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REMEDIAL DESIGN WORK PLAN

Duva Inactive Hazardous Waste Site
NYSDEC Site No. 7-34-051
Town of Clay, New York

Prepared as Required by
NYSDEC Order on Consent
Index No. A7-0300-93-04

Revision No.: 1

Date Issued: 9/14/93

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CONESTOGA-ROVERS & ASSOCIATES

TABLE OF CONTENTS

Page

1.0 INTRODUCTION 1
1.1 GENERAL 1
1.2 BACKGROUND 2
1.2.1 Site Location 2
1.2.2 Site History 2
1.2.3 Previous Investigations 4
1.2.3.1 1989 Soil Sampling Program 4
1.2.3.2 Soil IRM Investigations 4
1.2.3.3 1989 Groundwater Sampling Program 5
1.2.3.4 1990 Indoor Air Monitoring 6
1.2.3.5 Remedial Investigation 6
1.2.4 Interim Remedial Measures Implemented To Date 8
1.2.4.1 Groundwater Interim Remedial Measures 8
1.2.4.2 Soils Interim Remedial Measures 9
1.2.5 Nature and Extent of Contamination 9
1.2.5.1 General 9
1.2.5.2 Soils 10
1.2.5.3 Groundwater 13
1.2.5.4 Sediment and Surface Water 15
1.2.5.5 On-Site Air 15
1.2.6 Soil Vapor Extraction Pilot Study 16
1.3 REMEDIAL ACTION GOALS AND OBJECTIVES 17
1.4 SCOPE OF WORK 18

2.0 SOIL MODIFICATION REPORT 21

3.0 REMEDIAL DESIGN ACTIVITIES 22
3.1 DESIGN APPROACH 22
3.1.1 SVE System 22
3.1.2 Area #3 Excavation 23
3.1.3 Impermeable Cover 23
3.1.4 Existing Groundwater Treatment System 24
3.2 DESIGN PLANS AND SPECIFICATIONS 24
3.3 PROJECT SUPPORT PLANS 24
3.3.1 Health and Safety Plan 25
3.3.2 Sampling, Analysis and Monitoring Plan 26
3.3.3 Construction Quality Assurance Project Plan 26
3.3.4 Operations, Maintenance, and Monitoring Plan 27
3.3.5 Administrative Permitting Plan 28
3.3.6 Site Management Plan 29
3.3.7 Citizen Participation Plan 29

TABLE OF CONTENTS

Page

3.4 RD REPORT 30

4.0 MONITORING AND MAINTENANCE 32
4.1 PERFORMANCE STANDARDS 32
4.1.1 Cleanup Levels 32
4.1.1.1 Air Emission Criteria 32
4.1.1.2 Soil Treatment Levels 32
4.1.1.3 Groundwater Cleanup Levels 33
4.1.2 Operation Effectiveness 33
4.1.2.1 Groundwater Level Monitoring 33
4.1.2.2 Sampling of Groundwater Treatment System Discharge 33
4.1.2.3 Sampling of Air Emissions 33
4.1.2.4 Soil and Subsurface Gas Sampling 34
4.1.3 System Review and Re-Evaluation 34
4.1.3.1 Petition to Shutdown Remedial Systems 34
4.2 SYSTEM OPERATIONS MONITORING 36
4.3 SYSTEM INSPECTION AND MAINTENANCE 36
4.3.1 SVE System Maintenance 36
4.3.2 Groundwater Treatment System Maintenance 37
4.3.3 Impermeable Cover Maintenance 37
4.4 OPERATION AND MONITORING 38
4.4.1 Groundwater Sampling 38
4.4.2 Soil Sampling 38
4.4.3 Air Sampling 39

5.0 WASTE HANDLING 40
5.1 CONSTRUCTION/IMPLEMENTATION 40
5.1.1 Soils 40
5.1.2 Groundwater 40
5.1.3 Miscellaneous Debris 40
5.1.4 Equipment Cleaning and Decontamination Waters 41
5.2 OPERATION 41

6.0 PROJECT REPORTING AND SCHEDULE 42
6.1 PROJECT REPORTING 42
6.1.1 Monthly Reports 42
6.1.2 RD Submittals 42
6.2 PROJECT SCHEDULE 42

LIST OF FIGURES
(Following Report)

FIGURE 1.1	SITE LOCATION
FIGURE 1.2	SITE LAYOUT
FIGURE 1.3	TOTAL VOC CONCENTRATIONS IN SURFACE SOILS (0 - 6")
FIGURE 1.4	TOTAL VOC CONCENTRATIONS IN SUB-SURFACE SOILS (18 - 30")
FIGURE 1.5	TOTAL VOC CONCENTRATIONS IN SUB-SURFACE SOILS (>30")
FIGURE 1.6	TOTAL VOC CONCENTRATIONS IN GROUNDWATER
FIGURE 1.7	TOTAL VOC CONCENTRATIONS SURFACE WATER AND SEDIMENT SAMPLES
FIGURE 3.1	CONCEPTUAL FULL SCALE SVE TRENCH SCHEMATIC
FIGURE 3.2	CONCEPTUAL SVE TRENCH AND TREATMENT SYSTEM
FIGURE 6.1	PROPOSED RD/RA PROJECT SCHEDULE

1.0 INTRODUCTION

1.1 GENERAL

The Duva Property (referred to herein as "Site") is located in the Town of Clay, New York and is listed on the New York State Department of Environmental Conservation (NYSDEC) Registry of Inactive Hazardous Waste Disposal Sites in New York State as Site #7-34-057. A Remedial Investigation/Feasibility Study (RI/FS) program was completed for the Site in 1992 and a Record of Decision (ROD), dated March 1993, was prepared and issued by the NYSDEC. The ROD identified the remedial action plan for the Site which includes the following:

i) continued operation, maintenance and monitoring of the existing groundwater collection and treatment system;

ii) continued operation, maintenance and monitoring of the indoor air contaminant migration system;

iii) implementation of dual in-situ soil vapor/groundwater extraction;

iv) installation of a permanent impermeable cover over the remediation area;

v) development and implementation of long-term land use restrictions; and

vi) monitoring and evaluation of the effectiveness of the installed remedy.

This Remedial Design (RD) Work Plan has been developed to provide a framework for implementation of the remedial design and remedial action, and includes a summary of steps to be taken to complete and implement the design.

1.2 BACKGROUND

1.2.1 Site Location

The Site is located in the Town of Clay, New York approximately four miles north of the City of Syracuse, New York. The Site encompasses former agricultural land and is situated south of West Taft Road and immediately north of a residential development, Platinum Drive. The general location and layout of the Site are illustrated on Figures 1.1 and 1.2, respectively.

Property immediately to the south and west of the Site consists of recently constructed, single family residential homes; property immediately east and north of the Site consists of undeveloped land. All residential development in the vicinity of the Site is serviced by municipal water and sewer.

The Site occupies approximately five acres of land and is secured with a chain-link fence. The Site itself is partially wooded with heavier vegetation lying immediately to the east. The surface of the Site is grassed and gently slopes from north to south. The topography of the Site and significant surficial features are illustrated on Plan 1 (Site Topographic Plan) of the RI Report, dated April 1, 1992.

1.2.2 Site History

The complete history of the Site is presented in the RI Report. A summary of the Site history is presented below.

The Site was originally owned by Mr. Peter Duva who operated a truck farm business on the property. In December 1986, Mr. Duva sold the property to Donald W. Miller, Inc. Mr. Duva subsequently passed away and Mr. Duva's interests in the Site were assumed by the Duva Estate.

In mid-1987, residents of the adjacent properties contacted the NYSDEC and reported the presence of drums on the Site. In July 1987, the NYSDEC inspected the Site and found numerous drums staged in three separate areas of the property (refer to Figure 1.2). The NYSDEC reportedly collected several samples of the drummed material and of stained soils near the drums. Some of the drum contents and surrounding soils were found to contain resins and low levels of solvents.

Mr. Duva, Donald W. Miller, Inc., and General Electric Company were subsequently identified by the NYSDEC as potentially responsible parties (PRPs) for the Site.

In late 1988, the drums were removed from the Site and disposed of at an appropriate off-Site disposal facility under the direction of the NYSDEC.

In mid 1989, the basement sumps of several homes adjacent to the Site were found to contain solvents. The basement sumps in four homes located immediately adjacent to the Site were subsequently sealed in an enclosure and vented to the outside. An interim remedial measures (IRM) program was later implemented to address groundwater contamination attributable to the Site. The groundwater IRM work activities began in mid 1990 and included the installation and operation of a groundwater collection trench and sump on the downgradient side of the Site and the installation and operation of an on-Site water treatment plant.

In August 1989, the NYSDEC listed the Site on the "Registry of Inactive Hazardous Waste Disposal Sites in New York State" and classified it as a Class 2 site. A Class 2 site is defined as a "significant threat to the public health or environment - action required". At that time, the PRPs were requested by the NYSDEC to investigate and remediate potential soil contamination at the Site. An Interim Remedial Measures program for soils and an RI/FS were subsequently implemented at the Site.

The results of the various programs implemented at the Site are summarized in the sub-sections which follow.

1.2.3 Previous Investigations

The following discussion briefly summarizes each sampling program. Available data and associated documentation from each is presented in the RI Report.

1.2.3.1 1989 Soil Sampling Program

In January 1989, after the drum and soil removal project was complete, the remaining soil in the three drum staging areas was sampled by J.D. Plumley Engineering, P.C. of Syracuse, New York. A total of 29 sample aliquots were collected and composited in six samples for analyses. Each composite sample represented a suspected "hot spot" within the former drum staging areas.

1.2.3.2 Soil IRM Investigations

Implementation of the soil IRM Program began in July 1990 under the terms and conditions of an Order on Consent (Index No. A7-0232-90-05) entered into by the NYSDEC and the PRPs. The soil IRM Program consisted of the performance of three major tasks, as identified in the soil IRM Work Plan, which included:

i) investigation/characterization of soils by performance of a magnetometer survey of the Site and the collection of soil samples;

ii) removal of significantly contaminated soils, if any, which represent an imminent risk or hazard to public health or the environment; and

iii) temporary securement/isolation of residually contaminated soils remaining on Site, if appropriate.

The field investigative component of the soil IRM Work Plan consisted of a field survey to establish horizontal control; performance of a magnetometer survey over the Site; the screening of surficial soils for organic vapors; and the collection and analysis of surficial and subsurface soil samples for volatile organic compounds (VOCs). This work was conducted by Conestoga-Rovers & Associates (CRA) on behalf of the PRPs in July 1990.

The data from this investigation has been presented in the report entitled "Soil Interim Remedial Measures, Interim Data Report, Duva Property, Town of Clay, New York", dated September 1990 (CRA).

Based on the soil IRM data, the soils located within or adjacent to the former disposal areas did not appear to represent an imminent threat to human health or the environment. However, in order to address visual contamination observed in the soil which had been stockpiled on Site during the original drum removal program, the removal and off-Site disposal of this soil had been recommended and was performed in early 1991.

1.2.3.3 <u>1989 Groundwater Sampling Program</u>

In mid 1989, a groundwater investigation program which included the installation and sampling of four groundwater monitoring wells and sampling of adjacent residential basement sumps, was implemented.

In May 1989, the New York State Department of Health (NYSDOH) sampled basement sumps in homes adjacent to the Site. Samples were analyzed for VOCs.

In June 1989, four groundwater monitoring wells were installed and groundwater samples were collected from each of the four monitoring wells and analyzed for VOCs.

The analytical data obtained from these sampling events were previously reported in the document entitled "Interim Remedial Measures, Duva Property, Town of Clay, New York, Site Code 7-34-051, Volume III", March 23, 1990 (Malcolm Pirnie). Additional data which have been generated during the on-going operation of the groundwater collection trench and on-Site water treatment plant and which are presented under separate cover include: water level measurements, analytical data for extracted groundwater and analytical data from adjacent monitoring wells.

1.2.3.4 1990 Indoor Air Monitoring

Indoor air monitoring was conducted in four homes immediately adjacent to the southeast perimeter of the Site by NYSDOH in January and March 1990. This monitoring was intended to determine the impact the Site may have had on air quality within the adjacent homes and the effectiveness of the corrective measures which had been implemented to seal and vent the basement sumps of these same residences located immediately downgradient of the Site earlier in 1990.

In March 1992, additional monitoring of the indoor air quality in four homes adjacent to the southeast perimeter of the Site was performed by Malcolm Pirnie, Inc. in consultation with the Weinberg Consulting Group.

The results of indoor air sampling performed to date are summarized in the "Remedial Investigation Report", dated March 31, 1992.

1.2.3.5 Remedial Investigation

The characterization of the nature and extent of contamination at the Site was achieved through the completion of the various

field activities as proposed in the approved RI/FS Work Plan. These activities included the following:

i) topographic survey of the Site;

ii) magnetometer survey of the area north and west of the Site;

iii) collection of soil samples for the development of a Site Specific Parameter List (SSPL);

iv) investigation of surficial and/or shallow subsurface soils in the area north and east of the westernmost drum staging area;

v) collection of subsurface soil samples;

vi) excavation of test pits;

vii) installation and sampling of three monitoring wells within the till unit and five shallow monitoring wells within the shallow sand unit overlying the till;

viii) collection of surface water and sediment samples in drainage swales and ponded areas upstream and downstream of the drum staging areas; and

ix) related air monitoring.

All results, data and figures produced relating to these activities are presented in the "Remedial Investigation Report", dated March 31, 1992.

1.2.4 Interim Remedial Measures Implemented To Date

Two separate programs, one for groundwater and one for soils, have been developed and implemented as interim remedial measures for the Site. These programs are discussed below.

1.2.4.1 Groundwater Interim Remedial Measures

In June 1989, an interim remedial measures program was implemented pursuant to the Order on Consent (Index No. A7-0225-90-03) to address off-Site contaminated groundwater migration. This program, conducted by Malcolm Pirnie, Inc., included: installation of groundwater piezometers; and the design and construction of a groundwater collection trench to intercept groundwater beneath the Site and prevent its migration off Site. The primary components of the system include:

i) a subsurface collection drain and collection manhole at the downgradient perimeter of the Site which collects groundwater from the alluvium material situated above the lower permeability till unit;

ii) a buried forcemain to convey collected groundwater from the collection trench to the on-Site water treatment plant;

iii) an on-Site water treatment plant which utilizes carbon adsorption for treatment of organics and chemical precipitation for removal of metals (the latter is necessary for removal of iron to meet surface water discharge criteria); and

iv) a buried discharge pipe leading to a tributary of Bloody Brook.

Groundwater collected in the sumps of the downgradient residences which showed the presence of Site contaminants is also pumped into the on-Site collection trench for subsequent treatment at the on-Site water treatment facility.

Details of the design of the groundwater collection and treatment systems were submitted to the NYSDEC in the report entitled "Interim Remedial Measures, Duva Property, Town of Clay, New York", March 23, 1990 (Malcolm Pirnie, Inc.). The system was installed and put into operation during the summer of 1990.

1.2.4.2 Soils Interim Remedial Measures

In July 1990, the field investigation phase of the soil IRM Program was performed in accordance with the approved soil IRM Work Plan. Based on the soil IRM investigative results, it was recommended that soil generated during the original drum removal program and which had been stockpiled on Site be removed and disposed off Site in order to address visual contamination observed in the stockpile. By letter dated November 1, 1990, NYSDEC agreed with the recommendation and further requested that additional soil stockpiled on Site as a result of the groundwater interim remedial measures be removed. The work, as proposed and recommended, was performed during the winter/spring of 1991. A description of activities performed is presented in the "Soil Interim Remedial Measures, Soil Stockpile Removal/Disposal, Final Engineering Report, Duva Property, Town of Clay, New York", dated October 1991.

1.2.5 Nature and Extent of Contamination

1.2.5.1 General

Media investigated at the Site prior to and during the RI consisted of the following:

i) Soils

- background soils,
- surface and sub-surface soils over the entire Site;

ii) Surface Water and Sediments

- on-Site surface water and sediment,
- off-Site, downgradient surface water and sediment;

iii) Groundwater

- overburden (alluvium and underlying till);

iv) Air

- on-Site air quality during active remediation,
- inside air quality in adjacent residences.

The primary Site contaminants are VOCs consisting of trichloroethene, 1,1,1-trichloroethane, 1,2-dichloroethene, tetrachloroethene, toluene, acetone, ethylbenzene and xylene. The most predominant Site contaminant is trichloroethene. The distribution of contaminants within these media is illustrated on Figures 1.3 to 1.7, inclusive, and is further described in the sections which follow.

1.2.5.2 Soils

Background Soils

None of the Target Compound List (TCL) VOCs were detected in the background samples except for trichloroethene. Trichloroethene was detected at estimated concentrations below the practical quantitation limits.

Base/Neutral Acid extractables (BNAs), including fluoranthene, pyrene, benzo(a)anthracene, bis(2-ethylhexyl)phthalate, chrysene, benzofluoranthene (b and k isomers), were also detected at estimated concentrations below the practical quantitation limits; no other BNAs were detected.

DDD, DDE, and DDT (which are generally ubiquitous in agricultural areas) were detected in background surficial soil samples at concentrations ranging from 13J µg/kg to 630 µg/kg. All of the Target Analyte List (TAL) metals were detected within published concentration ranges for natural soils. No cyanide was detected in the background soil samples.

Surficial and Shallow Subsurface Soils

Residual VOC contamination in surficial soils was greatest within or immediately adjacent to the former drum staging areas. Organic vapor concentrations recorded on Site in the upper foot of the soil horizon indicated the greatest levels of residual organic concentrations in surficial soils located along the western limit of the easternmost drum staging area. The apparent zone of contamination, based on organic vapor concentrations, extends from the northern limit of the eastern most drum storage area, runs southward along a narrow strip located between the two easternmost drum staging areas, and terminates approximately 100 feet south of these areas.

This general distribution of contaminants in the surficial soils was confirmed by the analytical results for the surficial soil samples collected on Site. Concentrations of total VOCs in surficial soils within or immediately adjacent to the former drum staging areas ranged up to 225 ppm. Total VOCs in adjacent surficial soils decreased rapidly with distance from the staging areas and are generally less than 1 ppm. No significant VOC contamination was detected in the surficial soils from the westernmost drum staging area.

The relative distribution of contaminants in the shallow subsurface soils (18 to 30 inches) is generally consistent with the surface soils. The concentrations of VOCs were, however, generally higher in this zone and ranged up to approximately 7,300 ppm with the highest VOC concentrations reported within or immediately adjacent to the former drum staging areas.

Subsurface Soils

The primary VOCs detected in the on-Site subsurface soils consisted of: 1,1,1-trichloroethane, trichloroethene, tetrachloroethene, 1,2-dichloroethene, toluene, ethylbenzene, and xylenes.

The distribution of contaminants in the subsurface soils was generally consistent with the distribution noted in the surficial soils. VOCs were present at elevated concentrations beneath and downgradient of the drum staging areas. VOCs reported in the sub-surface soils were generally present at higher concentrations than the overlying surficial soils.

Total VOC levels in the westernmost former drum staging areas were generally less than 1 ppm in the shallow subsurface soils and in the deeper subsurface soils.

Subsurface soil contamination in the two easternmost drum staging areas did not extend significantly beyond the eastern and western limits of the drum staging areas. VOC contamination within and/or between the two easternmost former drum staging areas was present up to depths ranging from about 4 feet to 30 feet. VOC contamination downgradient of the eastern drum staging areas was generally present to a maximum depth of approximately 10 feet below ground surface (BGS).

The highest total VOC concentrations reported in any on-Site sample was 41,329 ppm from a depth of 8 to 9 feet below grade at Station B/1+00. The sample was collected from a sand pocket encountered within the till. The sand pocket and associated VOC concentrations were not detected in any adjacent boreholes indicating that the sand pocket is a very localized feature.

The greatest concentrations of VOCs in the remaining sub-surface soils appeared at or above the till contact beneath and downgradient of the easternmost drum staging areas. Soils above the till contact tended to be consistently wet to moist and displayed the highest concentrations of VOCs throughout the Site suggesting this zone represents the primary contaminant

migration pathway at this Site. The lower permeability till underlying the Site appears to retard the vertical migration of groundwater and contaminants. This is confirmed by the rapid decrease in VOC concentrations with depth in the till where samples were collected.

1.2.5.3 Groundwater

As was anticipated due to the dense, low permeability nature of the till beneath the Site, groundwater analyses confirmed the most significant groundwater contamination is present on Site in the lacustrine sands overlying the till. The highest estimated total VOC concentrations of 281.136 ppm and 342.816 ppm were reported in monitoring well MW-6, a shallow well completed above the till contact. Total VOC concentrations were several orders of magnitude lower in monitoring well MW-7 (1.569J ppm and 0.887J ppm), the deeper well of the pair completed in the till. VOC concentrations were also lower in monitoring well MW-1 (0.290J ppm and 1.526J ppm) located downgradient of MW-6 on the downgradient side of the groundwater collection trench.

The significantly lower concentrations of VOCs in the till further suggest this layer is retarding the vertical migration of contaminants at the Site.

The significant reduction in contaminant concentrations in MW-1, MW-10, MW-2, MW-9 and MW8, immediately downgradient of the groundwater collection trench, confirm the trench is effectively containing contaminants to the Site. Fluctuations in VOC concentrations in well MW-1 (as well as others on Site) appears to be related to groundwater conditions with higher concentrations reported during relatively dry periods. As a result, no reduction in VOC concentrations have been observed in this well.

No significant concentrations of VOCs were reported in the remaining monitoring wells installed on or adjacent to the Site. Consequently, the lateral extent (east-west) of on-Site groundwater contamination has been

defined and is limited in an east-west or cross-gradient direction. This pattern of contamination is consistent with what would be expected from a discreet source of contamination such as the drum staging areas.

Monitoring well MW-13, installed adjacent to Platinum Drive, downgradient of the Site, had reported total VOC concentrations of 1.26J ppm, 0.067 ppm, 0.013 ppm and 0.007J ppm during the four events it was sampled. These results, presented in their sequence of collection, indicate a significant decrease in concentrations of total VOCs has occurred over time.

VOCs were reported during one event only at 0.004J ppm in monitoring well MW-12, located west of MW-13. The samples collected from temporary probes advanced downgradient of MW-13 were also reported to contain residual low level VOCs.

No significant VOC concentrations were reported in samples collected from MW-14, MW-15, and MW-16 which are downgradient of MW-13. Samples collected from MW-17, immediately downgradient and to the east of MW-13, showed decreasing levels of VOCs in consecutive sampling rounds.

The analytical results from samples collected from downgradient monitoring wells have clearly identified the terminus of the contaminated plume and have delineated the extent of the off-Site migration of contaminants. Additionally, the analytical data indicated a reduction in the spread of contaminants off Site. This reduction in the concentration of VOCs over time indicate that the projects undertaken to date have been successful in reducing the off-Site spread of contamination from on-Site source areas.

A complete description of off-Site groundwater sampling activities and a presentation of associated results are presented under separate cover in the report entitled, "Off-Site Investigation, Addendum, Duva Property, Town of Clay, New York".

1.2.5.4 Sediment and Surface Water

Surface water and sediment samples were collected at two on-Site and three downgradient off-Site locations.

VOCs were not detected in any of the off-Site surface water samples collected. VOCs were detected in the off-Site sediment samples at total VOC concentrations ranging from 0.164 ppm to 0.260 ppm.

VOCs were detected in both on-Site surface water and sediment samples. The highest total VOC concentrations reported were 1.167(J) ppm for surface water and 0.168(J) ppm for sediment at a location immediately downgradient of the easternmost drum staging area. Significantly lower concentrations of VOCs were reported in the surface water and sediment samples collected downgradient of the westernmost drum staging area.

The results indicate residual soil contamination at the Site has had a limited effect on on-Site surface water and sediment quality and a negligible effect on sediment located off-Site. No effect on off-Site surface water was observed.

1.2.5.5 On-Site Air

Total VOCs were measured in the worker breathing zone and around the perimeter of active work areas during all ground intrusive activities conducted at the Site. Although VOCs were detected in the immediate vicinity of some soils disturbed during the investigation, total VOC concentrations rapidly dissipated and no effects on air quality were noted downwind of the active work zones.

Undisturbed soils at the Site are not expected to have any significant effect on ambient air quality based on existing Site conditions including:

i) the vegetative cover established over the on-Site soils;

ii) reported concentrations and limited areal extent of contaminants in the surficial soils; and

iii) lack of any surface discharge of sub-surface contaminants.

This scenario is supported by the fact that even disturbed contaminated soils, which would have the greatest potential effect on ambient air quality, had a minimal effect on air quality at the Site.

1.2.6 Soil Vapor Extraction Pilot Study

In mid 1992, a soil vapor extraction (SVE) pilot study was performed at the Site by Vapex Environmental Technologies, Inc. (Vapex). The objectives of the pilot study were to evaluate the feasibility of soil vapor extraction (SVE) and, if appropriate, develop a conceptual design parameter for utilizing SVE to remove the VOCs from contaminated subsurface soil at the Site. The results of this study were presented in the report entitled, "Report on the Results of the Soil Vapor Extraction Feasibility Study at the Miller/Duva Site in Clay, New York", dated October 1992. Conclusions presented in the report include:

i) Subsurface soils at the Site can be categorized into three primary strata: an approximate 2.5 to 3.0 foot thick upper zone of sand/fill alluvium underlain by a 2.5 to 3.0 foot thick zone of wet soft/till transitioning to a dense till. Groundwater is generally encountered at depths ranging from 2 to 4 feet below grade.

ii) The majority of elevated VOC concentrations are found within the alluvium and soft till in the vicinity of the two eastern former drum staging areas. VOCs are present in the dense till but appear to be most prominent in the upper two feet of the till.

iii) The removal of VOCs from Site soils utilizing vacuum extraction will require the implementation of dual phase vacuum extraction for the dewatering of the alluvium and soft till and the reduction in the moisture content of the dense till.

iv) The installation of an impermeable cover across the entire remediation area will be required to control infiltration and limit short circuiting of air flow.

v) The dual phase vacuum extraction system should utilize horizontal trench wells as the primary type of extraction well. The trench wells should be installed into the top two to three feet of the dense till. Trenches should be oriented perpendicular to the direction of groundwater flow at a spacing of 40 to 45 feet on center and should be designed to operate as both extraction wells and air inlet wells. Trench wells should be operated at a vacuum of approximately 15 inches of Hg to achieve an air flow rate of 1.5 scfm per foot of trench and a pore volume exchange rate of approximately 2,500 to 3,000 pore volumes per year.

vi) It is estimated that the majority of VOCs detected in Site soils (within the alluvium and soft till soil stratas) will be removed over the initial 2.5 to 3.5 years of dual phase vacuum extraction operation. However, testing indicates that an overall operating duration of eight to ten years will likely reduce VOC soil concentrations by 90 percent in the upper dense till.

1.3 REMEDIAL ACTION GOALS AND OBJECTIVES

The primary goal of the remedial action is to protect human health and the environment. The Remedial Action Objectives (RAOs) for the Site are:

i) to prevent or mitigate the migration of Site-related contaminated soils and groundwater, both on-Site and downwind or downgradient from the Site;

ii) to remediate Site-related contaminated soils and groundwater to the point where leachate from the soils and on-Site groundwater is eliminated or does not present an unacceptable health risk;

iii) to monitor groundwater and sample soils in a manner to verify the effectiveness of any remedial measures performed; and

iv) to minimize future Site restrictions to the maximum extent practical in order to allow for potential unimpeded future use of the Site.

Specific media cleanup levels for the Site are identified in the ROD. In the event that the cleanup levels cannot be reached by the continued operations of the dual SVE/groundwater extraction system and the remaining contamination does not pose risk to human health and the environment, it may be requested that the SVE system be discontinued.

1.4 SCOPE OF WORK

The Remedial Design tasks include the preparation of:

i) a Soil Modification Report, which evaluates the effectiveness of following support technologies to reduce time required to achieve the RAOs in a cost effective manner:

- deep soil mixing;
- pneumatic soil fracturing;
- surface tilling;
- upgradient groundwater collection trench;

ii) a detailed description of the remedial objectives and the means by which each essential element of the selected remedial alternative will be implemented to achieve those objectives;

iii) detailed design drawings and specifications in sufficient detail to allow the construction and startup of the dual SVE/groundwater collection system, modifications to the existing groundwater treatment system (if required), construction of the air/soil vapor treatment system, and the construction of impermeable cover;

iv) a time schedule to implement the RD;

v) a Health and Safety Plan;

vi) an Emergency Response Plan;

vii) a Sampling, Analysis and Monitoring Plan which includes a description of any monitoring, if appropriate, needed during implementation of Remedial Design/Remedial Action (RD/RA) and any periodic groundwater monitoring of wells, if appropriate;

viii) an Administrative Permitting Plan which identifies all local, State or Federal permits or authorization and access agreements, if any, required to implement the remedial action;

ix) a Site Management Plan;

x) a Construction Quality Assurance Project Plan including a contingency plan to be implemented if any element of the RD fails;

xi) a Draft Operation, Maintenance and Monitoring Plan; and

xii) a Citizen Participation Plan.

The above-mentioned documents will be incorporated into a report detailing the RD to be submitted to the NYSDEC.

Upon approval of the RD, the following remedial action tasks will be implemented:

i) excavation and backfilling of Area #3 (soil from Area #3 will be transferred to Areas #1 and #2);

ii) construction and startup of the dual SVE/groundwater extraction system and the soil vapor treatment system, and modification of the existing groundwater treatment system, if required;

iii) construction of an impermeable cap over the remediation area;

iv) if determined to be necessary, implementation of selected soil modification methods, or construction of an upgradient groundwater collection trench;

v) preparation of the final Operation, Maintenance and Monitoring Plan; and

vi) long-term operation, maintenance and reporting.

2.0 SOIL MODIFICATION REPORT

A soil modification report will be prepared and submitted to the NYSDEC prior to finalization of the remedial design. This report will evaluate the effectiveness of the following support technologies to reduce the overall estimated soil remedial time of eight to ten years in a cost effective manner:

i) deep soil mixing;
ii) pneumatic soil fracturing;
iii) surface tilling; and
iv) upgradient groundwater collection trench.

Deep soil mixing, pneumatic soil fracturing and surface tilling are intended to increase soil/air permeability while the upgradient groundwater collection trench is intended to decrease the volume of groundwater required to be treated. These technologies will be evaluated based on, but not limited to, the following criteria:

i) implementability;
ii) effectiveness; and
iii) cost.

A report will be prepared to describe the technologies, to present the results of the evaluation and to recommend if any of the technologies should be implemented.

The Soil Modification Report will be submitted to NYSDEC for approval prior to completion of the remedial design. If the Soil Modification Report recommends the use of these technologies, they will be implemented with the remedial action. See Section 6.0 for the project schedule.

3.0 REMEDIAL DESIGN ACTIVITIES

3.1 DESIGN APPROACH

There are several components or systems that must be designed, constructed and/or implemented to complete the remedial action for the Site. The conceptual design aspects of each of these components are discussed in the following sections. Modification of the design aspects discussed below may be necessary during completion of the design.

3.1.1 SVE System

The SVE remediation area will encompass the two eastern former drum staging areas (see Figure 3.1). Contaminated soil from the western former drum staging area (Area #3) will be excavated and transferred to the SVE remediation area.

The design of a dual phase SVE system for the Site will be based on the conclusions and design criteria specified in the Vapex pilot study report (see Section 1.2.6). The conceptual design elements for the SVE system will consist of the following:

i) extraction trenches;
ii) air vent wells;
iii) vacuum system;
iv) air treatment system; and
v) process control system.

Figures 3.1 and 3.2 illustrate the conceptual layout of the SVE trench and air treatment system.

Groundwater/soil vapor extraction trenches may consist of perforated high density polyethylene (HDPE) piping (4 or 6-inch diameter) installed in a peagravel bed and sloped from the ends towards the center. A low

sump in the center will collect groundwater which will then be conveyed to the groundwater treatment system. Air vents, in the form of wells or trenches, will be installed between the trenches to introduce non-contaminated air and to enhance pore volume exchange, and may be uniformly spaced over the remediation area. The extracted air stream will be treated by vapor phase carbon adsorbers for removal of VOCs prior to discharge to atmosphere. The process controls for the SVE system will be integrated with those of the groundwater treatment system.

3.1.2 Area #3 Excavation

Potentially contaminated vadose zone soil from former drum staging Area #3 will be excavated from the approximate boundaries identified on Figure 3.1. The actual limits of vadose zone soil excavation will be based on soil sampling and comparison to the Site-specific soil cleanup levels. Determination of these levels is discussed in Section 4.1.1.2. The Area #3 excavation will be backfilled with clean imported fill soils upon receipt of NYSDEC approval.

3.1.3 Impermeable Cover

An impermeable cover will be installed over the remediation area after construction of the SVE extraction trench system and completion of the excavation/transferring of potentially contaminated soil from Area #3 to the remediation area.

The conceptual design for the impermeable cover consists of:

i) 12-inch thick layer of compacted clay or a synthetic/composite liner;
ii) 6-inch thick layer of sand;
iii) 6-inch thick layer of topsoil; and
iv) vegetative cover.

The clay layer will be compacted to achieve a hydraulic conductivity of 1×10^{-7} cm/sec or less. A 6-inch thick layer of clean sand will be placed on top of the compacted clay to protect the clay and facilitate lateral drainage. Six inches of topsoil will be placed over the sand and will be seeded and mulched to promote vegetation and protect the cover from erosion.

3.1.4 Existing Groundwater Treatment System

If necessary, the existing groundwater treatment system may be modified to accommodate the treatment of additional groundwater to be collected as part of the dual phase SVE system.

3.2 DESIGN PLANS AND SPECIFICATIONS

Design plans and specifications will be prepared to construct and implement the remedial actions for the Site and will be required for the following:

i) SVE system, including the air treatment system;
ii) excavation and backfilling of Area #3;
iii) construction of the impermeable cover; and
iv) modification of the existing groundwater treatment system, if necessary.

These plans and specifications shall satisfy all applicable local, State and Federal laws, rules and regulations.

3.3 PROJECT SUPPORT PLANS

Project-specific documents will be developed to support the implementation of the RD/RA and will include the following:

i) Health and Safety Plan (HASP), including an Emergency Response Plan;
ii) Sampling, Analysis and Monitoring Plan (SAMP);
iii) Construction Quality Assurance Project Plan (CQAPP);
iv) Operations, Maintenance and Monitoring Plan (OMMP);
v) Administrative Permitting Plan;
vi) Site Management Plan; and
vii) Citizen Participation Plan.

These documents are described in the subsections which follow.

3.3.1 Health and Safety Plan

A HASP will be included as an appendix to the RD and will be developed to detail activities to be performed at the Site for the protection of persons at and in the vicinity of the Site during construction and after construction of the RD. The approved RI/FS HASP, dated November 1990, will be modified, as appropriate, to include the remedial action construction and implementation activities. The HASP will be prepared in accordance with 29 CFR 1910.

The HASP will include personnel responsibilities, protective equipment requirements, decontamination procedures, training requirements, medical surveillance requirements and an emergency response plan. The emergency response plan will consist of a list of appropriate regulatory and emergency agencies to be notified in the event of an emergency, telephone numbers, and routes to emergency medical care facilities. The emergency plan will be implemented in case of an emergency or special condition, including but not limited to equipment breakdowns, fire, odor, explosion and spills or releases of hazardous or toxic substances.

3.3.2 Sampling, Analysis and Monitoring Plan

A SAMP will be developed to describe in detail the various sampling activities to be undertaken at the Site during the RD/RA and will include an analytical Quality Assurance Project Plan. Sampling activities may include, if appropriate, periodic sampling and water level measurements of groundwater monitoring wells on and/or off Site.

The SAMP will include a discussion of the types of samples, sampling locations, the sampling protocols, analytical parameters and protocols, the data quality objectives, and data validation requirements. In addition, a sampling schedule will be included.

3.3.3 Construction Quality Assurance Project Plan

A CQAPP will be prepared to ensure, with a reasonable degree of certainty, that complete Remedial Action meets or exceeds all design criteria, plans, and specifications. At a minimum, the CQAPP will include the elements that are summarized below:

i) quality assurance objectives;

ii) responsibility and authority;

iii) construction quality assurance personnel qualifications;

iv) CQAPP staffing requirements;

v) inspection activities;

vi) types and frequency of inspection and testing activities;

vii) sampling requirements;

viii) documentation of CQAPP activities;

ix) inspection/testing passing and failure criteria; and

x) contingency plan for instituting corrective action if any element of the RD/RA fails to achieve any of its design objectives.

3.3.4 Operations, Maintenance, and Monitoring Plan

A draft OMMP will be developed for submittal along with the RD. The draft OMMP will describe operations, maintenance, and monitoring activities to be undertaken after approval of the construction of the RD. After completion of the RD activities and RA construction activities, the draft OMMP will be revised, as appropriate, and a final OMMP will be submitted to the NYSDEC.

The OMMP will cover both implementation and long-term operation of the remedial system. The existing groundwater treatment system operations manual will be revised, as required, and included in the final OMMP. The OMMP will detail the following:

i) operating procedures (including equipment operation manuals provided by the manufacturers) for the SVE system, the air and groundwater treatment system;

ii) routine waste handling procedures;

iii) description of potential operating problems;

iv) maintenance procedures for the:

a) security fence,
b) impermeable cover,
c) SVE trench and air vents,

d) vacuum and air treatment systems, and

e) groundwater treatment system;

v) routine inspection requirements;

vi) long-term monitoring testing requirements with references to the SAMP;

vii) corrective action plan;

viii) description of equipment;

ix) records and reporting mechanisms required;

x) shutdown and/or emergency notifications;

xi) emergency response plan; and

xii) an estimate of the number of years during which operation, maintenance and monitoring activities will be performed.

3.3.5 Administrative Permitting Plan

An Administrative Permitting Plan (APP) will be prepared to describe in detail the substantive administrative permitting requirements and actual permits, if any, and/or property access agreements necessary to construct and operate the remedial systems. The APP will also include a schedule for seeking and obtaining such permits and/or access agreements. At a minimum, the following will be reviewed and obtained if required:

i) local grading and building permits;

ii) State Pollutant Discharge Elimination Systems (SPDES) Permitting Program;

iii) the NYSDEC Air Emissions Permitting Requirements;

iv) Stormwater Permitting Program; and

v) property access agreements.

Actual permits (i.e. air emission discharge permit, SPDES permit) may not be required if operation of the remedial systems can be regulated under the terms and conditions of the RD/RA Consent Order. Treated groundwater from the existing Groundwater Treatment System is currently discharged to an off-Site storm sewer system under the terms and conditions of the Groundwater IRM Consent Order (Index No. A7-0225-90-3) which substantively complies with the NYSDEC SPDES requirements.

Building permits may be required to construct the soil vapor treatment system building and other construction activities, as required. Any building permits will be obtained from the Town of Clay.

3.3.6 Site Management Plan

A Site Management Plan (SMP) will be developed to describe in detail the overall management of the RD/RA activities. The selected RD/RA contractor is TreaTek-CRA Company. The SMP will include:

i) a list of key project personnel;
ii) organization structure of the contractor and subcontractor;
iii) a brief description of key project personnel's responsibilities; and
iv) a description of the contractor's previous experience in similar projects.

3.3.7 Citizen Participation Plan

A Citizen Participation Plan (CPP) will be prepared for the Site RD/RA activities. The CPP will be consistent with the NYSDEC publication

"New York State Inactive Hazardous Waste Site Citizen Participation Plan", dated August 30, 1988; the NYCRR Part 375 Inactive Hazardous Waste Site Regulations, effective May 30, 1992; and the NYSDEC memorandum, dated October 28, 1992, entitled, "Citizen Participation Requirements Contained in Part 375 - Interim Guidance".

Fact sheets will be developed and/or public information meetings may be held:

i) upon completion of the RD;
ii) prior to start of remedial construction;
iii) after completion of remedial construction; and/or
iv) periodically during the long-term operation of the remedial system.

3.4 RD REPORT

A Remedial Design Report will be prepared and submitted to NYSDEC for approval upon completion of all remedial design activities. The RD report will include the following:

i) a detailed description of the remedial objectives and the means by which each essential element of the selected remedial action (see Section 1.1) will be implemented to achieve those objectives, including, but not limited to:

   a) construction and operation of any structures,

   b) the collection, destruction, treatment and/or disposal of hazardous wastes and substances and their constituents and degradation products and any soil or other material contaminated thereby,

   c) the collection, destruction, treatment and/or disposal of contaminated groundwater, leachate and air,

   d) physical security and posting of the Site,

e) monitoring, if needed, which integrates needs which are present on and off Site during implementation of the RD/RA;

ii) design plans and specifications as described in Section 3.2;

iii) the project support documents as described in Section 3.3;

iv) a construction schedule;

v) discussion of the design strategy and the design basis;

vi) discussion of the technical factors of importance;

vii) description of assumptions made and detailed justification of these assumptions;

viii) discussion of the possible sources of error and references to possible operation and maintenance problems;

ix) detailed drawings of the proposed design;

x) tables listing equipment and specifications;

xi) tables giving material balances; and

xii) appendices including:

a) sample calculation (one example presented and explained clearly for significant or unique design calculations), and

b) derivation or equations essential to understanding the report.

Upon receipt of approval of the RD, construction of the remedial system will begin.

4.0 MONITORING AND MAINTENANCE

4.1 PERFORMANCE STANDARDS

The following sections discuss the development of performance standards for the remedial systems, methods to determine the effectiveness of the remedial systems and the remedial system evaluations to be performed.

4.1.1 Cleanup Levels

4.1.1.1 Air Emission Criteria

Discharge of soil gas from the SVE system will substantively comply with the NYSDEC's air permitting requirements. Air emission limits for the SVE system will be as stated in the current guideline values for Site-specific parameters as presented in the draft New York State Air Guide-1, 1991 Edition.

4.1.1.2 Soil Treatment Levels

There are currently no standards for the remediation of soil. Soil cleanup levels for the Duva Site, as specified in the ROD, are as set forth in the procedures of NYSDEC Division of Hazardous Waste Remediation Technical and Administrative Guidance Memorandum (TAGM) 92-4046: Determination of Soil Cleanup Objectives and Cleanup Levels. This TAGM requires that Total Organic Carbon (TOC) analysis be performed on the Site vadose zone soil to set the soil cleanup levels for specific VOCs. As stated in this TAGM, these levels may be unattainable after implementation of the RD/RA. It is believed that the selected remedy is best for the Site and will be protective of human health and the environment. In the event that the continued operation of the SVE system ceases to be effective before cleanup levels are reached and remaining residual contamination does not pose risk to human health and the environment, the

PRPs may request that operation of the SVE system be discontinued prior to attainment of soil cleanup levels.

4.1.1.3 Groundwater Cleanup Levels

Cleanup levels for groundwater are either the groundwater standards set forth in NYSDEC Division of Water Technical and Guidance Series 1.1.1 and/or in the New York State Sanitary Code, Part 5, whichever is more stringent.

4.1.2 Operation Effectiveness

4.1.2.1 Groundwater Level Monitoring

The effectiveness of the groundwater collection system will be established by continuation of the groundwater level monitoring program. The purpose of the monitoring program will be to demonstrate that an inward gradient across the Site is being created and maintained by the operation of the groundwater collection system.

4.1.2.2 Sampling of Groundwater Treatment System Discharge

The effectiveness of the groundwater treatment system will be determined by sampling of the effluent. Sampling of the effluent will continue to be conducted in accordance with the criteria specified in the groundwater IRM Order on Consent.

4.1.2.3 Sampling of Air Emissions

Air discharges from the SVE system will be monitored to ensure that emission limits are not exceeded. The sampling of air emissions from

the SVE system will be conducted in substantive compliance with the New York State emissions discharge regulations.

4.1.2.4 Soil and Subsurface Gas Sampling

The effectiveness of the SVE system will be determined by collecting and analyzing soil and subsurface gas samples in accordance with the monitoring program discussed in Section 4.2. The analytical result of the samples will be compared to background samples collected prior to SVE system startup and the soil cleanup criteria to monitor the performance of the SVE system.

4.1.3 System Review and Re-Evaluation

The performance of the groundwater extraction and treatment systems and the SVE system will be comprehensively reviewed and re-evaluated every five years. The review and re-evaluation process will involve determining the effectiveness of the remedial systems in achieving the remedial objectives for the Site and specifying and implementing any improvements to the system deemed necessary to improve the effectiveness of the remedial systems.

4.1.3.1 Petition to Shutdown Remedial Systems

When the remedial objectives for the Site have been achieved to the maximum extent practicable, a petition to shutdown one or all of the remedial systems may be submitted to the NYSDEC in accordance with the RD/RA Order on Consent.

The remediation of the groundwater at the Site will be deemed achieved if all reasonable efforts have been made to restore the groundwater quality at the Site to the levels set forth in 6 NYCRR Parts 700-705 consistent with the anticipated use of the property. It is recognized that such

restoration in the Site groundwater and soils may be technically infeasible. Therefore, termination of the groundwater remedial program prior to achieving State groundwater quality standards will be considered by NYSDEC if the following can be demonstrated:

- any future residual groundwater chemical presence does not pose an unacceptable risk to human health and environment;

- the residual groundwater chemical presence is compatible with the anticipated future use of the Site; and

- a "zero-slope" has been reached with regard to groundwater quality improvement (i.e. continued pumping and treatment will not result in any noticeable decrease in the concentration of chemicals in the groundwater).

Remediation of the soils at the Site will be deemed achieved if all reasonable efforts have been made to achieve the soil cleanup levels presented in Section 4.1.1.2 and the ROD. Termination of the SVE system prior to achieving those cleanup criteria will be considered by NYSDEC if the following can be demonstrated:

- the residual chemical presence in the soil does not pose an unacceptable risk to human health and environment;

- the residual chemical presence in the soil is compatible with the anticipated future use of the Site; and

- a "zero-slope" has been reached with regard to soil quality improvement (e.g. future operation of the SVE system will not result in any noticeable decrease in the concentration of chemicals in the soil).

The criteria outlined above for termination of groundwater and soil remediation may be modified and refined based on the performance and evaluation of the respective remedial systems. In the event the SVE system is shut down, monitoring of both groundwater and soil vapor will be conducted to

evaluate possible rebound effects and ensure that any residual contaminants do not start to mirgrate into the adjacent homes.

4.2 SYSTEM OPERATIONS MONITORING

The operation of the groundwater collection and treatment system and the SVE system will be monitored to ensure that the systems are operating within design specifications and to obtain data that will be used if modifications to the systems are required to make them operate more efficiently.

Operations monitoring of the groundwater extraction and treatment system and the SVE system will include but not be limited to:

- routine monitoring and laboratory testing;
- recording operational problems;
- modifications to system operation; and
- reporting.

4.3 SYSTEM INSPECTION AND MAINTENANCE

A system maintenance program will be developed for each remedial system and presented in the Operation, Maintenance and Monitoring Plan (OMMP). The draft OMMP will be submitted to NYSDEC with the Remedial Design for approval. A final OMMP will be submitted to NYSDEC upon completion of the construction/startup phase of the remedial systems. The new remedial systems requiring such a program are discussed below.

4.3.1 SVE System Maintenance

A regular inspection and maintenance program will be developed and implemented during operation of the SVE system. Components

of the SVE system that are damaged will be either repaired or replaced. General inspection and maintenance activities that will be performed include:

- inspection of extraction trench sumps, vacuum piping and vacuum blower;
- correction of operational problems;
- repair or replacement of damaged parts;
- inspection of the air treatment system; and
- replacement of vapor phase carbon beds.
- Routine monitoring of vacuum pressure vs. flow rate.

4.3.2 Groundwater Treatment System Maintenance

The inspection and maintenance program will generally be developed and implemented for the existing groundwater treatment system. General inspection and maintenance activities that will be performed include:

- replacement of carbon beds (if an activated carbon system is used);
- inspection of piping, tanks, pumps, etc.;
- correction of operational problems; and
- repair or replacement of damaged parts.

4.3.3 Impermeable Cover Maintenance

Following completion of Site grading and covering activities, a regular inspection and maintenance program will be implemented to ensure that the vegetative soil cap is maintained and that surface water drainage is in

accordance with design specifications. General inspection and maintenance activities that will be performed include:

- repair damaged sections of the cover;
- fill low lying areas that may develop to prevent surface water ponding; and
- implement measures to prevent erosion as required.

4.4 OPERATION AND MONITORING

The sampling and analytical protocols to be used during operation and monitoring of the remedial systems will be developed during the remedial design process and presented in the SAMP. A brief discussion of the sampling activities that will be performed during operation and monitoring of the remedial systems follows.

4.4.1 Groundwater Sampling

Groundwater sampling and hydraulic monitoring will be conducted to monitor operation of the groundwater collection system. The purpose of the sampling will be to monitor the effectiveness of the groundwater collection system and the system's progress in achieving the remedial objectives. The results of the groundwater sampling will also be used to determine the point when operation of the groundwater extraction system at the Site can be terminated.

4.4.2 Soil Sampling

Soil sampling will be conducted to monitor the operation of the SVE system (see Section 4.1.2.4). The purpose of the sampling will be to

monitor the effectiveness of the SVE system and its progress in achieving the established cleanup levels. The results of the soil samples will also be used to determine the point at which operation of the SVE system can be terminated.

4.4.3 Air Sampling

Air sampling will be conducted to monitor the vented gas from the SVE system (as specified in Section 4.1.2.3). The purpose of the sampling will be to monitor the ambient air to ensure that ambient air criteria are not exceeded during operation of the SVE system.

5.0 WASTE HANDLING

The following sections present the waste handling procedures that will be implemented during the construction/implementation of the remedial systems and operation of the remedial systems.

5.1 CONSTRUCTION/IMPLEMENTATION

5.1.1 Soils

Soils generated by the excavation of Area #3 and the installation of extraction trenches will be placed within the remediation area and graded, as appropriate, prior to installation of the impermeable cover.

5.1.2 Groundwater

Groundwater generated during the construction and implementation of the remedial systems will be temporarily stored on-Site in 55-gallon drums or portable polytanks (depending on quantity generated) and then treated at the on-Site groundwater treatment facility.

5.1.3 Miscellaneous Debris

Trees and brush generated during cleanup and grubbing activities will either be chipped and used as mulching material or will be disposed of off-Site in a sanitary landfill.

5.1.4 Equipment Cleaning and Decontamination Waters

Equipment cleaning and decontamination waters generated during construction and implementation of the remedial systems will be handled in accordance with the protocols discussed in Section 5.1.2.

5.2 OPERATION

Spent carbon generated by the groundwater treatment system or the air filters of the SVE system will be either disposed of off-Site at an appropriate landfill or will be sent off-Site for regeneration. The determination as to which handling method will be used will be made based on economics and the amount of spent carbon generated.

6.0 PROJECT REPORTING AND SCHEDULE

6.1 PROJECT REPORTING

6.1.1 Monthly Reports

Monthly reports will be prepared and submitted to the NYSDEC, as required in the RD/RA Order on Consent.

6.1.2 RD Submittals

The following documents will be submitted to the NYSDEC:

i) a Soil Modification Report;

ii) an RD Report, as described in Section 3.4;

iii) a Final Engineering Report which includes as-built drawings; and

iv) a Final OMMP.

6.2 PROJECT SCHEDULE

Figure 6.1 presents the proposed schedule for the Remedial Design and Remedial Action program. The actual schedule is dependent upon several factors which are unknown at this time and therefore, the proposed schedule will be subject to change and revision as additional information is obtained during the design phase.

If delays are anticipated or suddenly arise, the NYSDEC Project Manager will be notified. The PRPs may request a modification to the schedule if additional time is required, provided the request is made in writing and accompanied by justification for the added time and a proposed revised

schedule NYSDEC will review such request and, if it concurs, the revised schedule shall become effective. The proposed schedule may also be shortened as appropriate if activities are completed ahead of schedule.

The initiation of several activities shown in the schedule depends on prompt NYSDEC review and approval of submitted reports and plans. Therefore, the actual schedule for several activities may require modification, depending on the actual time required for the NYSDEC to review and approve the submittals, as well as the time required for any revisions to reports and plans that may be required by the NYSDEC.

The schedule for implementation of the remedial construction activities may, upon NYSDEC concurrence, be revised upon receipt of approval of the RD.

FIGURES

FIGURES

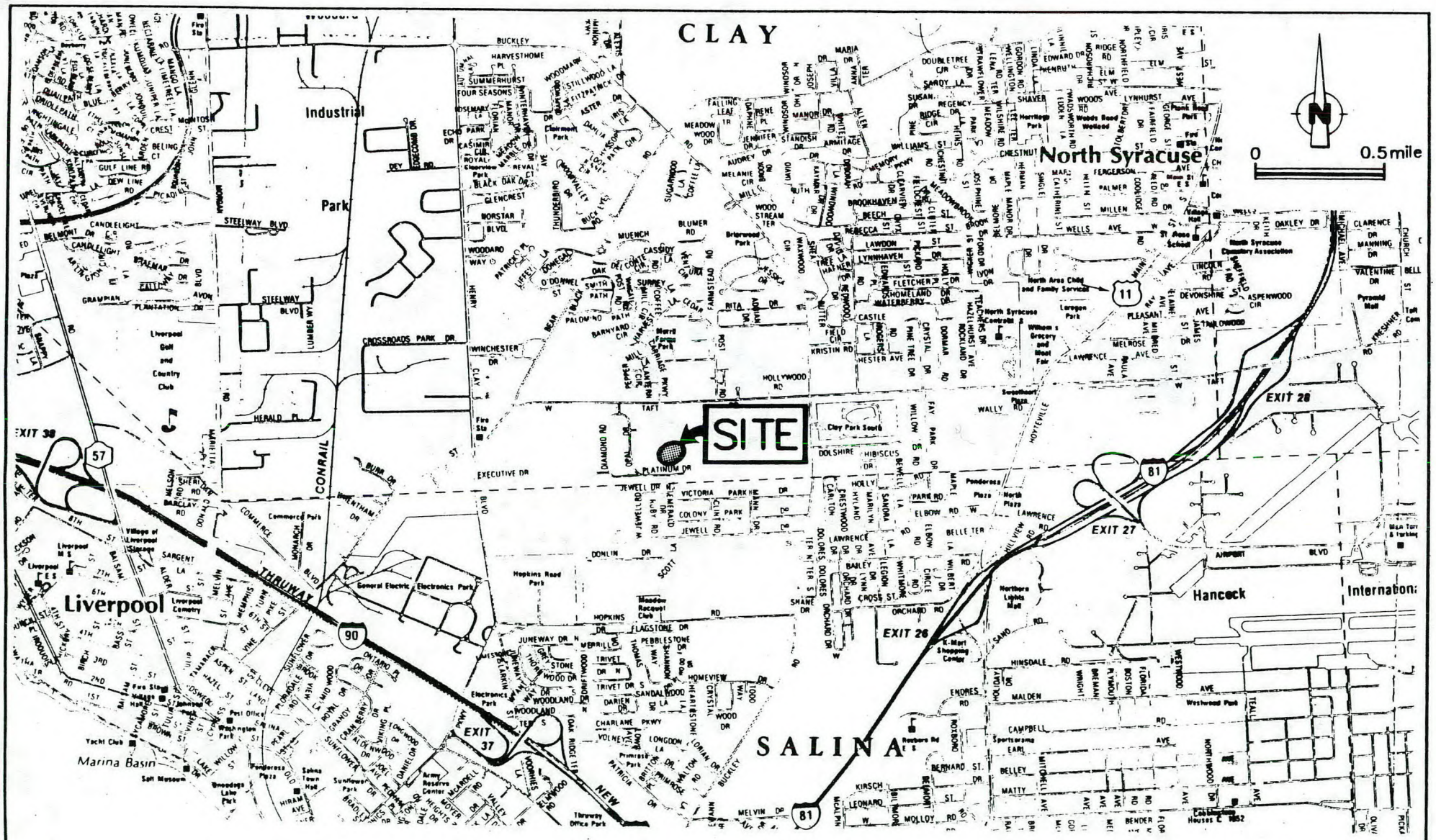


figure 1.1

SITE LOCATION
DUVA PROPERTY
Town of Clay, New York

CRA

5471 (1) JUL 12/93 (NF) REV.0

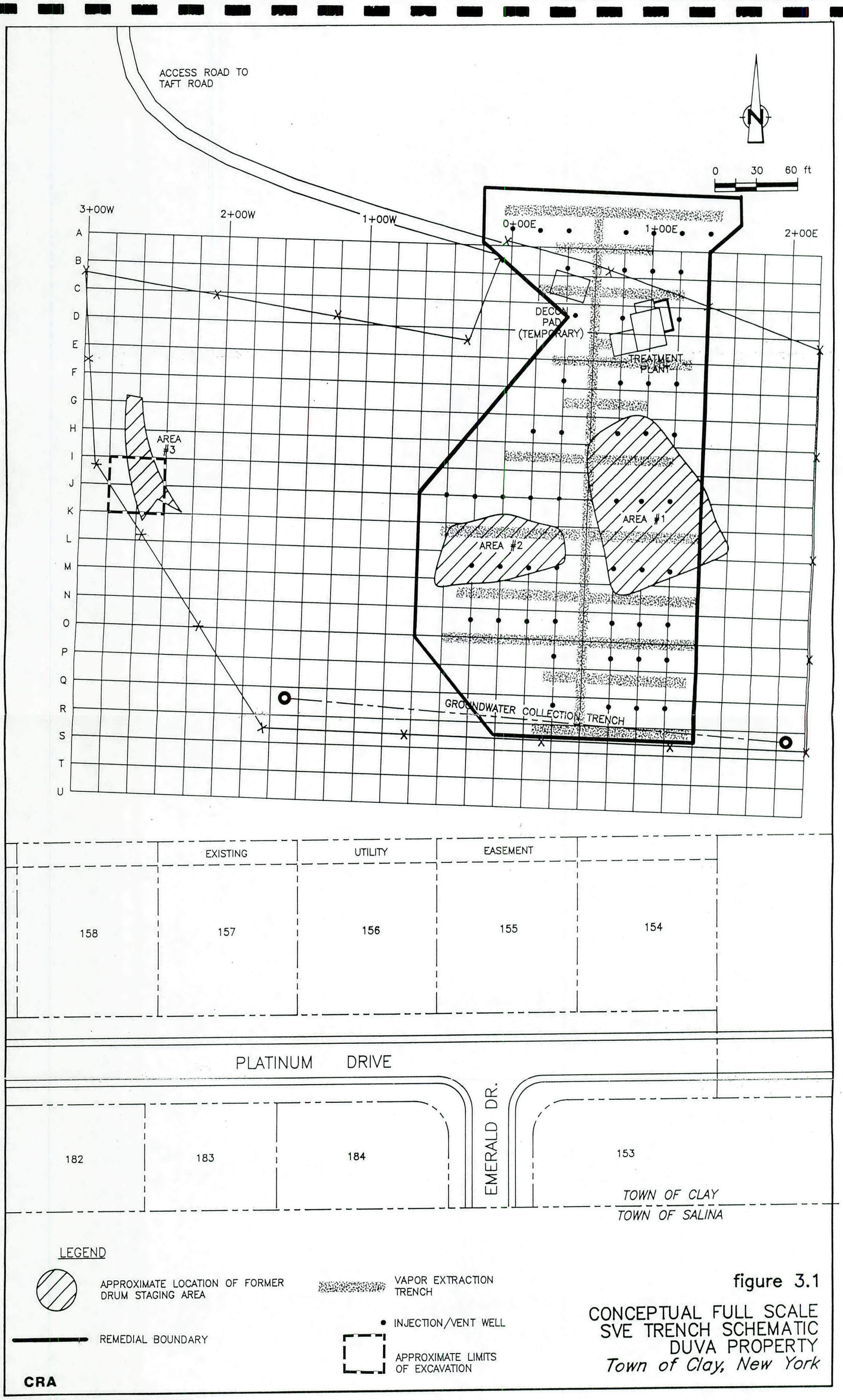
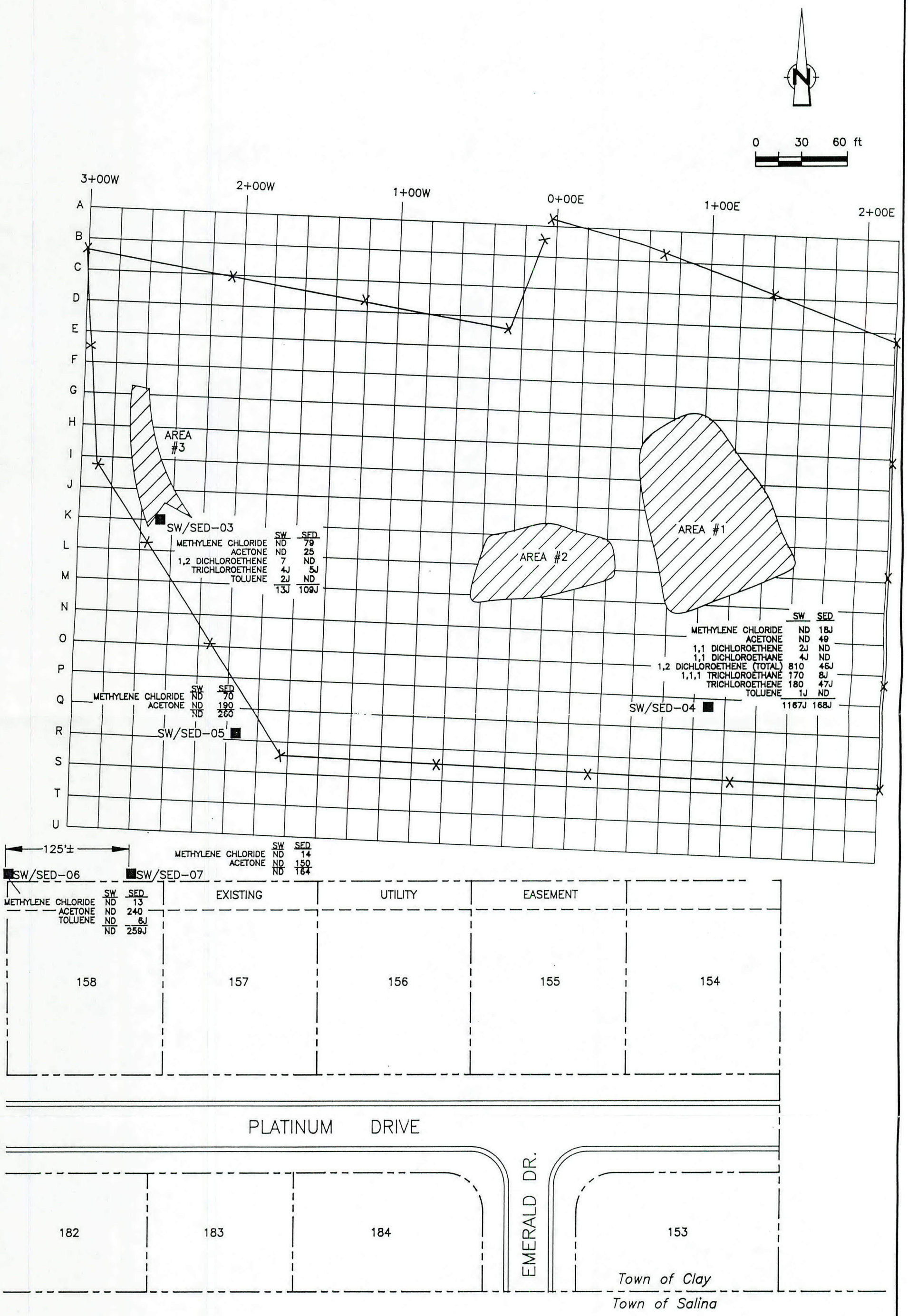


figure 3.1

CONCEPTUAL FULL SCALE
SVE TRENCH SCHEMATIC
DUVA PROPERTY
Town of Clay, New York

5471 (1) JUL 12/93 (NF) REV.0



LEGEND

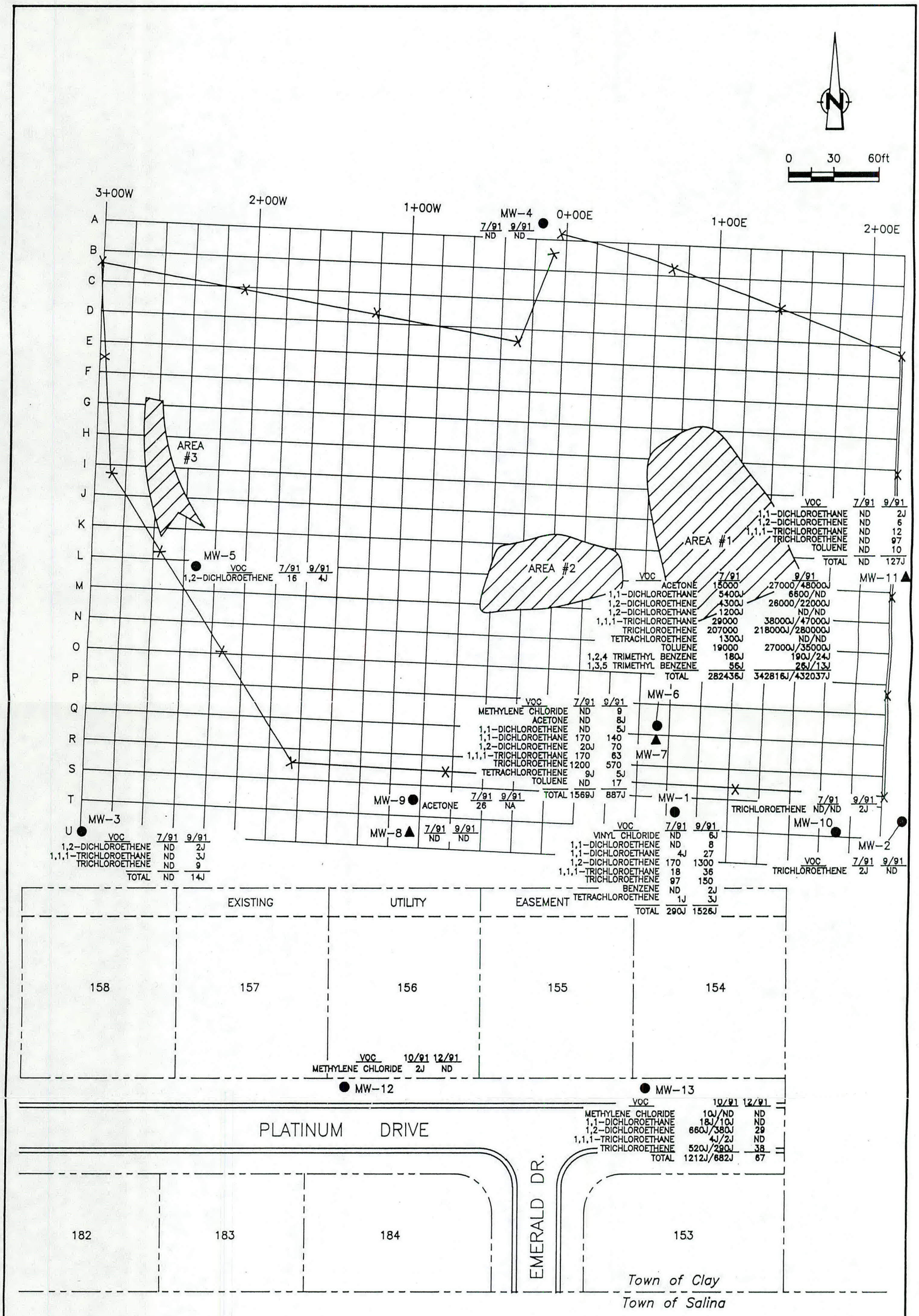
SW/SED-04 ■	SURFACE WATER/SEDIMENT SAMPLING LOCATION
240	TOTAL VOC's (ppb)
J	ESTIMATED VALUE
ND	NOT DETECTED

figure 1.7

TOTAL VOC CONCENTRATIONS
SURFACE WATER AND SEDIMENT SAMPLES
DUVA PROPERTY
Town of Clay, New York

CRA

5471 (1) JUL 12/93 (NF) REV.0



LEGEND

MW-4 ● MONITORING WELL COMPLETED IN ALLUVIUM

J ESTIMATED VALUE

▲ MONITORING WELL COMPLETED IN TILL

NOTES:

1. MW-11 LOCATED 105'± EAST OF GRIDLINE 2+20E
2. MW-2 LOCATED 185'± EAST OF SOUTHEAST CORNER OF FENCE
3. ALL VOC's REPORTED IN ppb

figure 1.6

TOTAL VOC CONCENTRATIONS IN GROUNDWATER DUVA PROPERTY

Town of Clay, New York

CRA

5471 (1) JUL 12/93 (NF) REV.0

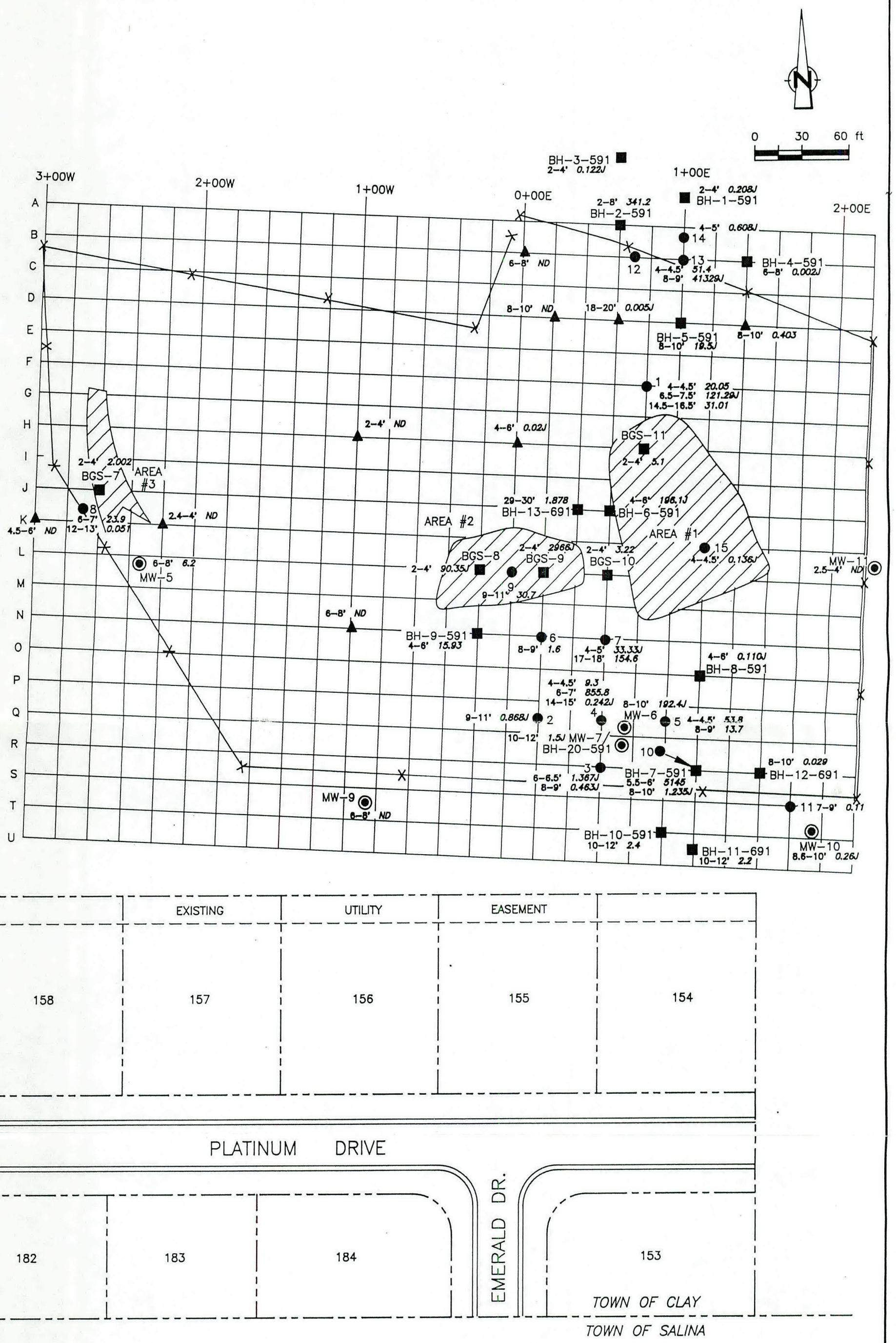


figure 1.5

TOTAL VOC CONCENTRATIONS (ppm)
IN SUB-SURFACE SOILS (>30")
DUVA PROPERTY
Town of Clay, New York

5471 (1) JUL 12/93 (NF) REV.0

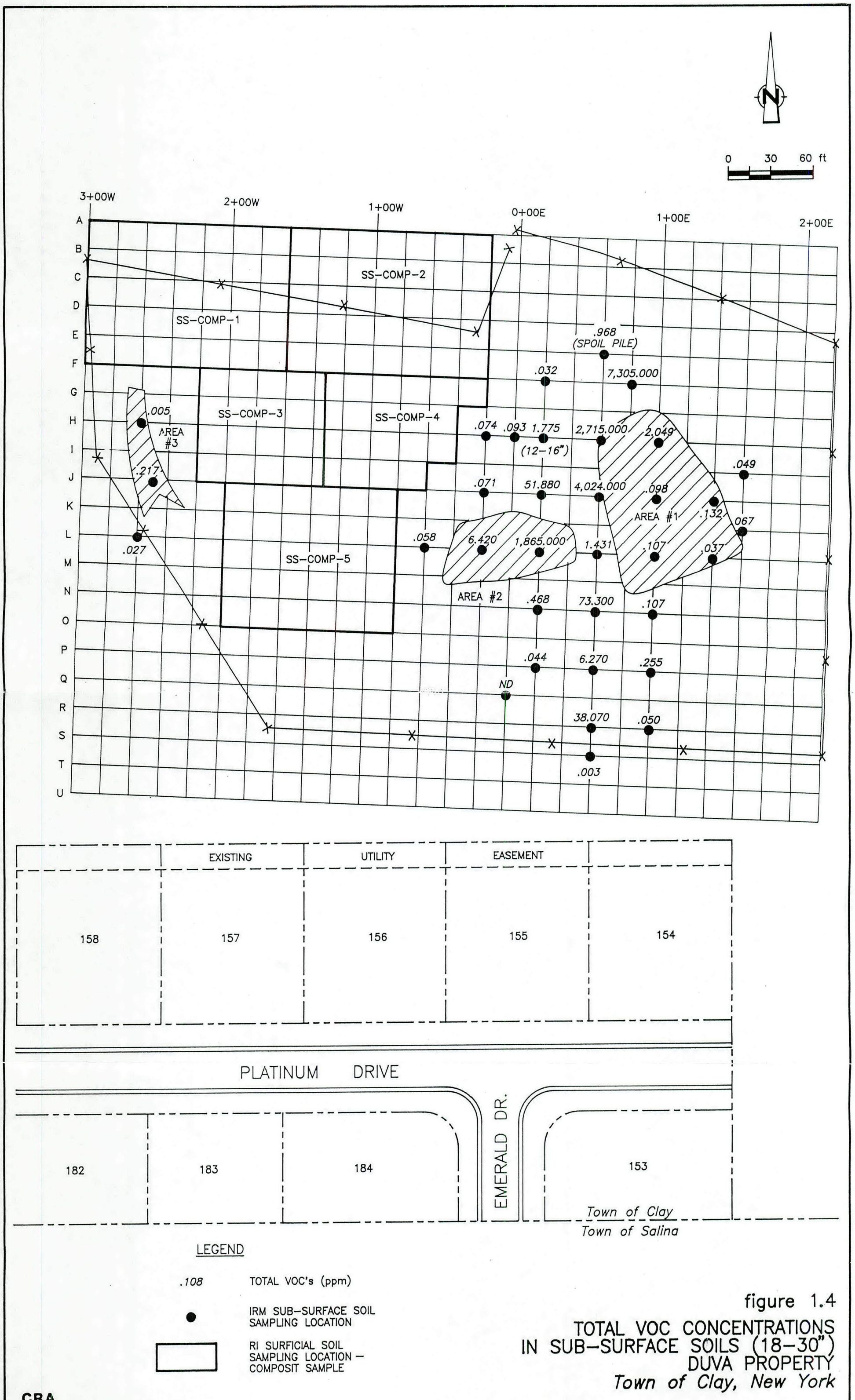


figure 1.4

TOTAL VOC CONCENTRATIONS IN SUB-SURFACE SOILS (18-30")
DUVA PROPERTY
Town of Clay, New York

CRA

5471 (1) JUL 12/93 (NF) REV.0

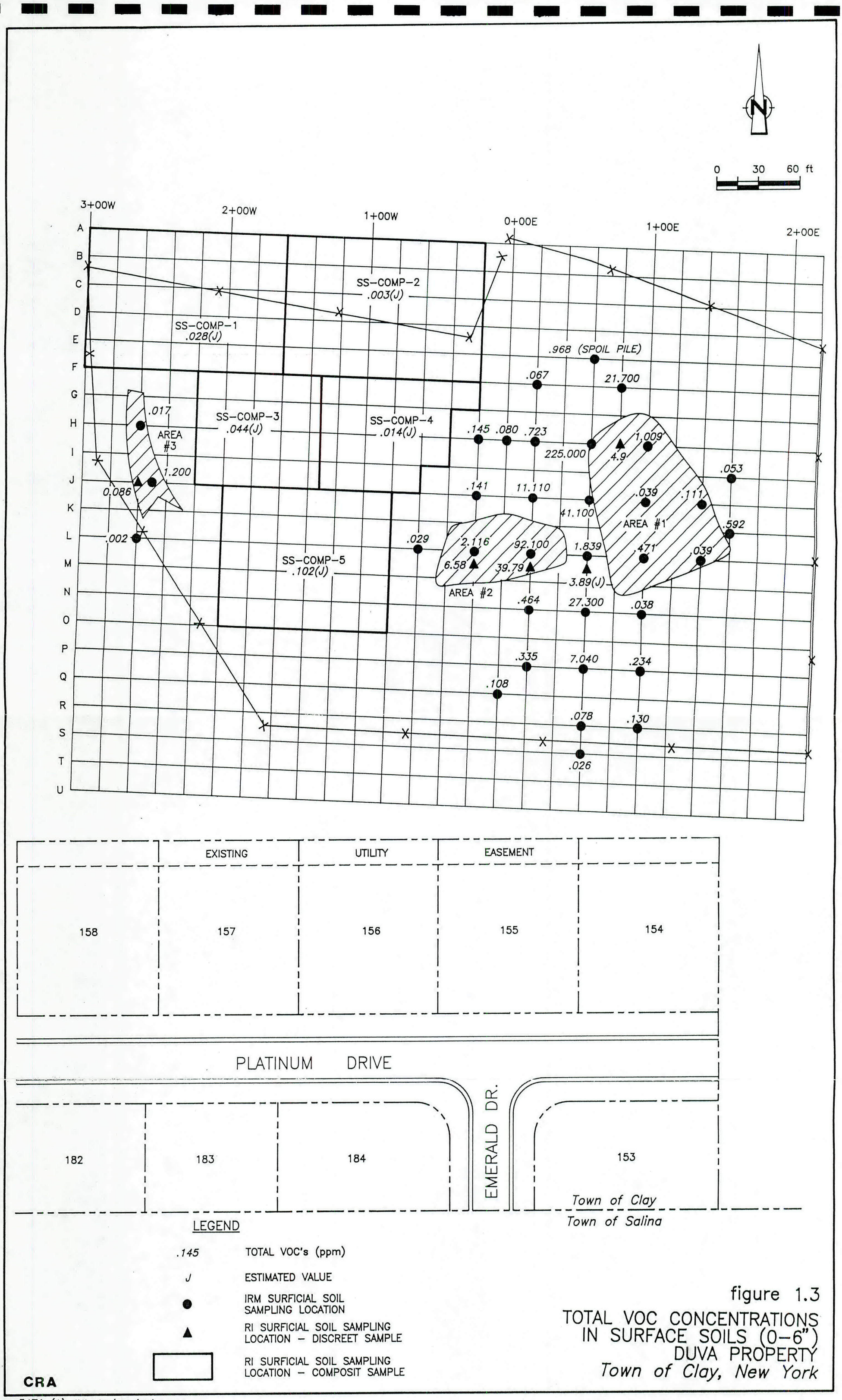


figure 1.3
TOTAL VOC CONCENTRATIONS IN SURFACE SOILS (0–6")
DUVA PROPERTY
Town of Clay, New York

5471 (1) JUL 12/93 (NF) REV.0

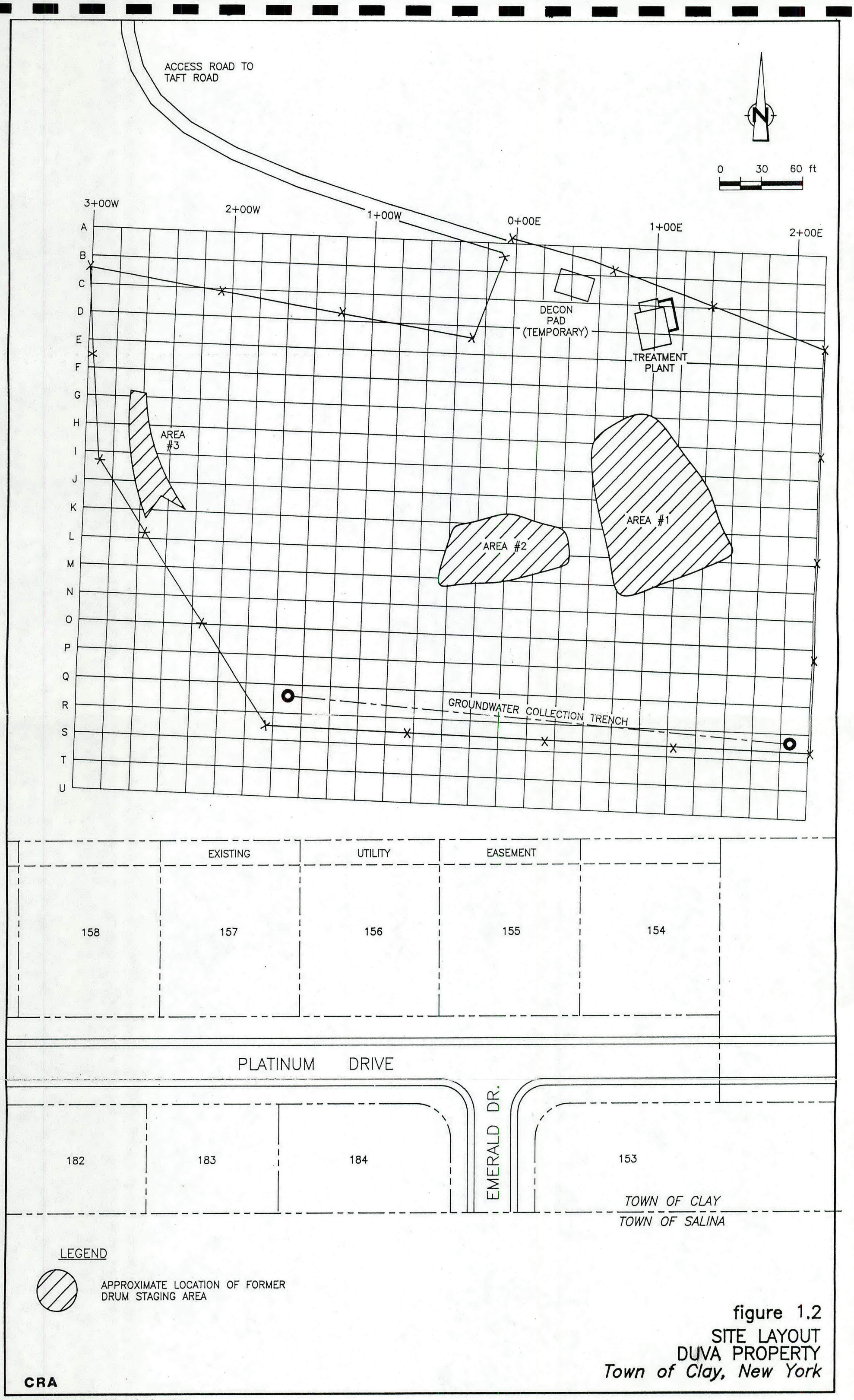
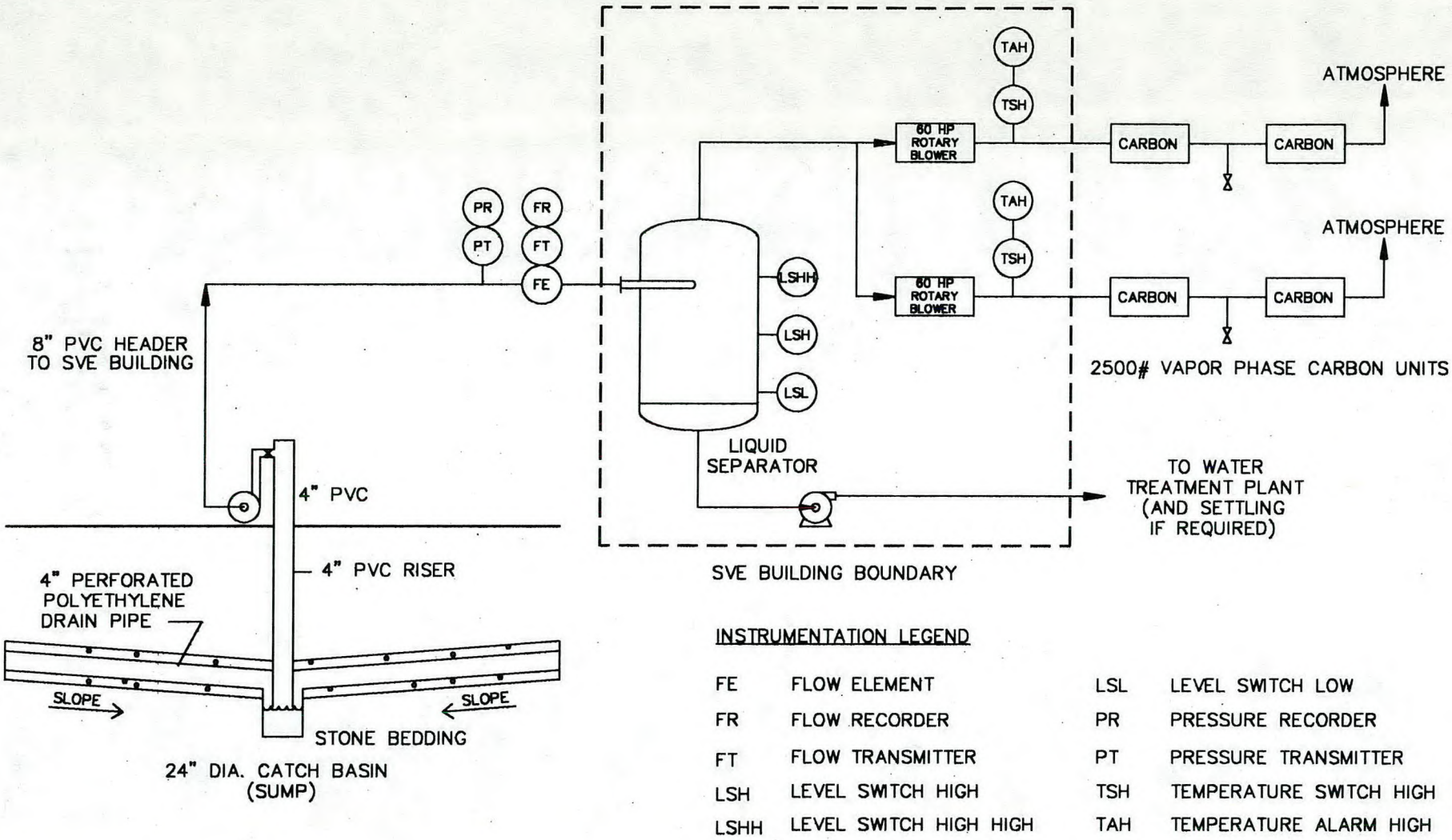


figure 1.2
SITE LAYOUT
DUVA PROPERTY
Town of Clay, New York

CRA

5471 (1) JUL 12/93 (NF) REV.0



INSTRUMENTATION LEGEND

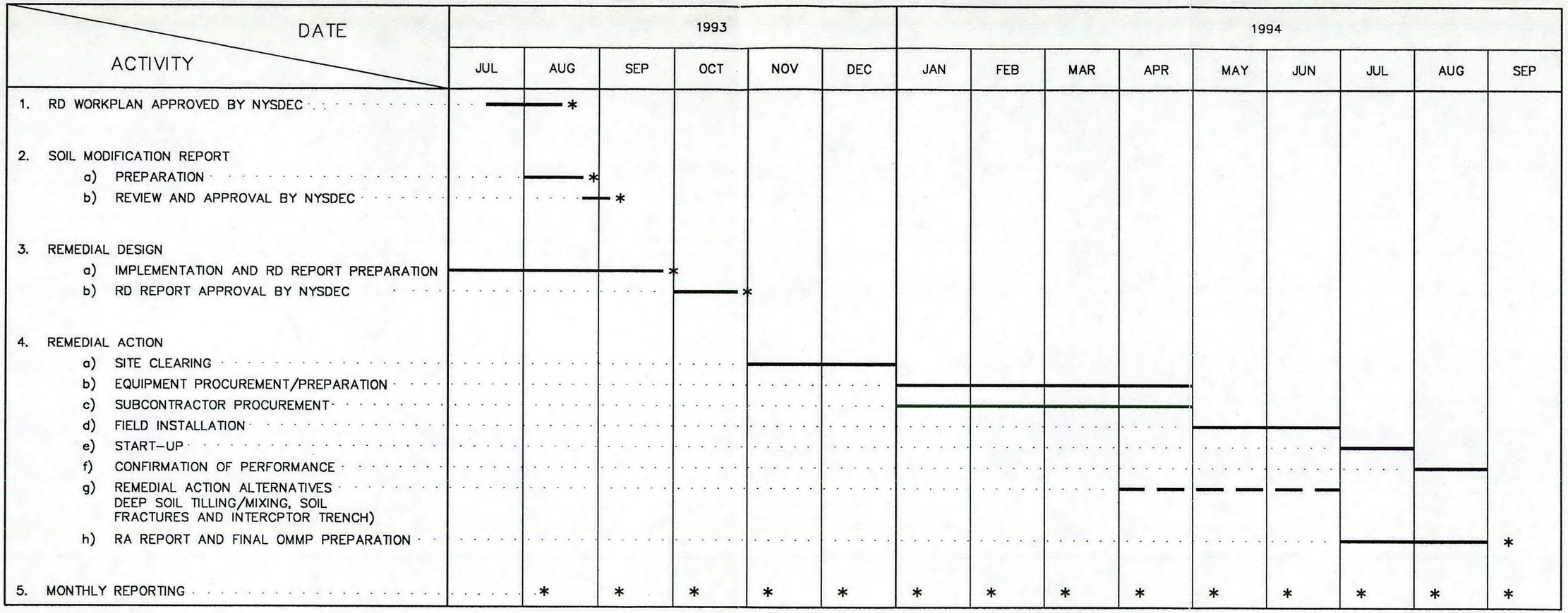
FE	FLOW ELEMENT	LSL	LEVEL SWITCH LOW
FR	FLOW RECORDER	PR	PRESSURE RECORDER
FT	FLOW TRANSMITTER	PT	PRESSURE TRANSMITTER
LSH	LEVEL SWITCH HIGH	TSH	TEMPERATURE SWITCH HIGH
LSHH	LEVEL SWITCH HIGH HIGH	TAH	TEMPERATURE ALARM HIGH

figure 3.2

CONCEPTUAL SVE TRENCH AND TREATMENT SYSTEM
DUVA PROPERTY
Town of Clay, New York

CRA

5471 (1) SEP 13/93 (NF) REV.1 (P-01)



LEGEND

* SUBMITTAL

figure 6.1

PROPOSED RD/RA PROJECT SCHEDULE
DUVA PROPERTY
Town of Clay, New York

CRA

5471 (1) JUL 5/93 (NF) REV.0 (S-01)