepared for Pesticides (i.e., utilizing analytical method SW-846 8081a), DV SOP HW-23 should be used in conjunction with the QA/QC criteria detailed in SW-846 Method 8081A.]; and
- HW-2, Evaluation of Metals Data for the CLP Program, Revision 11, January 1992.

Radiological analytical data will be validated according to the "Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP)", Draft for Public Comment, August 2001 (EPA 402-B-01-003).

The data package submittal requested from the laboratory for the analytical determinations in soil, "sediment," surface water, and groundwater will contain all data generated during the analyses, including mass spectral identification charts, mass spectral tuning data, spike recoveries laboratory duplicate results, method blank results, instrument calibration, and holding times documentation. All sample data and laboratory quality control results will be requested for soil and sediment analyses completed for TOC and groundwater analysis completed for the natural attenuation parameters (nitrate, sulfate, chloride, methane/ethane/ethene, (BOD), and (COD)).

Commensurate levels of data validation will be performed on the results and the data packages reported for the proposed analyses. A *qualitative* review will be completed for the TOC data and the data on the natural attenuation parameters. A qualitative review includes and analysis of the following items as they are applicable to the Method 9060, Lloyd Kahn, and natural attenuation parameters procedures: data completeness, custody documentation, holding times, laboratory and field QC blanks, instrument calibrations, laboratory control sample recoveries, matrix spike/matrix spike duplicate (MS/MSD) precision and accuracy, laboratory duplicate precision, instrument performance, surrogate recoveries for organic analyses, field duplicate precision, internal standard responses for organic analyses, instrument run logs, and all other laboratory QC samples.

Other analyses will be subjected to full data validation. Full data validation is a *qualitative* and *quantitative* review of those items evaluated during a qualitative assessment in addition to calculating sample and laboratory QC results with the instrument raw data. This level of data quality provides assurance that all sample results reported by the laboratory were transcribed, calculated, and reported correctly. Therefore, this level of data review requires laboratories to submit all environmental sample results, laboratory QC results, and instrument raw data (i.e., a full data package or "CLP-type" data deliverable).

5.0 SCHEDULE

The schedule for all tasks included in the project is presented in **Figure 13**.

6.0 STAFFING

The project team organization for performing the work described in this Work Plan is presented in **Figure 14**.

If you would like to discuss any aspects of the work outlined above, please contact me at (617) 457-7866.

Sincerely,

PARSONS

Beth Wheeler for
Jacqueline Travers, P.E.
Project Manager

Enclosures

cc: S. Absolom, SEDA
T. Enroth, USACE
K. Hoddinott, USACHPPM
C. Boes, AEC
T. Matthews, OSC

Table 1
Soil Gas Survey Results
SEAD-12 Supplemental RI Workplan
Seneca Army Depot Activity
Romulus, New York

LOC_ID	DICHLOROETHENE (ppbv)	BENZENE (ppbv)	TRICHLOROETHENE (ppbv)	TOLUENE (ppbv)	P-XYLENES (ppbv)	TOTAL VOC (ppmv)
SG12-117	0	0	6	0	0	6
SG12-118	0	0	0	0	0	3
SG12-119	0	132	461	11	0	5
SG12-120	0	0	0	197	0	6
SG12-121	452	3	1708	21	0	7
SG12-122	0	0	0	250	14	9
SG12-123	0	116	0	170	0	4
SG12-124	0	0	0	0	0	5
SG12-125	0	0	0	0	0	3
SG12-126	0	146	0	250	141	6
SG12-127	0	0	0	396	82	4
SG12-128	0	0	0	0	0	4
SG12-129	0	0	1	0	0	2
SG12-130	0	0	6	12	0	10
SG12-131	0	0	0	174	0	5
SG12-132	0	0	55	123	0	5
SG12-133	0	4	0	0	0	2
SG12-134	0	0	89	190	0	10
SG12-135	0	0	97	0	0	3
SG12-136	0	0	54	281	0	4
SG12-137	0	0	146	217	351	9
SG12-138	0	0	138	36	0	2
SG12-139	0	0	414	125	0	5
SG12-140	0	0	206	275	0	4
SG12-141	0	0	191	1	0	4
SG12-142	0	43	0	147	10	4
SG12-143	0	140	0	217	0	6
SG12-144	4	0	39	94	0	4
SG12-145	0	118	0	48	0	5
SG12-146	0	0	0	0	0	4
SG12-147	119	82	2407	22	0	7
SG12-148	0	74	110	171	0	6
SG12-149	0	0	0	0	0	3
SG12-150	0	123	0	212	136	6
SG12-151	0	0	958	32	0	4
SG12-152	0	0	98	0	0	3
SG12-153	0	0	31	0	0	2
SG12-154	0	0	633	1	0	3
SG12-155	0	0	224	144	0	3
SG12-156	0	0	0	0	0	2
SG12-157	0	0	0	10	0	4
SG12-158	0	69	148	2	0	2
SG12-159	0	0	0	0	0	3
SG12-160	0	0	0	149	0	9
SG12-161	0	0	193	2	0	6
SG12-162	0	0	10	206	0	9
SG12-163	0	94	0	12	0	4
SG12-164	0	0	0	0	0	7
SG12-165	0	0	245	180	0	4
SG12-166	0	0	0	0	0	13
SG12-167	0	4	0	13	0	4
SG12-168	0	0	0	93	0	7
SG12-169	0	0	0	320	0	28
SG12-170	0	0	0	0	0	1

TABLE 2
Comparison of Summary Statistics in Background Soil to Class 3 Soil for Radionuclides
SEAD-12 Supplemental RI Workplan
Seneca Army Depot Activity

Parameter	Units	No. of Samples		No. of Detections		Frequency of Detections		Minimum		Maximum		Average		Median		Std Dev		Above Background using WRS?	Above Background + Residential DCGL using WRS?	Above Background+ Worker DCGL using WRS?
		BKGD	Class 3 (1)	BKGD	Class 3 (1)	BKGD	Class 3 (1)	BKGD	Class 3 (1)	BKGD	Class 3 (1)	BKGD	Class 3 (1)	BKGD	Class 3 (1)	BKGD	Class 3 (1)			
Gross Alpha	pCi/g	0	3	NA	3	NA	100%	NA	6.00	NA	13.00	NA	9.00	NA	8.00	NA	3.61	NA	NA	NA
Gross Beta	pCi/g	0	3	NA	3	NA	100%	NA	21.00	NA	27.00	NA	24.00	NA	24.00	NA	3.00	NA	NA	NA
Actinium-228	pCi/g	0	3	NA	3	NA	100%	NA	0.68	NA	0.84	NA	0.77	NA	0.78	NA	0.08	NA	NA	NA
Bismuth -214	pCi/g	35	103	27	99	77%	96%	0.60	0.05	2.60	3.00	1.35	1.69	1.40	1.70	0.47	0.65	YES	YES	NO
Cesium-137	pCi/g	35	100	12	84	34%	84%	0.05	0.05	0.70	1.50	0.32	0.51	0.30	0.40	0.22	0.37	YES	NO	NO
Cobalt-57	pCi/g	35	100	5	34	14%	34%	0.05	0.05	0.10	0.30	0.06	0.08	0.05	0.05	0.02	0.05	NO	NO	NO
Cobalt-60	pCi/g	35	100	6	73	17%	73%	0.05	0.05	0.40	0.70	0.13	0.25	0.10	0.20	0.08	0.17	YES	NO	NO
Lead-210	pCi/g	35	100	5	64	14%	64%	0.60	0.60	21.10	72.30	5.62	9.25	3.43	5.60	5.35	11.60	YES	YES	NO
Lead-211	pCi/g	35	100	4	56	11%	56%	0.40	0.35	10.75	20.10	3.20	5.36	2.15	3.70	3.13	5.02	YES	YES	NO
Lead-214	pCi/g	35	103	33	96	94%	93%	0.60	0.05	2.50	2.90	1.48	1.54	1.45	1.68	0.44	0.68	NO	NO	NO
Plutonium-239	pCi/g	35	100	8	20	23%	20%	0.05	0.05	0.25	0.25	0.13	0.09	0.11	0.10	0.05	0.05	NO	NO	NO
Promethium-147	pCi/g	29	5	10	1	34%	20%	2.10	3.25	17.80	16.50	6.43	6.47	4.15	4.20	4.70	5.62	NO	NO	NO
Radium-223	pCi/g	35	100	1	11	3%	11%	0.10	0.15	0.70	1.50	0.22	0.33	0.20	0.25	0.10	0.28	YES	NO	NO
Radium-226	pCi/g	35	100	27	90	77%	90%	0.60	0.05	2.60	3.00	1.36	1.63	1.40	1.70	0.47	0.73	YES	YES	NO
Radium-228	pCi/g	35	100	34	92	97%	92%	1.00	0.05	3.50	3.60	1.73	1.91	1.65	2.00	0.51	0.76	YES	NO	NO
Thallium-208	pCi/g	0	3	NA	3	NA	100%	NA	0.26	NA	0.41	NA	0.35	NA	0.39	NA	0.08	NA	NA	NA
Thorium-227	pCi/g	29	0	8	NA	28%	NA	0.10	NA	0.55	NA	0.23	NA	0.25	NA	0.11	NA	NA	NA	NA
Thorium-230	pCi/g	35	100	9	52	26%	52%	0.20	0.05	2.70	2.30	0.54	0.73	0.32	0.70	0.53	0.64	NO	NO	NO
Thorium-232	pCi/g	35	100	34	91	97%	91%	0.25	0.05	2.00	1.90	0.98	1.05	0.90	1.20	0.36	0.43	NO	NO	NO
Thorium-234	pCi/g	0	3	NA	3	NA	100%	NA	0.30	NA	0.76	NA	0.48	NA	0.38	NA	0.25	NA	NA	NA
Tritium	pCi/g	35	100	6	56	17%	56%	0.05	0.05	30.23	418.00	1.68	28.13	0.05	0.50	5.81	64.91	YES	NO	NO
Uranium-233/234	pCi/g	35	100	17	77	49%	77%	0.05	0.05	1.90	1.90	0.46	0.74	0.10	0.80	0.46	0.41	YES	NO	NO
Uranium-235	pCi/g	35	100	19	37	54%	37%	0.05	0.05	0.40	0.40	0.11	0.09	0.10	0.05	0.08	0.06	NO	NO	NO
Uranium-238	pCi/g	35	100	27	98	77%	98%	0.05	0.05	1.40	1.80	0.67	0.87	0.75	0.90	0.40	0.28	YES	NO	NO

For the minimum, maximum, average, median, standard deviation, and the the duplicates and samples were averaged together, the detects (no qualifier or J qualifier) were taken at full value, and all non-detects (U or UJ qualifier) were taken at half value.

(1) The collection area includes Class 3, Building 813, Building 818, EM 11, EM-13, EM-37, EM-40, EM-7, EM-8, EM-10, EM-14, and EM-38.

Table 3
Well Placement Rationale - Existing and Proposed Monitoring Wells
SEAD-12 Supplemental RI Workplan
Seneca Army Depot Activity, Romulus, NY

Monitoring Well Loc ID	Status	Rationale
Existing Permanent or 1st Phase Temporary Wells		
MW12-37	existing	1,708 ppbv TCE concentration in soil gas sample SG12-121; TCE concentration of 1,600 ug/L during two sampling events in the Remedial Investigation
MW12-38	existing	8.5 ppmv total VOC concentraion in soil gas sample SG12-122
MW12-39	existing	6.0 ppmv total VOC concentration in soil gas sample SG12-148
MW12-40	existing	Placed 300' downgradient of Bldg 813 and elevated TCE concentration at SG12-121
TW12-1	proposed	633 ppbv TCE concentration in soil gas sample SG12-154
TW12-2	proposed	5.5 ppmv total VOC and 471 ppbv BTEX concentrations in soil gas sample SG12-150
TW12-3	proposed	2,407 ppbv concentration of TCE in soil gas sample SG12-147
TW12-4	proposed	10.0 ppmv total VOC concentration in soil gas samples SG12-130 and SG12-134
TW12-5	proposed	191 ppbv TCE concentration in soil gas sample SG12-141
TW12-6	proposed	Suspected downgradient direction from Bldg 813 and elevated TCE concentration in MW12-40
TW12-7	proposed	Suspected downgradient direction from Bldg 813 and elevated TCE concentration in MW12-40
TW12-8	proposed	Suspected downgradient direction from Bldg 813 and elevated TCE concentration in MW12-40
TW12-9	proposed	Suspected downgradient direction from Bldg 813 and elevated TCE concentration in MW12-40
2nd Phase Temporary Wells - 6 of 12 to be Installed		
TW12-10	proposed	Installation based on detections at TW12-3
TW12-11	proposed	Installation based on detections at TW12-3
TW12-12	proposed	Installation based on detections at TW12-4
TW12-13	proposed	Installation based on detections at TW12-6 or TW12-9
TW12-14	proposed	Installation based on detections at TW12-7
TW12-15	proposed	Installation based on detections at TW12-7 or TW12-8
TW12-16	proposed	Installation based on detections at TW12-8
TW12-17	proposed	Installation based on detections at TW12-8 or TW12-9
TW12-18	proposed	Installation based on detections at TW12-9
TW12-19	proposed	Installation based on detections at TW12-5
TW12-20	proposed	Installation based on detections at TW12-3
TW12-21	proposed	Installation based on detections at TW12-1

Table 4
Temporary Well Sampling Plan
SEAD-12 Supplemental RI
Seneca Army Depot Activity, Romulus, NY

Loc ID	Sampling Phase	Parameters	Methods	Duplicates	MS/MSD	Rinse Blanks	Trip Blanks	Total Samples
TW12-1	I	Lab: VOCs Field: DO, ORP, pH, Cond., Temp., Turbidity	8260B				1	2
TW12-2	I	Lab: VOCs Field: DO, ORP, pH, Cond., Temp., Turbidity	8260B					1
TW12-3	I	Lab: VOCs Field: DO, ORP, pH, Cond., Temp., Turbidity	8260B	1 VOC	1 VOC	1	1	5
TW12-4	I	Lab: VOCs Field: DO, ORP, pH, Cond., Temp., Turbidity	8260B					1
TW12-5	I	Lab: VOCs Field: DO, ORP, pH, Cond., Temp., Turbidity	8260B				1	2
TW12-6	I	Lab: VOCs Field: DO, ORP, pH, Cond., Temp., Turbidity	8260B					1
TW12-7	I	Lab: VOCs Field: DO, ORP, pH, Cond., Temp., Turbidity	8260B					1
TW12-8	I	Lab: VOCs Field: DO, ORP, pH, Cond., Temp., Turbidity	8260B					1
TW12-9	I	Lab: VOCs Field: DO, ORP, pH, Cond., Temp., Turbidity	8260B					1
TW12-10 - TW12-21	II	Lab: VOCs Field: DO, ORP, pH, Cond., Temp., Turbidity	6 8260B	1VOC	1VOC	1	2	11
Totals	9 Phase I, 6 Phase II		15/analysis	2 VOC	2 VOC	2	5	26

Note: All field parameters to be measured using Horiba U-22 flow through cell

Table 5
Permanent Well Sampling Plan
SEAD-12 Supplemental RI
Seneca Army Depot Activity, Romulus, NY

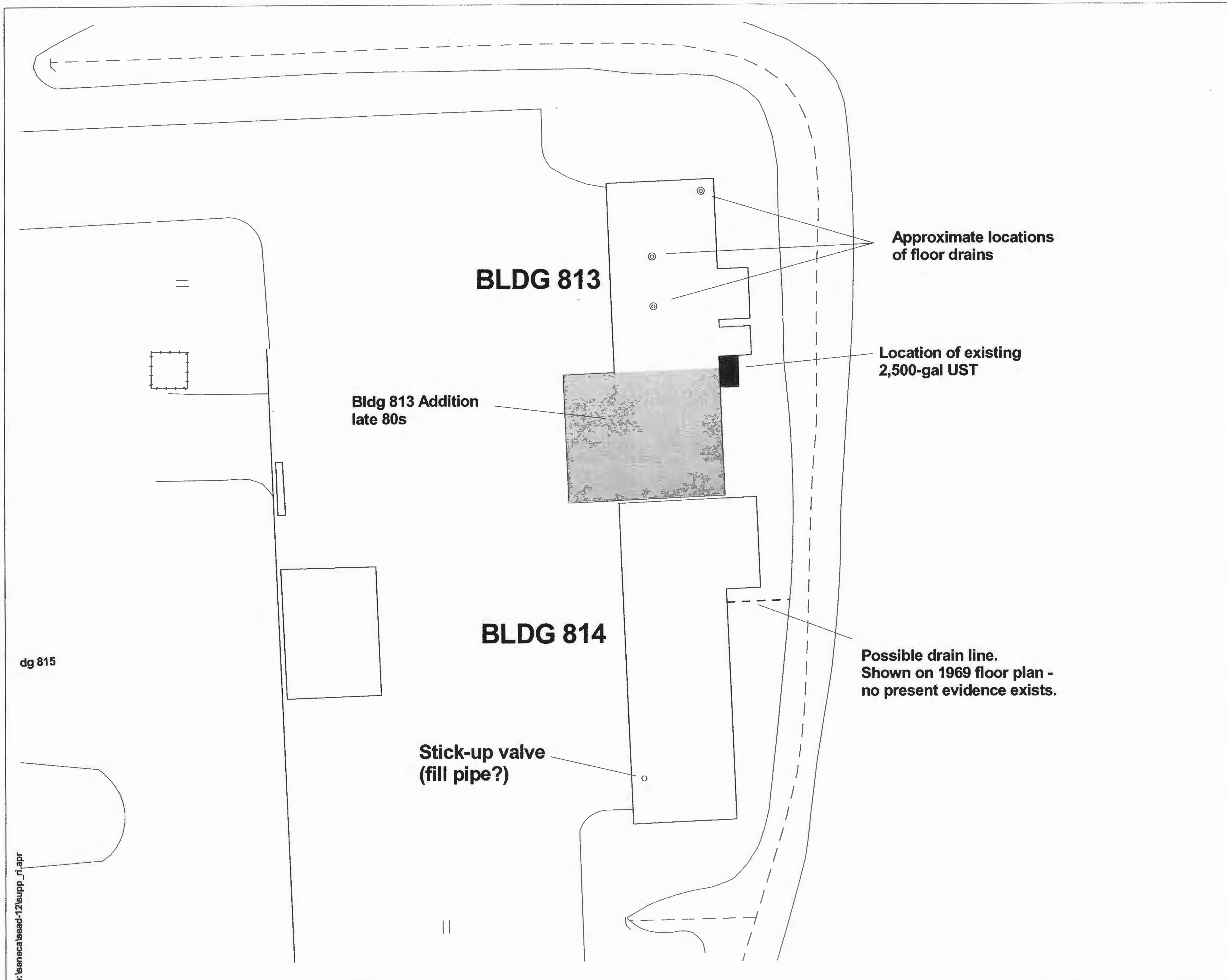
Loc ID	Parameters	Methods	Duplicates	MS/MSD	Rinse Blanks	Trip Blanks	Total Samples
MW12-37	Lab: VOCs, Pest/PCB, Metals, NO_3, SO_4, Cl_2, M/E/E, TOC, BOD, COD Field: DO, ORP, pH, Cond., Temp., Turbidity, H_2S, Fe^{+2}, CO_2, Alk.	8260B, 8081A, 6010B, 300, 8015M, 9060, 405.1, 410.4	1 for all lab parameters	1 for all lab parameters	1 for all lab parameters	1	41
MW12-38	Lab: VOCs, Pest/PCB, Metals, NO_3, SO_4, Cl_2, M/E/E, TOC, BOD, COD Field: DO, ORP, pH, Cond., Temp., Turbidity, H_2S, Fe^{+2}, CO_2, Alk.	8260B, 8081A, 6010B, 300, 8015M, 9060, 405.1, 410.4					10
MW12-39	Lab: VOCs, Pest/PCB, Metals, NO_3, SO_4, Cl_2, M/E/E, TOC, BOD, COD Field: DO, ORP, pH, Cond., Temp., Turbidity, H_2S, Fe^{+2}, CO_2, Alk.	8260B, 8081A, 6010B, 300, 8015M, 9060, 405.1, 410.4					10
MW12-40	Lab: VOCs, Pest/PCB, Metals, NO_3, SO_4, Cl_2, M/E/E, TOC, BOD, COD Field: DO, ORP, pH, Cond., Temp., Turbidity, H_2S, Fe^{+2}, CO_2, Alk.	8260B, 8081A, 6010B, 300, 8015M, 9060, 405.1, 410.4					10
PW12-TBD1	Lab: VOCs, Pest/PCB, Metals, NO_3, SO_4, Cl_2, M/E/E, TOC, BOD, COD Field: DO, ORP, pH, Cond., Temp., Turbidity, H_2S, Fe^{+2}, CO_2, Alk.	8260B, 8081A, 6010B, 300, 8015M, 9060, 405.1, 410.4					10
PW12-TBD2	Lab: VOCs, Pest/PCB, Metals, NO_3, SO_4, Cl_2, M/E/E, TOC, BOD, COD Field: DO, ORP, pH, Cond., Temp., Turbidity, H_2S, Fe^{+2}, CO_2, Alk.	8260B, 8081A, 6010B, 300, 8015M, 9060, 405.1, 410.4					10
PW12-TBD3	Lab: VOCs, Pest/PCB, Metals, NO_3, SO_4, Cl_2, M/E/E, TOC, BOD, COD Field: DO, ORP, pH, Cond., Temp., Turbidity, H_2S, Fe^{+2}, CO_2, Alk.	8260B, 8081A, 6010B, 300, 8015M, 9060, 405.1, 410.4					10
PW12-TBD4	Lab: VOCs, Pest/PCB, Metals, NO_3, SO_4, Cl_2, M/E/E, TOC, BOD, COD Field: DO, ORP, pH, Cond., Temp., Turbidity, H_2S, Fe^{+2}, CO_2, Alk.	8260B, 8081A, 6010B, 300, 8015M, 9060, 405.1, 410.4					10
PW12-TBD5	Lab: VOCs, Pest/PCB, Metals, NO_3, SO_4, Cl_2, M/E/E, TOC, BOD, COD Field: DO, ORP, pH, Cond., Temp., Turbidity, H_2S, Fe^{+2}, CO_2, Alk.	8260B, 8081A, 6010B, 300, 8015M, 9060, 405.1, 410.4					10
PW12-TBD6	Lab: VOCs, Pest/PCB, Metals, NO_3, SO_4, Cl_2, M/E/E, TOC, BOD, COD Field: DO, ORP, pH, Cond., Temp., Turbidity, H_2S, Fe^{+2}, CO_2, Alk.	8260B, 8081A, 6010B, 300, 8015M, 9060, 405.1, 410.4					10
PW12-TBD7	Lab: VOCs, Pest/PCB, Metals, NO_3, SO_4, Cl_2, M/E/E, TOC, BOD, COD Field: DO, ORP, pH, Cond., Temp., Turbidity, H_2S, Fe^{+2}, CO_2, Alk.	8260B, 8081A, 6010B, 300, 8015M, 9060, 405.1, 410.4				1	11
Totals		110	10	10	10	2	142

Notes: Permanent well IDs to be determined based on converted temporary well IDs

VOC - Volatile Organic Compounds (8260B)
Pest/PCB - Pesticides/Polychlorinated Biphenyls (8081A)
Metals - (6010B)
NO_3 - Nitrate (300)
SO_4 - Sulfate (300)
Cl_2 - Chloride (300)
M/E/E - Methane, Ethane, Ethene (8015M)
TOC - Total Organic Carbon (9060)
BOD - Biologic Oxygen Demand (405.1)
COD - Chemical Oxygen Demand (410.4)
DO - Dissolved Oxygen
ORP - Oxidation/Reduction Potential
Cond - Conductivity
Temp - Temperature
H_2S - Hydrogen Sulfide
Fe^{+2} - ferrous iron
CO_2 - Carbon Dioxide
Alk - Alkalinity

Table 6
Soil Sample Location Rationale
SEAD-12 Supplemental RI Workplan
Seneca Army Depot Activity, Romulus, NY

Soil Sample Loc ID	Depth	Status	Rationale
MW12-40	Surface	existing	Pb-211 was detected at 20.1 J pCi/g, which is well above the DCGL for Class III and site background.
SS12-21	Surface	existing	Tritium was detected at 210 pCi/g, which is well above the DCGL for Class III and site background.
SS12-27	Surface	existing	Pb-211 was detected at 19.2 J pCi/g, which is well above the DCGL for Class III and site background.
SS12-35	Surface	existing	Tritium and Pb-210 were detected at 418 pCi/g and 9 J pCi/g, respectively, which are well above the DCGLs for Class III and site background values.
SS12-41	Surface	existing	Pb-210 was detected at 72.3 J pCi/g, which is well above the DCGL for Class III and site background.
SS12-52	Surface	existing	Tritium was detected at 228 J pCi/g, which is well above the DCGL for Class III and site background.
SS12-60	Surface	existing	Pb-210 was detected at 51.6 J pCi/g, which is well above the DCGL for Class III and site background.
SS12-66	Surface	existing	Pb-210 was detected at 44.4 J pCi/g, which is well above the DCGL for Class III and site background.
TP12-10A	1 ft.	existing	Pb-210 was detected at 56.9 J pCi/g, which is well above the DCGL for Class III and site background.
TP12-10C	5.5 ft.	existing	Pb-210 was detected at 57.8 J pCi/g, which is well above the DCGL for Class III and site background.
TP12-20A	0.5 ft.	existing	Pb-210 was detected at 44.6 J pCi/g, which is well above the DCGL for Class III and site background.
TP12-22BB	1.5 ft.	existing	Pb-211 was detected at 18.6 J pCi/g, which is well above the DCGL for Class III and site background.
TP12-24C	1 ft.	existing	Pb-211 was detected at 17 J pCi/g, which is well above the DCGL for Class III and site background.
MW12-40	1 ft.	proposed	To further explore area at depth where maximum concentration of Pb-211 was detected at the surface.
SS12-35	1 ft.	proposed	To further explore area at depth where maximum concentration of tritium and an elevated level of Pb-210 were detected at the surface.



LEGEND

N

20 0 20 40 Feet

PARSONS

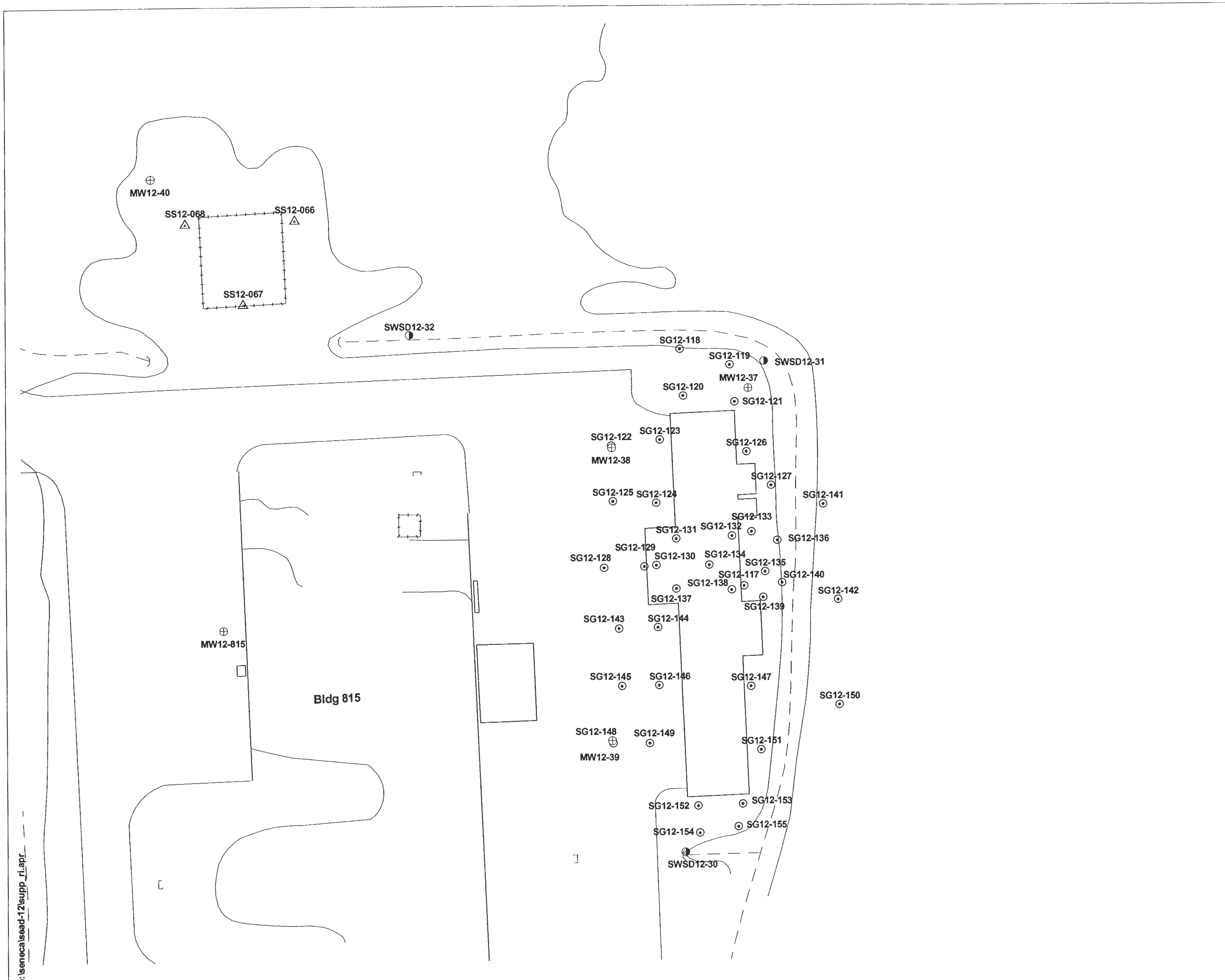
SENECA ARMY DEPOT ACTIVITY

SUPPLEMENTAL RI
SEAD 12

FIGURE 1
BUILDINGS 813 AND 814

SCALE 1:30

DATE MAY 2003



LEGEND

SG12-128
⊙ SOIL GAS SAMPLE LOCATION

MW12-37
⊕ MONITORING WELL LOCATION
subsurface soil samples
also collected

SS12-67
△ SURFACE SOIL SAMPLE
LOCATION

SW/SD12-30
◑ SURFACE WATER/SEDIMENT
SAMPLE LOCATION

N

50 0 50 Feet

PARSONS

SENECA ARMY DEPOT ACTIVITY

SUPPLEMENTAL RI
SEAD 12

FIGURE 2
REMEDIAL INVESTIGATION
SAMPLING LOCATIONS

SCALE 1:50	DATE MAY 2003

LEGEND

SG12-128
⊙ SOIL GAS SAMPLE LOCATION
4.0 W/ VOC CONCENTRATION (ppm)

MW12-37
⊕ MONITORING WELL LOCATION

SOIL GAS ISOCONCENTRATION CONTOURS

5 ppm

10 ppm

N

50 0 50 Feet

PARSONS

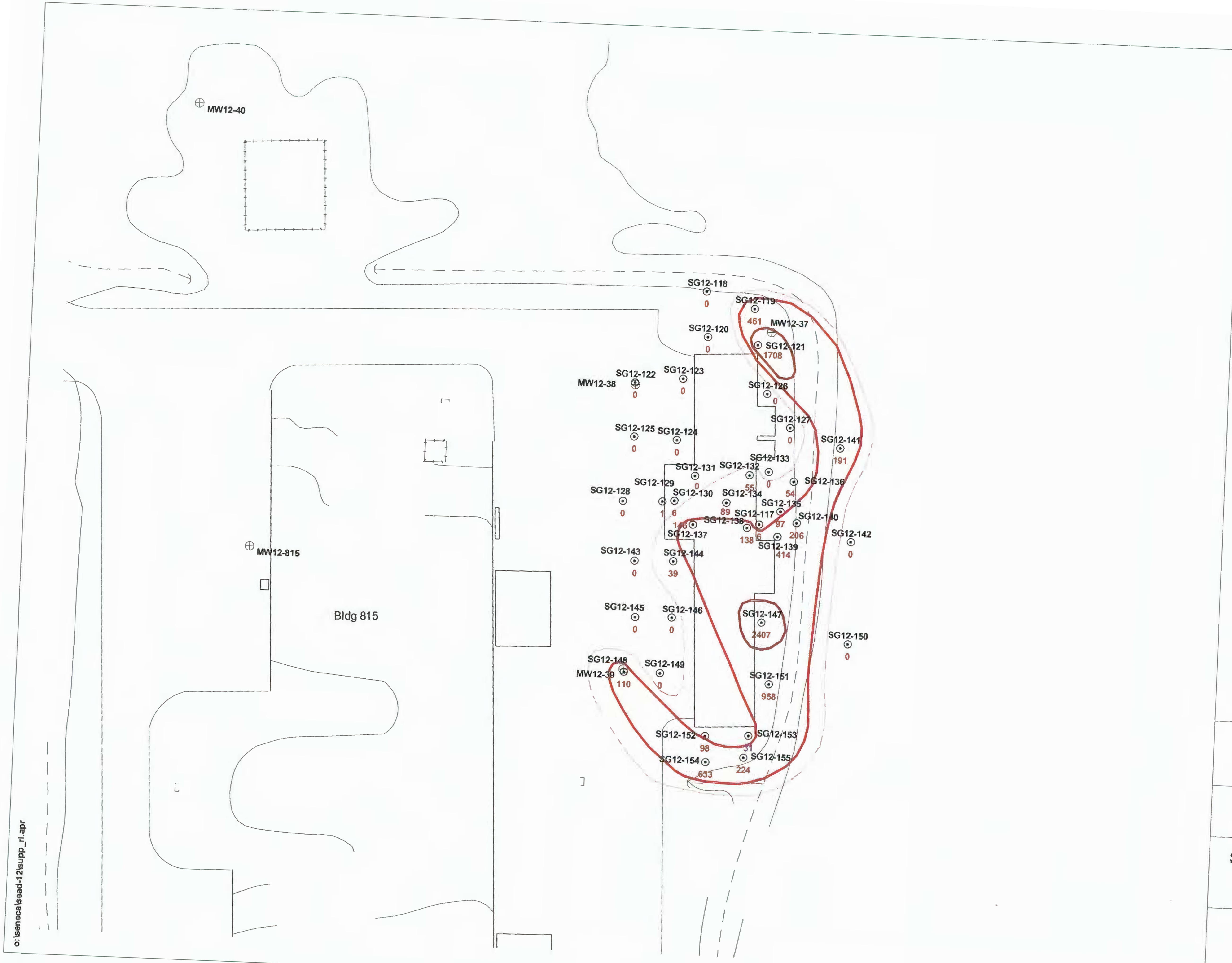
SENECA ARMY DEPOT ACTIVITY

SUPPLEMENTAL RI

SEAD 12

FIGURE 3
SOIL GAS TOTAL VOC CONCENTRATIONS

SCALE 1:50 | DATE MAY 2003



LEGEND

SG12-128
10
SOIL GAS SAMPLE LOCATION W/ TCE CONCENTRATION (ppb)

MW12-37
MONITORING WELL LOCATION

SOIL GAS ISOCONCENTRATION CONTOURS

10 ppb

100 ppb

1000 ppb

N

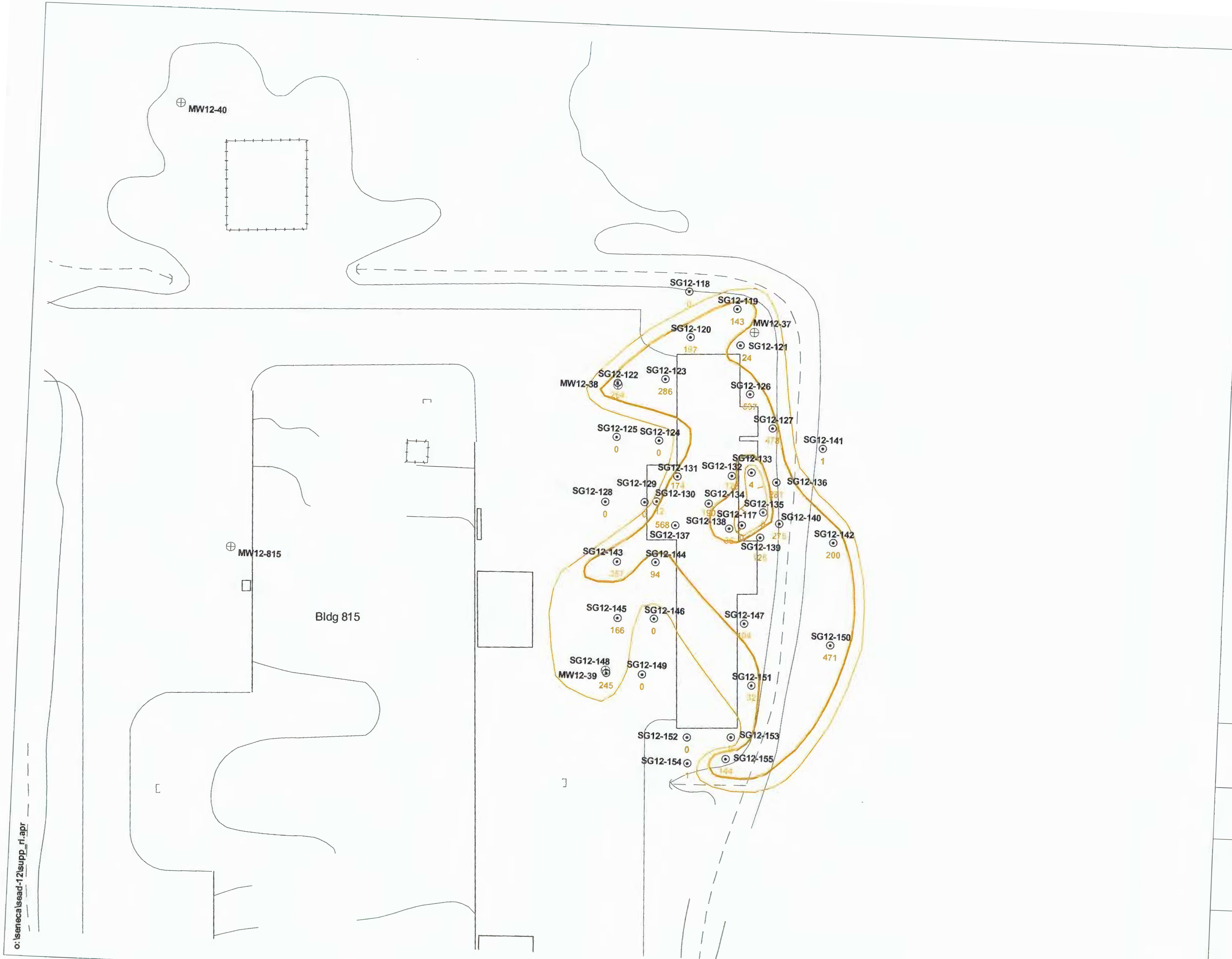
50 0 50 Feet

PARSONS

SENECA ARMY DEPOT ACTIVITY
SUPPLEMENTAL RI
SEAD 12

FIGURE 4
SOIL GAS TCE CONCENTRATIONS

SCALE 1:50 DATE



LEGEND

SG12-128
SOIL GAS SAMPLE LOCATION
256 W/ BTEX CONCENTRATION (ppb)

MW12-37
MONITORING WELL LOCATION

SOIL GAS ISOCONCENTRATION CONTOURS

10 ppb

100 ppb

N

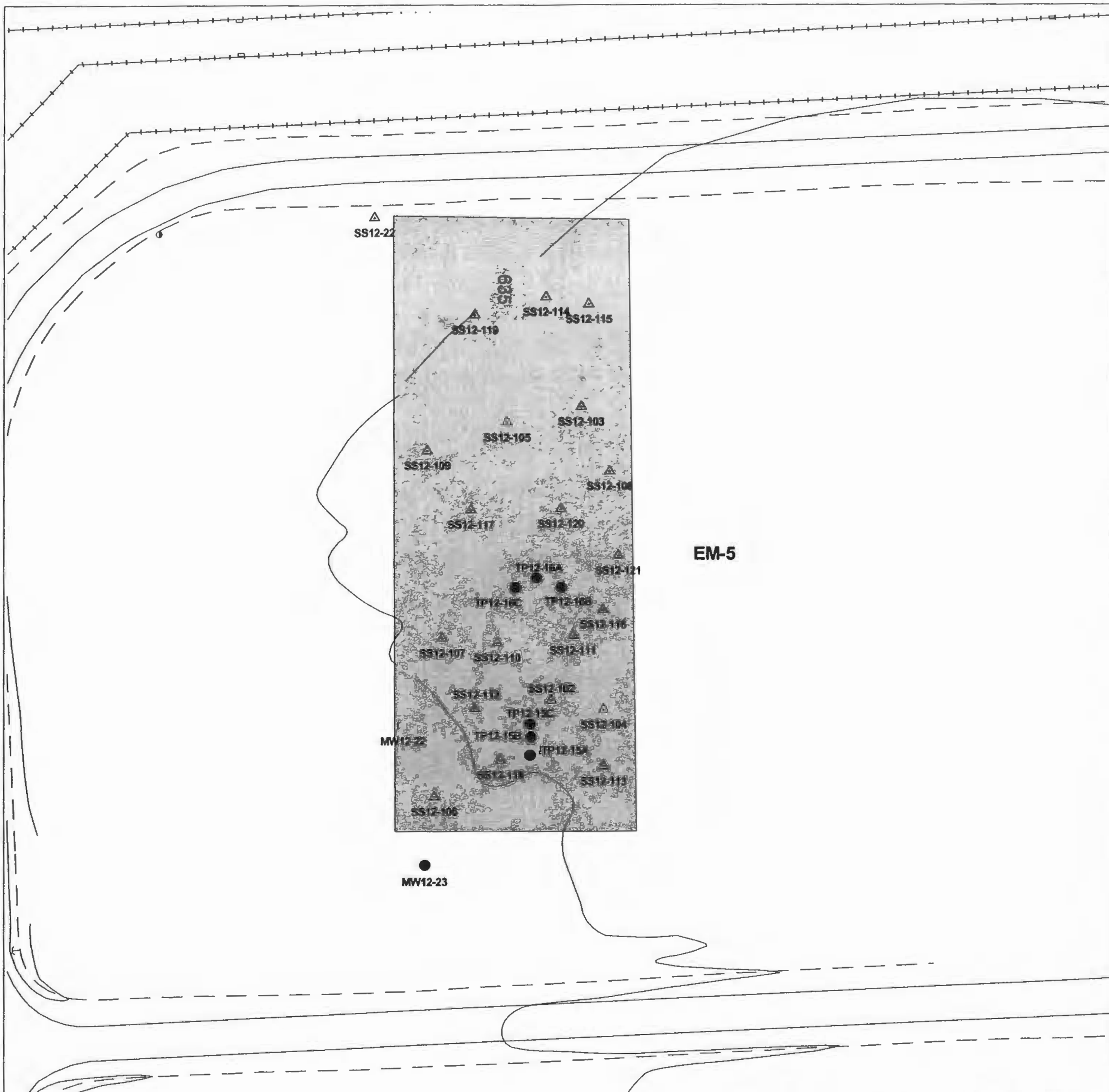
50 0 50 Feet

PARSONS

SENECA ARMY DEPOT ACTIVITY
SUPPLEMENTAL RI
SEAD 12

FIGURE 5
SOIL GAS BTEX CONCENTRATIONS

SCALE 1:50 DATE



SS12-128
△ PREVIOUS SURFACE SOIL SAMPLE LOCATION

TP12-15
● PREVIOUS SUBSURFACE SOIL SAMPLE LOCATION

POTENTIAL RELEASE AREA

80 0 80 Feet

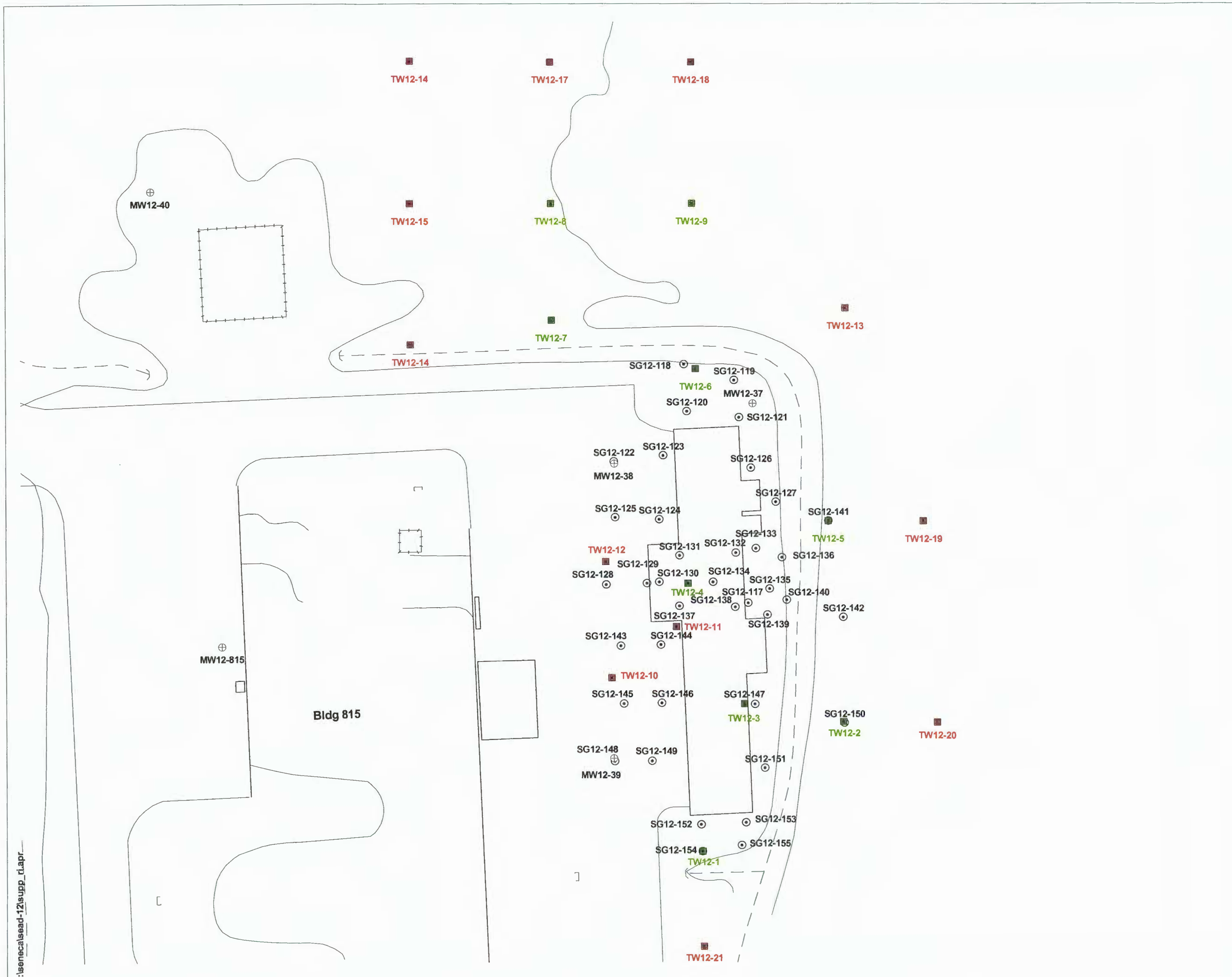
N

PARSONS

SENECA ARMY DEPOT ACTIVITY
SUPPLEMENTAL RI
SEAD 12

FIGURE 6
PREVIOUS SOIL SAMPLE LOCATIONS AT EM-5

SCALE 1:100	DATE APRIL 2003



LEGEND

SG12-128 SOIL GAS SAMPLE LOCATION

MW12-37 MONITORING WELL LOCATION

MW12-37 TEMPORARY WELL LOCATION

Green - 1st phase of borings

Red - 2nd phase of borings 6 of 12 to be installed based on 1st round results

N

50 0 50 Feet

PARSONS

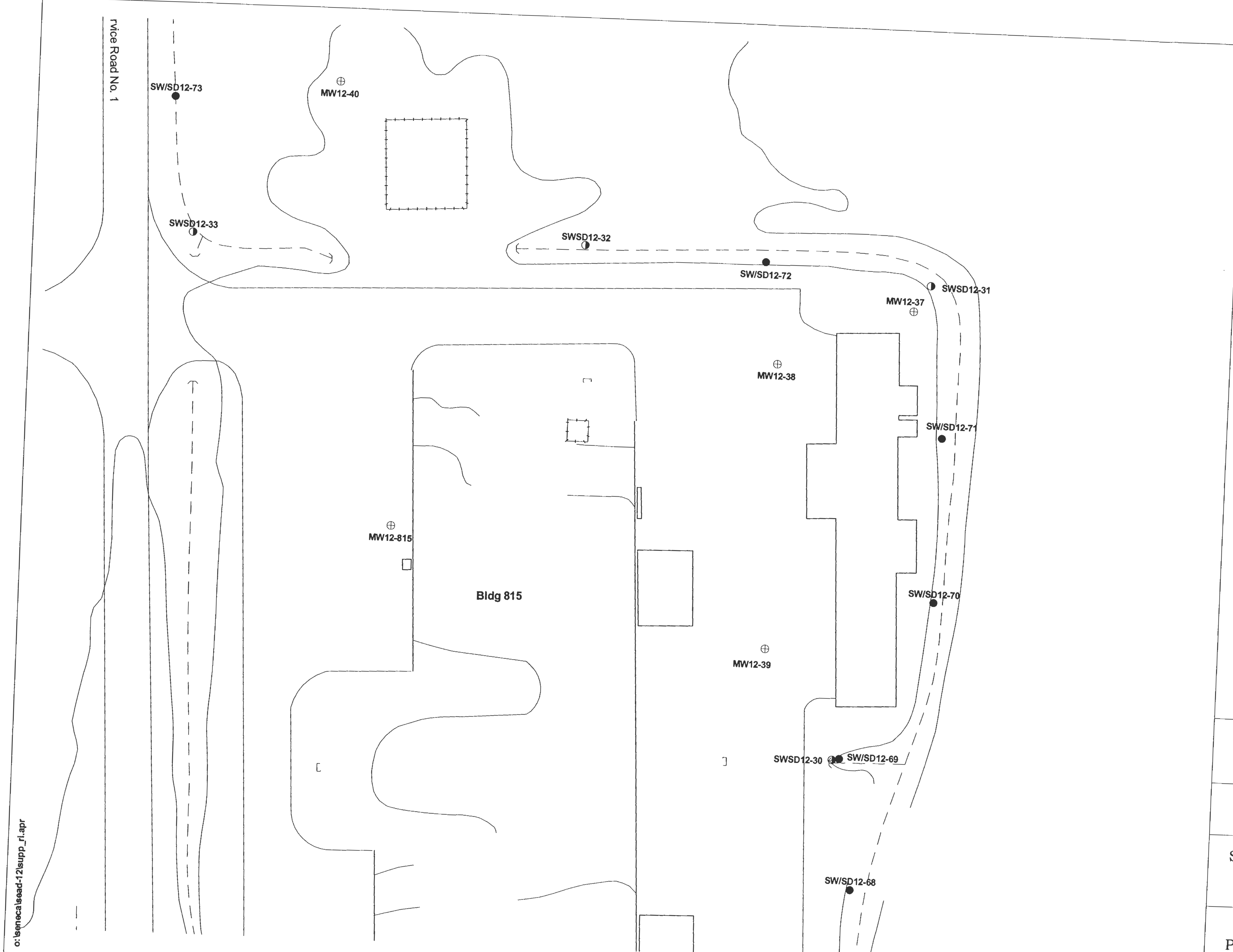
SENECA ARMY DEPOT ACTIVITY

SUPPLEMENTAL RI

SEAD 12

FIGURE 7
PROPOSED TEMPORARY WELL LOCATIONS

SCALE 1:50	DATE MAY 2003



LEGEND

SW/SD12-30 PREVIOUS SURFACE WATER/ SEDIMENT SAMPLING LOCATION

SW/SD12-70 PROPOSED SURFACE WATER/ SEDIMENT SAMPLING LOCATION

N

50 0 50 Feet

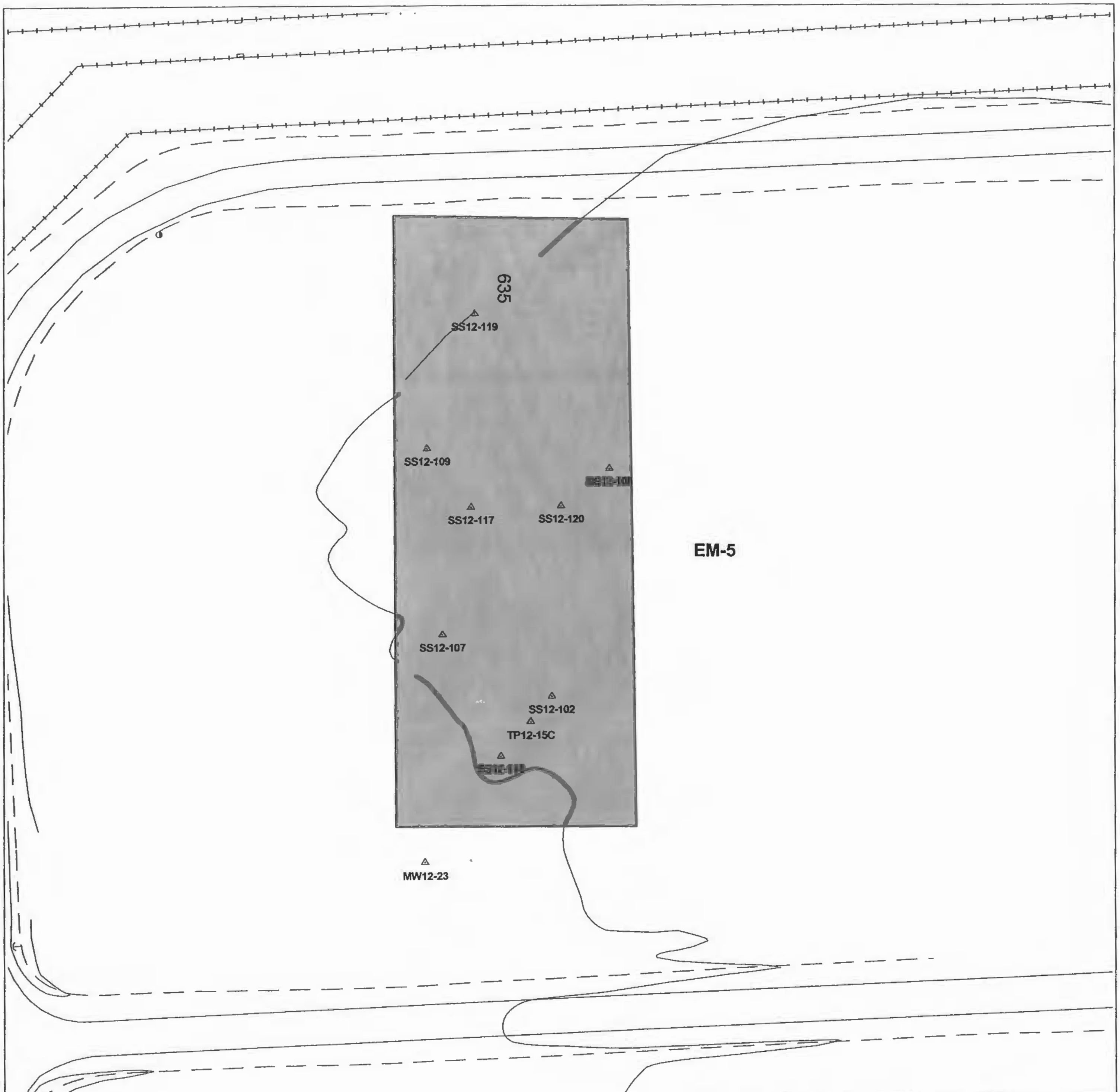
PARSONS

SENECA ARMY DEPOT ACTIVITY

SUPPLEMENTAL RI
SEAD 12

FIGURE 8
PROPOSED SURFACE WATER/
SEDIMENT SAMPLING LOCATIONS

SCALE 1:50 DATE



SS12-128

△ PROPOSED SOIL SAMPLE LOCATION

POTENTIAL RELEASE AREA

N

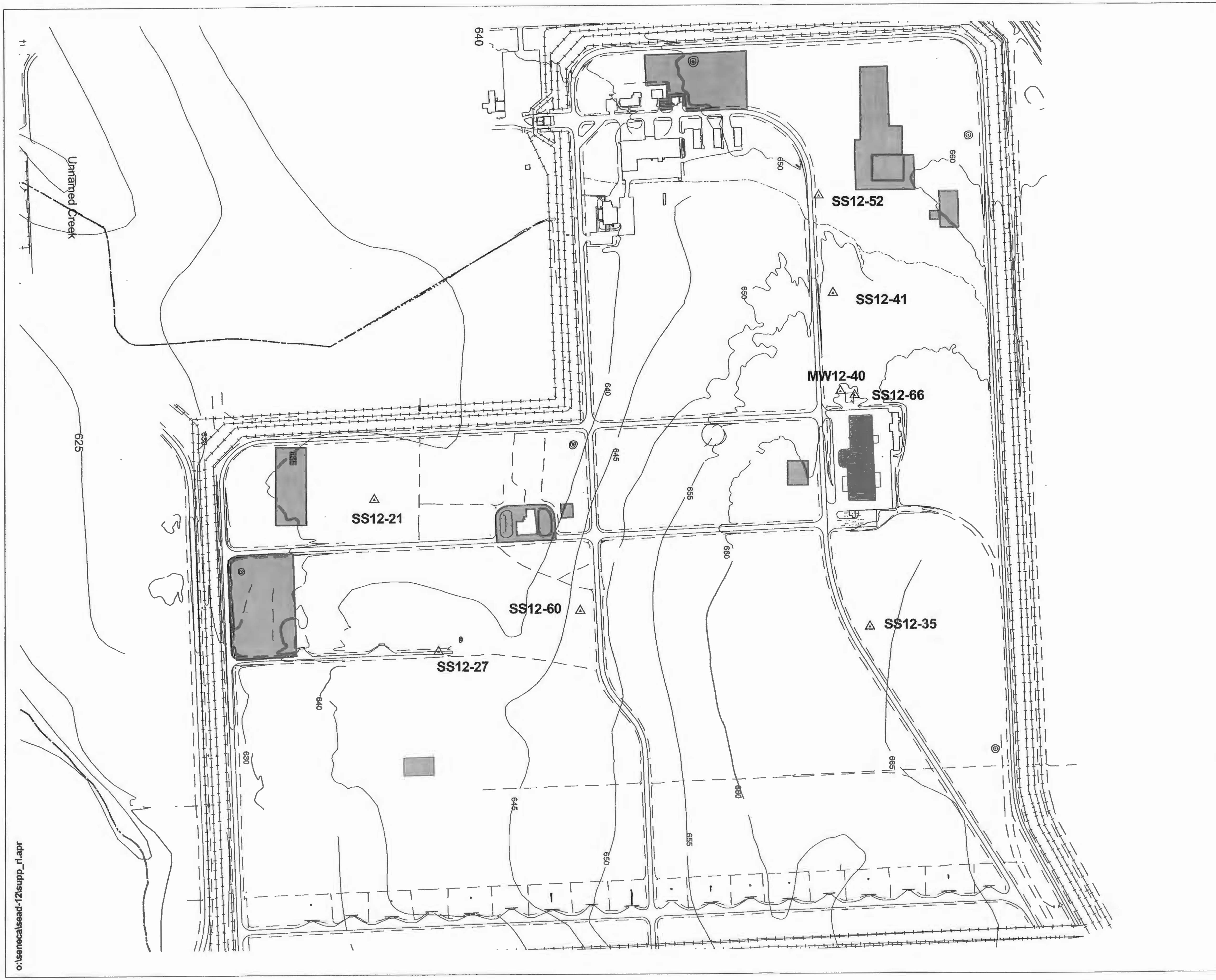
80 0 80 Feet

PARSONS

SENECA ARMY DEPOT ACTIVITY
SUPPLEMENTAL RI
SEAD 12

FIGURE 9
PROPOSED SOIL SAMPLE LOCATIONS AT EM-5

SCALE 1:100	DATE APRIL 2003



LEGEND

SS12-128

PROPOSED SURFACE SOIL SAMPLE LOCATION

POTENTIAL RELEASE AREA

N

500 0 500 Feet

PARSONS

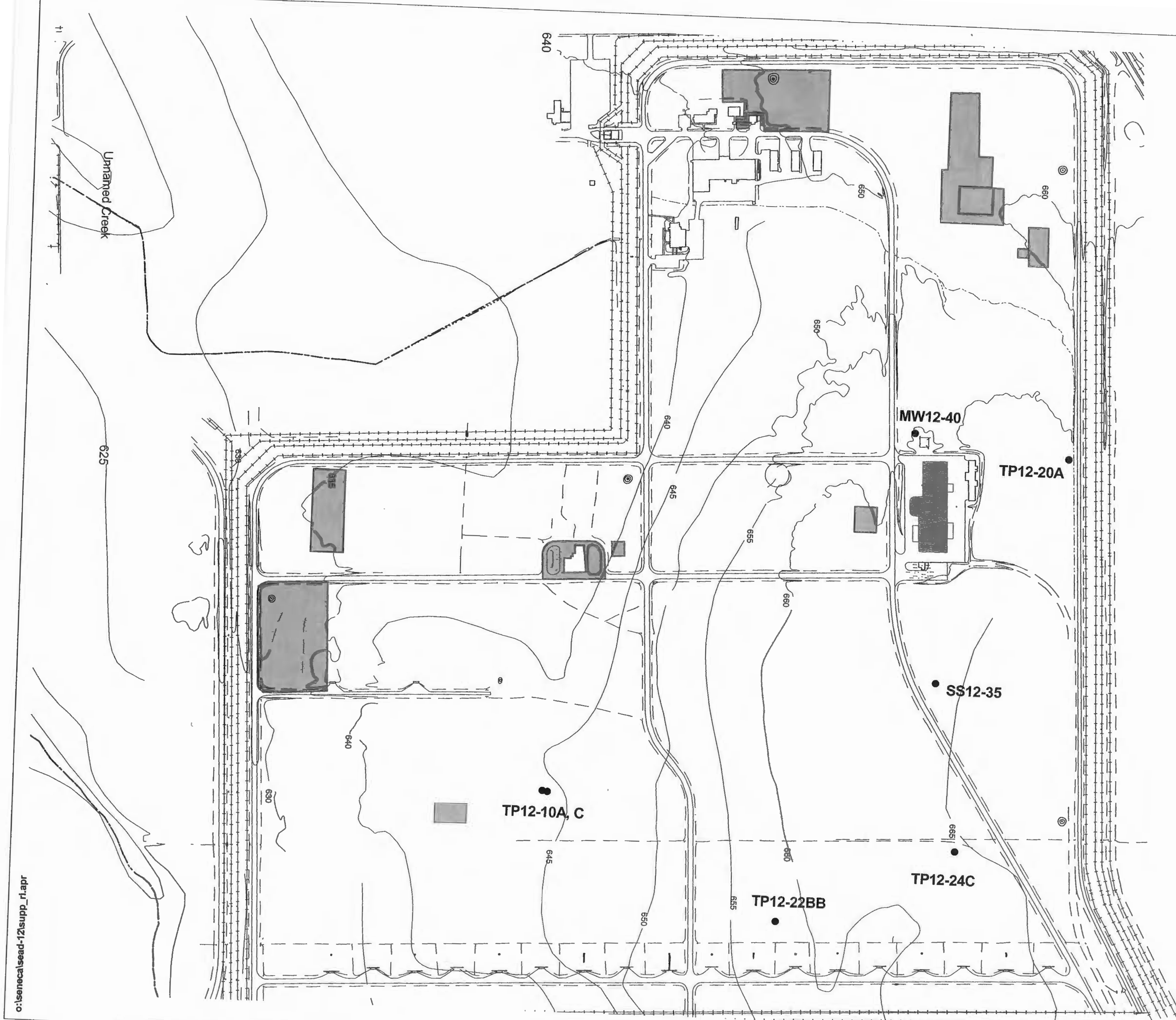
SENECA ARMY DEPOT ACTIVITY

SUPPLEMENTAL RI

SEAD 12

FIGURE 10
PROPOSED SURFACE SOIL SAMPLE LOCATIONS IN THE CLASS 3 AREA

SCALE 1:500	DATE APRIL 2003



LEGEND

TP12-10 • PROPOSED SUBSURFACE SOIL SAMPLE LOCATION

POTENTIAL RELEASE AREA

N

500 0 500 Feet

PARSONS

SENECA ARMY DEPOT ACTIVITY

SUPPLEMENTAL RI

SEAD 12

FIGURE 11
PROPOSED SUBSURFACE SOIL SAMPLE LOCATIONS IN THE CLASS 3 AREA

SCALE 1:500

DATE

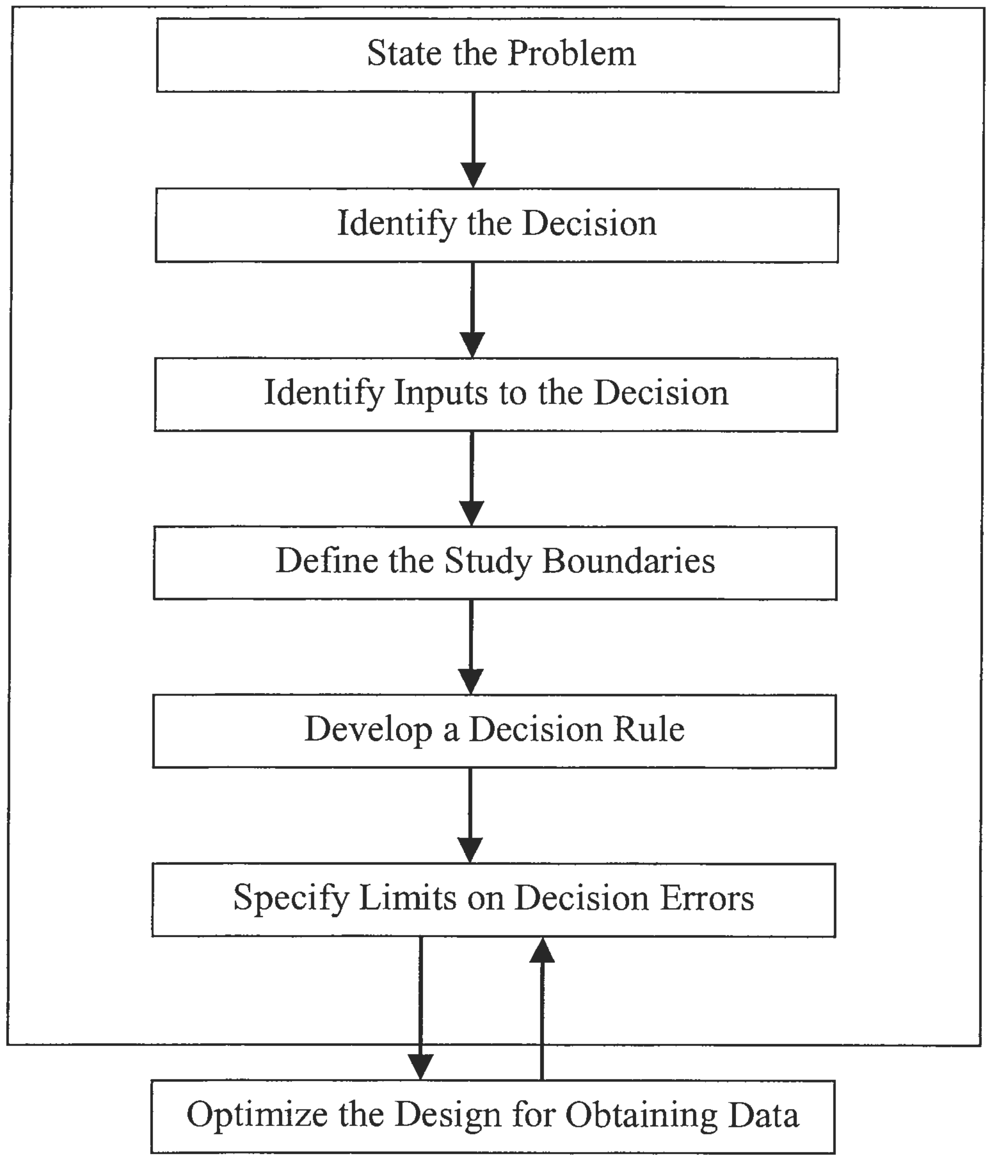
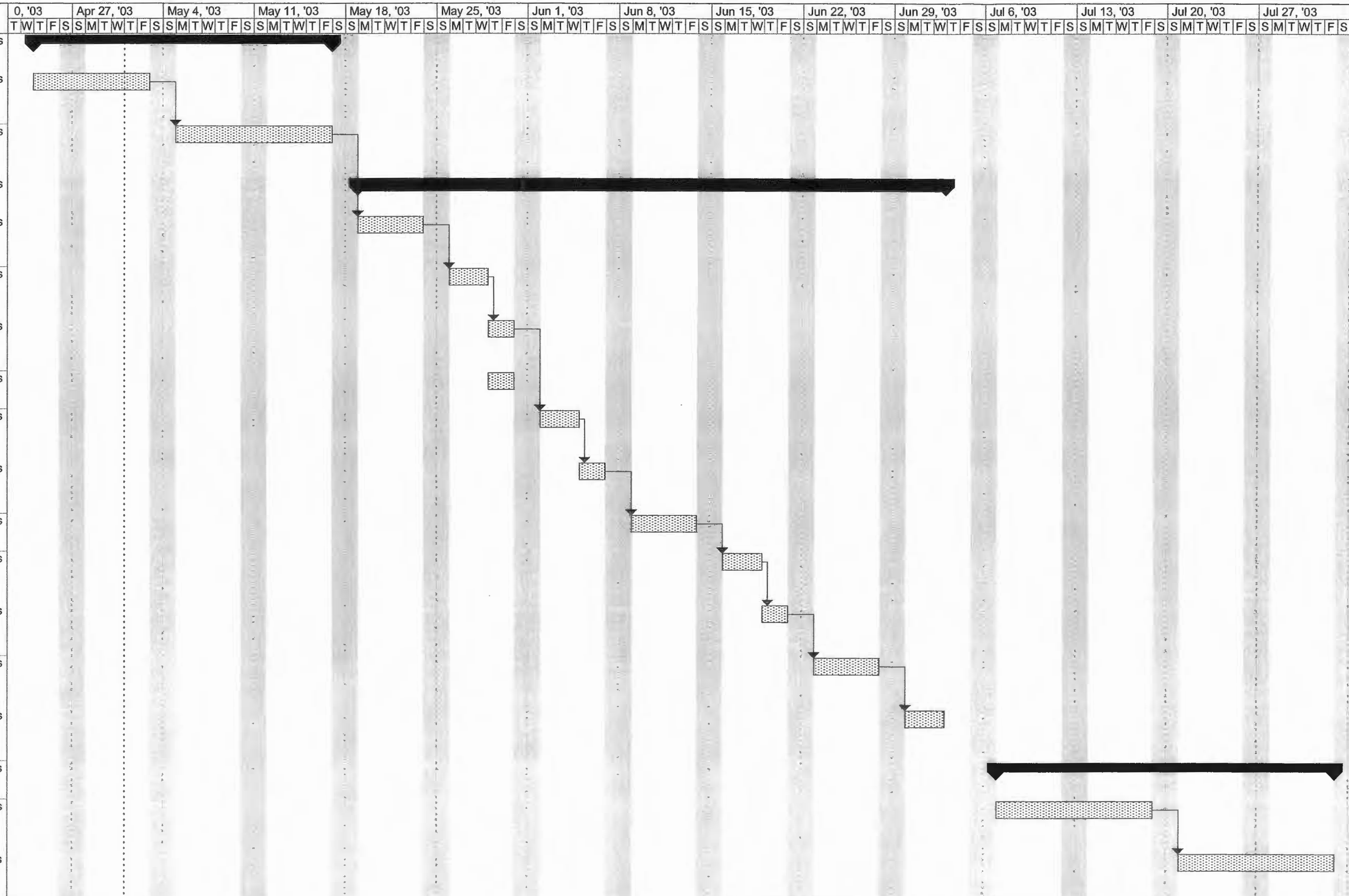


Figure 12
EPA Quality Assurance Management Staff's
Data Quality Objectives Process
(Guidance for the Data Quality Objectives Process, EPA/600/R-96/055, Sept 1996)

Figure 13
Project Schedule
SEAD-12 Supplemental RI
Seneca Army Depot Activity, Romulus, NY

ID	Task Name	Duration
1	**Prepare Work Plan**	17 days
2	Preparation of Draft Work Plan	7 days
3	Review and Revision of Work Plan	10 days
4	**Field Work**	33 days
5	Installation of 9 Temporary Wells	5 days
6	Sampling of Temporary Wells	3 days
7	Surface Water/Sediment Sampling	2 days
8	Data Review and Anlaysis	2 days
9	Installation of 6 Temporary Wells	3 days
10	Sampling of Temporary Wells	2 days
11	Data Review and Analysis	5 days
12	Installation of 7 Permanent Wells	3 days
13	Development of Permanent Wells	2 days
14	EM-5/Class 3 Areas Investigation	5 days
15	Sampling of Permanent Wells	3 days
16	**Prepare Report**	20 days
17	Preparation of Draft Report	10 days
18	Review and Revision of Report	10 days



Project: schedule
Date: Thu 5/1/03

Task | Milestone | Project Summary | External Milestone
Progress | Summary | External Tasks | Deadline

FIGURE 14
PROJECT TEAM ORGANIZATION FOR THE SUPPLEMENTAL RI AT SEAD-12
SENECA ARMY DEPOT ACTIVITY