

**UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK**

**TEN LANDFILLS
RCRA FACILITY INVESTIGATION
PHASE II GROUNDWATER MONITORING
DRAFT FINAL REPORT**

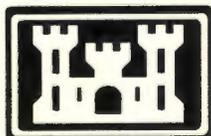
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Baltimore District**

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**US Army Corps
of Engineers**

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UNITED STATES MILITARY ACADEMY
West Point, New York

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A	Soil Boring Logs
B	Groundwater Sample Collection Logs
C	Data Validation Assessment

1.0 INTRODUCTION

1.1 Project Background

The United States Military Academy (USMA) is located on the western side of the Hudson River at West Point, Orange County, New York. The USMA was established in 1802 as a training facility for officers in the Army. The Department of the Army (DA) owns, controls and operates the USMA. The location of the USMA is shown on Figures 1-1 and 1-2.

Various studies, assessments and investigations concerning the environmental conditions of the USMA have been conducted by the DA since 1980. Three recent work plans and two reports are particularly relevant to the development of this report. The first work plan is the January 1994 Resource Conservation and Recovery Act (RCRA) Facility Assessment Work Plan of Ten Landfills that described the investigation to evaluate ten landfills located throughout the USMA. The ten landfills correspond to ten solid waste management units (SWMUs). SWMU No. USMA-15 has been divided into two landfills (USMA-15A and USMA-15B). The landfills and the corresponding SWMU Number are referred to as:

- PX Landfill (USMA-1)
- Michie Stadium Parking Lot Landfills, Lots A, B, C and E (USMA-2, 3, 4 and 6)
- Professor's Row Landfill (USMA-8)
- Village Farm Landfill (USMA-13)
- Morgan Farm Road Landfill (USMA-15A)
- High School Landfill (USMA-15B); and
- Camp Buckner Landfill (USMA-35).

The first report is the June 1995 RFA of Ten Landfills Report. The report presented the findings of the 1994 RFA Work Plan.

Based upon the results presented in the RFA of Ten Landfills Report, the New York State Department of Environmental Conservation (NYSDEC) required the USMA to further

assess the environmental conditions associated with nine of the Ten Landfills (except the Professor's Row Landfill) in a letter dated December 11, 1995. The Professor's Row landfill was excluded because it could not be located during the RFA investigation.

Subsequent to the NYSDEC requirement for further action, Delivery Order Number 0075 was issued by the United States Army Corps of Engineers (USACE) to Malcolm Pirnie, Inc. (Malcolm Pirnie) under Contract Number DACA31-94-D-0017 on April 18, 1996. A Work Plan Addendum (the second work plan) dated May 21, 1996 was written under that Delivery Order.

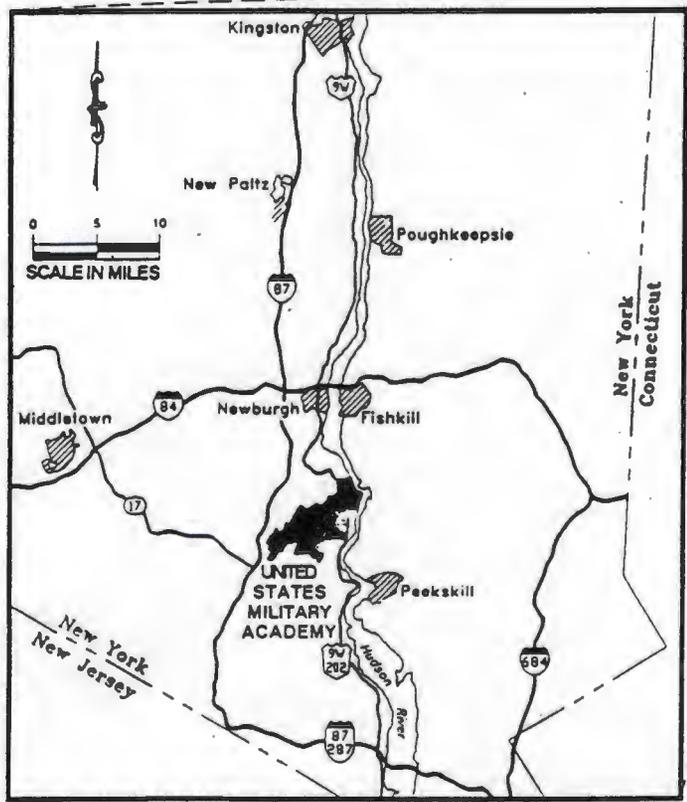
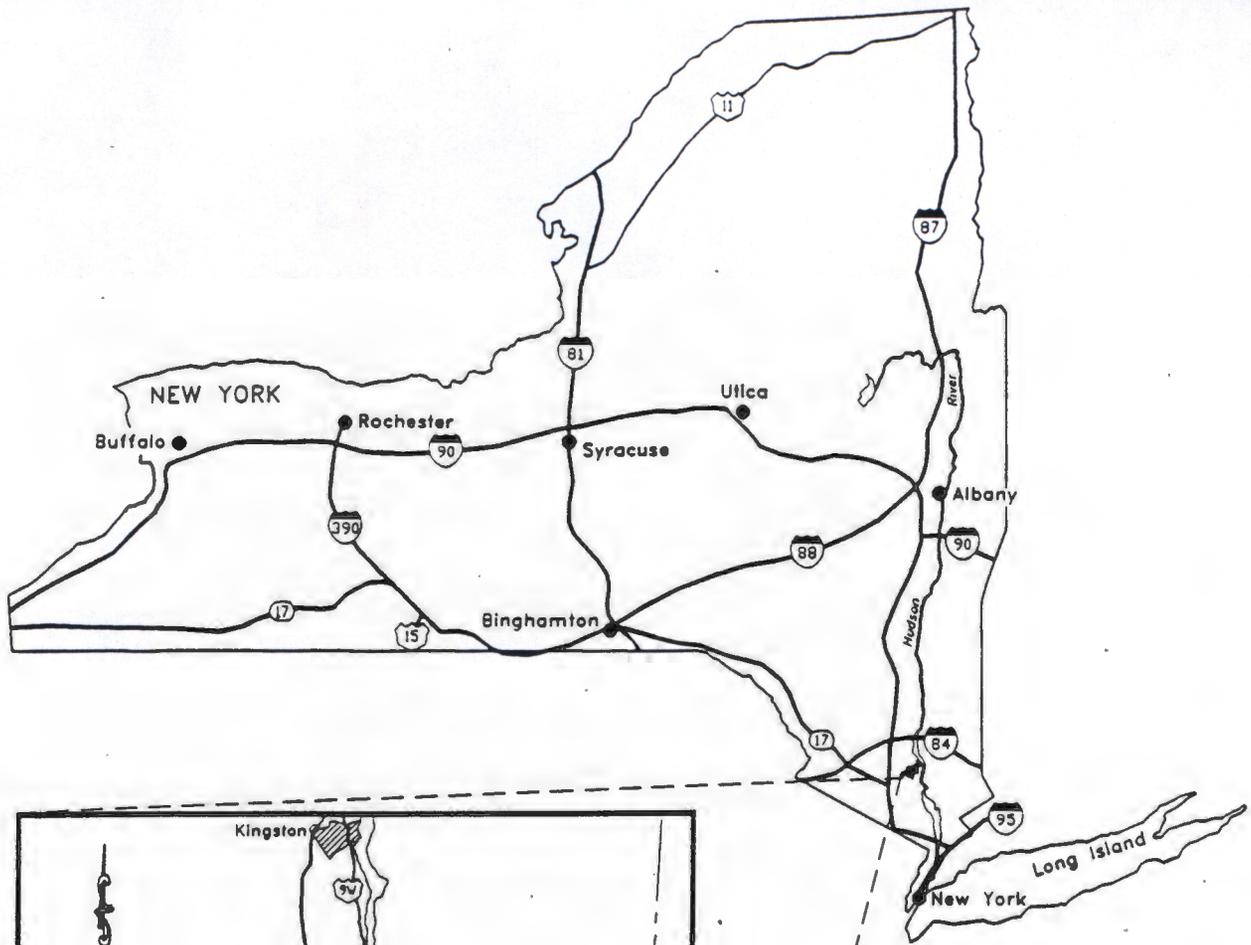
The second report issued was the June 1997 Final RCRA Facility Investigation of Ten Landfills Report which presented the results of the 1996 Work Plan Addendum.

Based upon the results presented in the 1997 Final RFI of Ten Landfills Report, NYSDEC in its February 17, 1998 letter requested additional investigations. A Phase II Work Plan Addendum (the third work plan) dated June 1998 was written to address that request. This report summarizes the scope of work and results of the Phase II Work Plan Addendum investigations.

1.2 Project Objective and Scope

The USACE authorized Malcolm Pirnie to develop and implement a Phase II Work Plan Addendum for the Ten Landfills. The objective of this addendum was to perform additional sampling and investigation of the Michie Lots B and E, Camp Buckner, and PX Landfills (Figures 1-3a and 1-3b) as requested by the NYSDEC in its February 17, 1998 letter. This objective was met by completing the following tasks:

- 1) Collection of one round of groundwater samples from monitoring wells LBMW-03, LEMW-01, LEMW-02, LEMW-03, LEMW-04, and LEMW-05. These monitoring wells are located at the Michie Stadium Lots B and E Landfills. Groundwater samples (filtered and unfiltered) were analyzed for Target Analyte List (TAL) metals.



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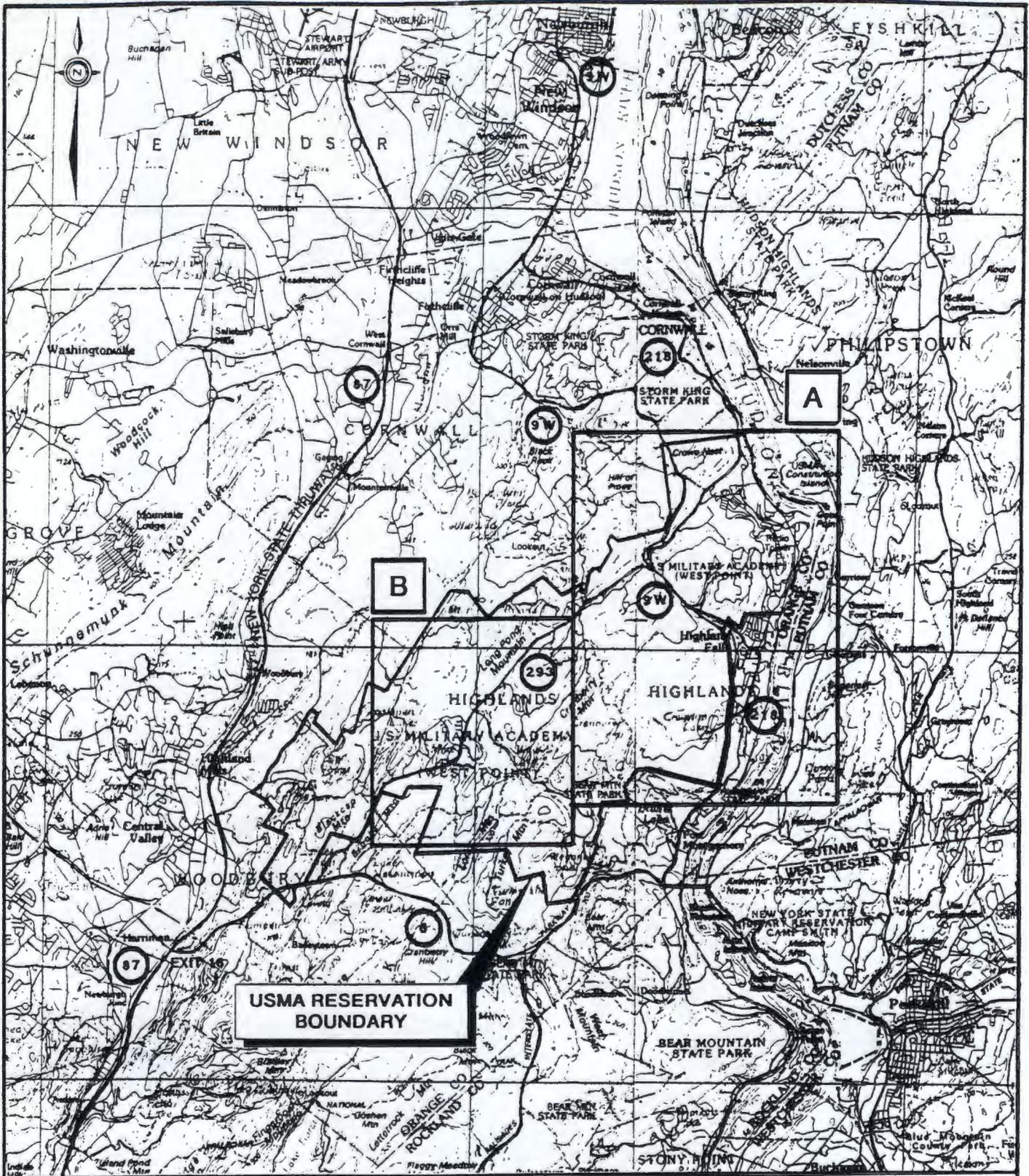
**UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK**

LOCATION MAP

Source: WCFS, 1994 RFA

SCALE AS NOTED

FIGURE 1-1



NOTE:
KEY MAPS A AND B ARE SHOWN AS
FIGURES 1-3A AND 1-3B.

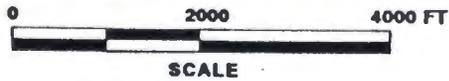
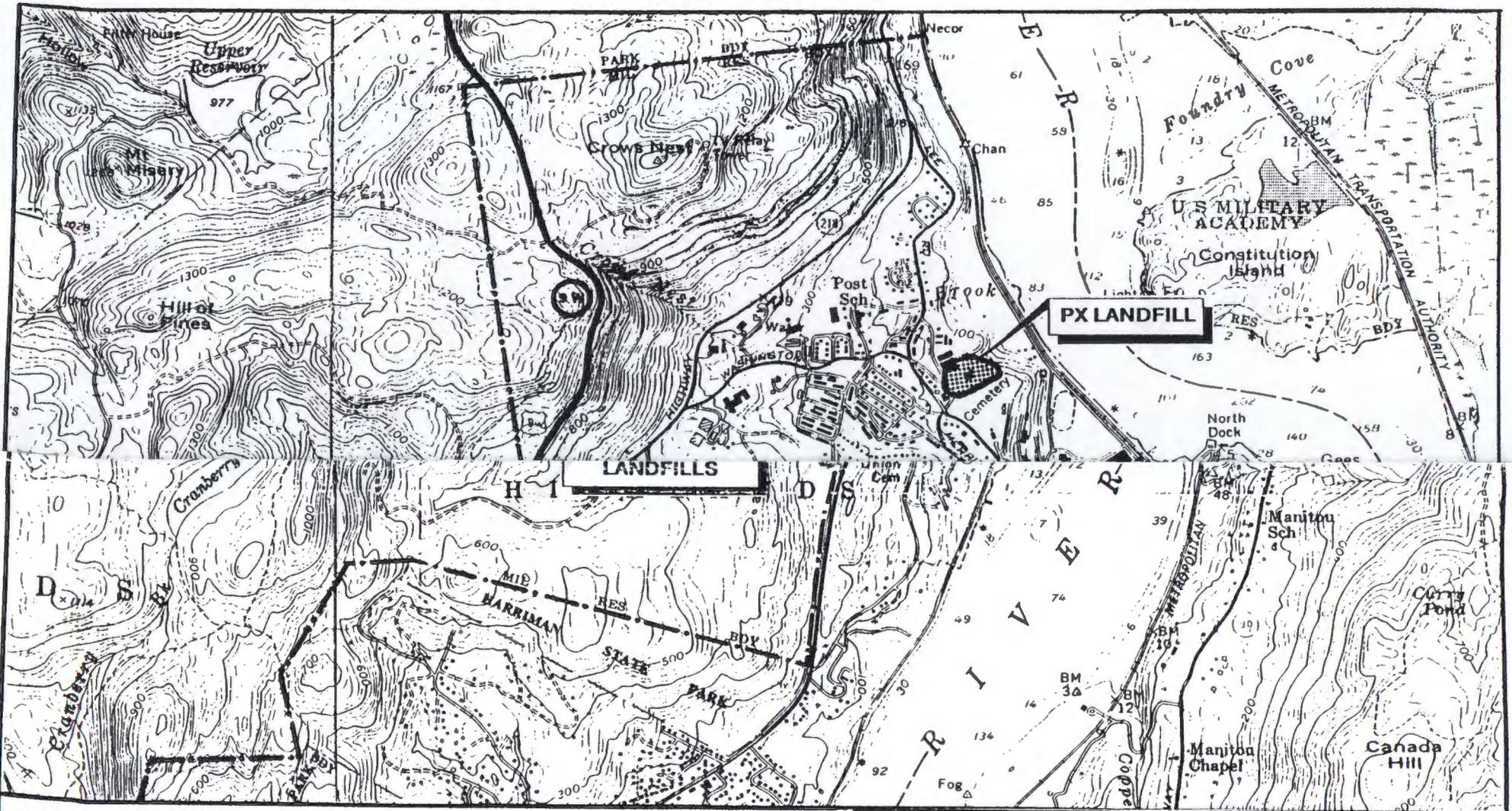
Source: WCFS, 1994 RFA

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**UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK
VICINITY MAP**

SCALE AS NOTED

FIGURE 1-2



LEGEND:

--- USMA RESERVATION BOUNDARY

NOTE:

LOCATIONS AND EXTENT OF LANDFILLS AREA APPROXIMATE
THE PROFESSOR'S ROW LANDFILL COULD NOT BE LOCATED

Source: WCFS, 1994 RFA



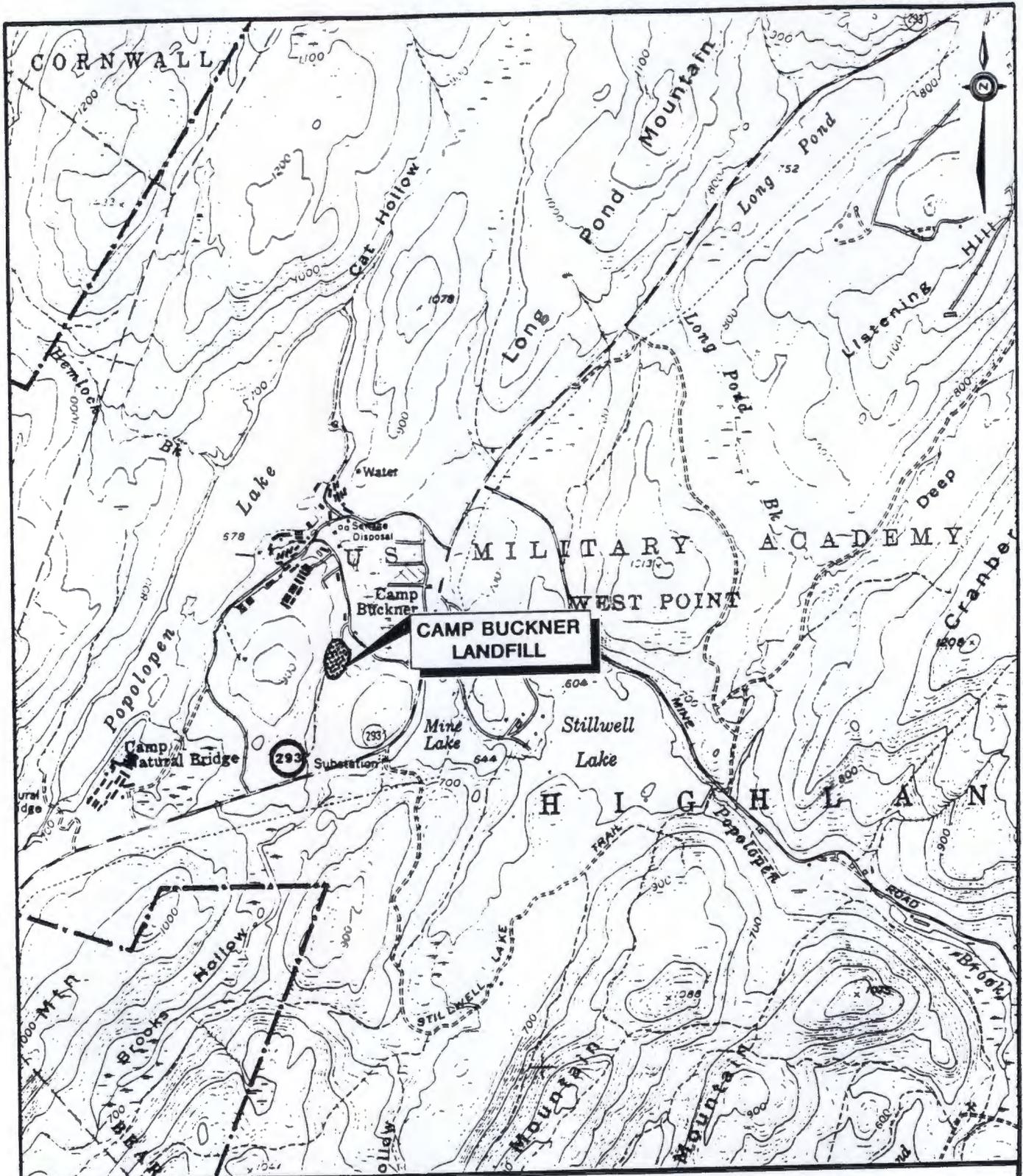
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WEST POINT, NEW YORK

TEN LANDFILLS LOCATION MAP

SCALE AS NOTED

FIGURE 1-3a



0 2000 4000 FT
 SCALE

LEGEND:
 - - - - - USMA RESERVATION BOUNDARY

NOTE:
 LANDFILL LOCATION IS APPROXIMATE.

Source: WCFS, 1994 RFA

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UNITED STATES MILITARY ACADEMY
 WEST POINT, NEW YORK

CAMP BUCKNER LOCATION MAP

SCALE AS NOTED

FIGURE 1-3b

- 2) Collection of quarterly groundwater samples from the four existing monitoring wells located at the PX Landfill (PXMW-01, PXMW-02, PXMW-03, and PXMW-04) and from one monitoring well at the Camp Buckner Landfill (CBMW-03). Groundwater samples (filtered and unfiltered) were analyzed for TAL metals.

- 4) Collection of up to three groundwater seep samples downslope of the PX Landfill. Groundwater seep samples (unfiltered) were analyzed for TAL metals.

2.0 SCOPE OF WORK

The following sections describe the details of the scope of work completed for this investigation. Figures 2-1 through 2-4 show the sample locations for the individual areas of concern.

2.1 Groundwater Investigation

The groundwater investigation consisted of five specific tasks:

- Monitoring Well Installation;
- Monitoring Well Development;
- Monitoring Well Survey;
- Monitoring Well Sampling; and
- Groundwater Seep Sampling

Each of these tasks are described in the following sections.

2.1.1 Monitoring Well Installation

The scope of work outlined in the June 1998 RFI Phase II Work Plan Addendum includes the installation of up to two additional overburden monitoring wells hydraulically upgradient of the PX Landfill and the existing upgradient well (PXMW-01). PXMW-01 is screened immediately above the overburden/bedrock contact at approximately 11 feet below the ground surface. As stated in the work plan, bedrock outcrops upgradient from PXMW-01 along Washington Road (i.e., the saturated overburden pinches out between PXMW-01 and the bedrock outcrop).

An attempt was made to install the two upgradient monitoring wells adjacent to Building 695 and southwest of PXMW-03. However, since groundwater was not encountered above the overburden/bedrock contact within the soil borings, the overburden wells could not be installed. The locations of the two soil borings (PXMW-05 and PXMW-

06) are shown on Figure 2-3. The boring logs for PXMW-05 and PXMW-06 are found in Attachment A.

2.1.2 Monitoring Well Development

Monitoring well development was not conducted as part of the Phase II Work Plan Addendum tasks because no new monitoring wells were installed during the Phase II work.

2.1.3 Monitoring Well Survey

Monitoring well survey was not conducted as part of the Phase II Work Plan Addendum tasks because no new monitoring wells were installed during the Phase II work.

2.1.4 Monitoring Well Sampling

Groundwater samples were collected from monitoring wells located at the Michie Stadium Landfill (LBMW-03, LEMW-01 through LEMW-05 on Figure 2-1); Camp Buckner Landfill (CBMW-03 on Figure 2-2); and PX Landfill (PXMW-01 through PXMW-04 on Figure 2-3). Prior to the collection of groundwater samples, groundwater level measurements were obtained from each of the monitoring wells.

The hydrogeologic conditions encountered caused a variation in the monitoring well sampling procedure stated in the approved Phase II Work Plan Addendum. Modifications were made to the purging technique. Modifications included varying the well evacuation device from a 2-inch diameter submersible pump to a dedicated disposable polyethylene bailer, because of the height and volume of water in the wells. Several wells did not produce enough yield to evacuate the three to five times the standing water volume minimum as proposed in the Phase II Work Plan Addendum. Monitoring wells were purged until they were dry, or three well volumes were removed (Attachment B). Groundwater samples were collected within two hours of the completion of purging.

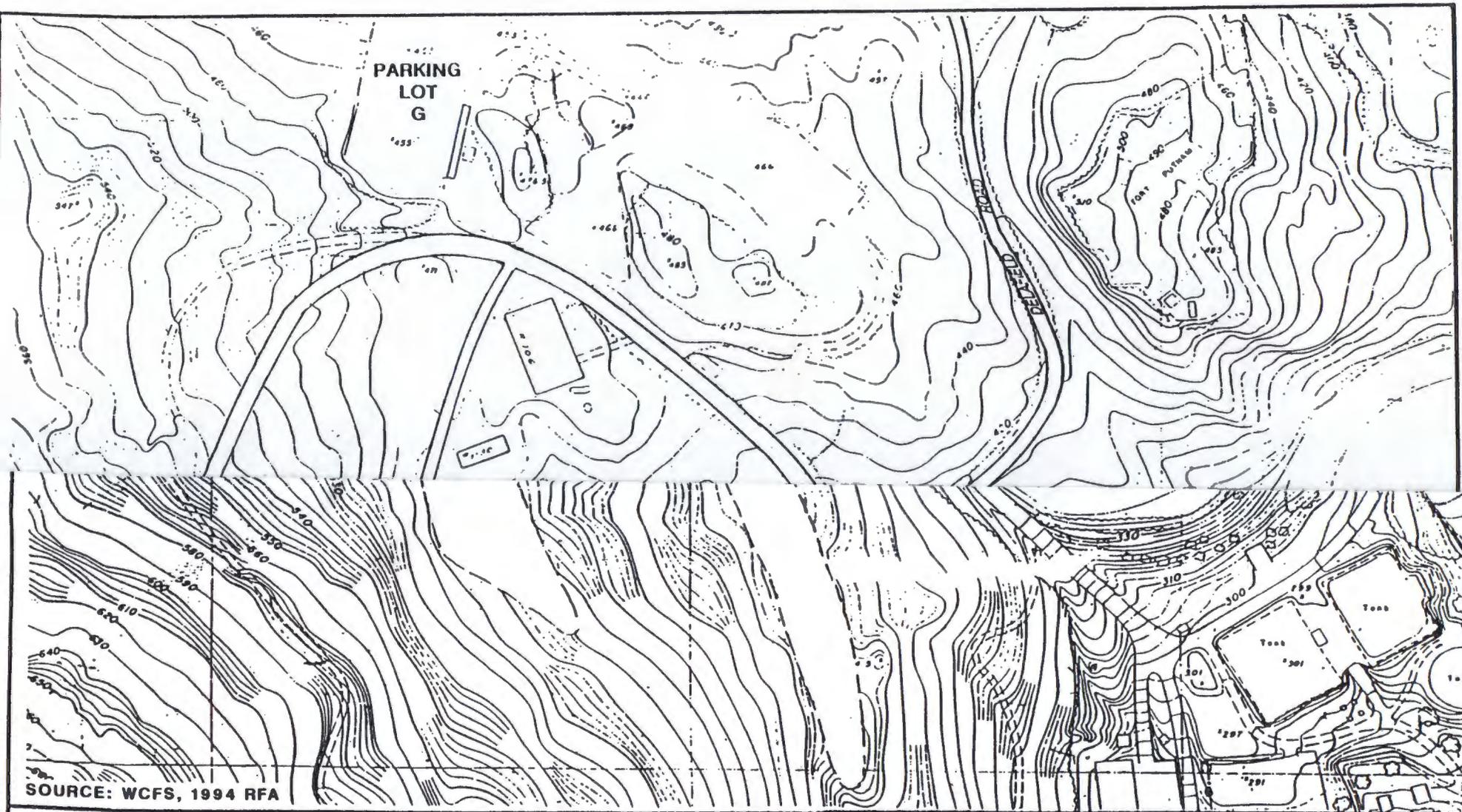
Groundwater samples were collected using disposable polyethylene bailers and submitted to the laboratory for filtered and unfiltered TAL metal analyses. The filtered

groundwater samples were filtered in the field using a 10 um filter apparatus, except during the second round quarterly sampling. During this round, samples were inadvertently filtered with a 1.0 um filter instead of the 10 um filter size specified in the approved Phase II Work Plan Addendum. This change was brought to the attention of the NYSDEC prior to analysis of the samples and the decision was made to analyze filtered and unfiltered aliquots as sampled.

2.1.5 Groundwater Seep Sampling

Groundwater seep samples were collected from locations downgradient from the PX Landfill (Figure 2-4), in lieu of being able to install monitoring wells downgradient from the PX Landfill and collect groundwater samples from these wells. Unfiltered seep samples were collected directly into the sample container and were analyzed for TAL metals.

During the first round quarterly sampling, groundwater seeps were not present in the PX area. A water sample was collected from a culvert located adjacent to the PXMW-02 monitoring well in lieu of the seep samples. During the second round quarterly sampling, one groundwater seep (PXSP-02) was found and sampled. On the third and fourth quarterly sampling, the groundwater seep PXSP-02 was again found and sampled. No other seeps were observed in the PX area in the last three sampling rounds.



SOURCE: WCFS, 1994 RFA



LEGEND

⊕ MONITORING WELL LOCATION

MAP SOURCE:
 FIGURE ENTITLED PARKING AREAS WEST OF MICHIE STADIUM; OFFICE OF THE ENGINEER, USMA; PLAN NO. 3-649; JUNE 5, 1969.

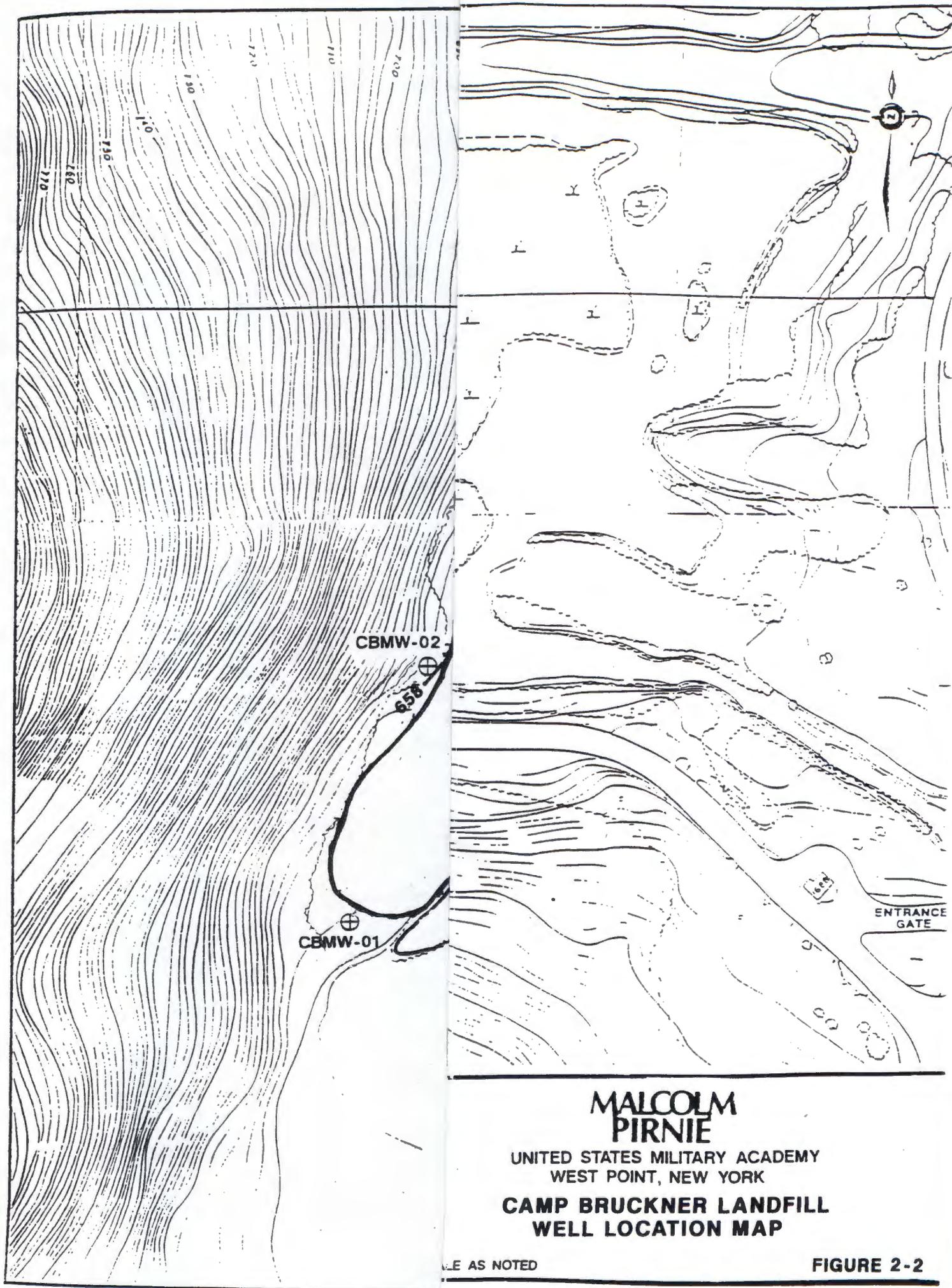


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 MICHIE STADIUM PARKING LOT LANDFILLS
 WELL LOCATION MAP**

SCALE AS NOTED

FIGURE 2-1



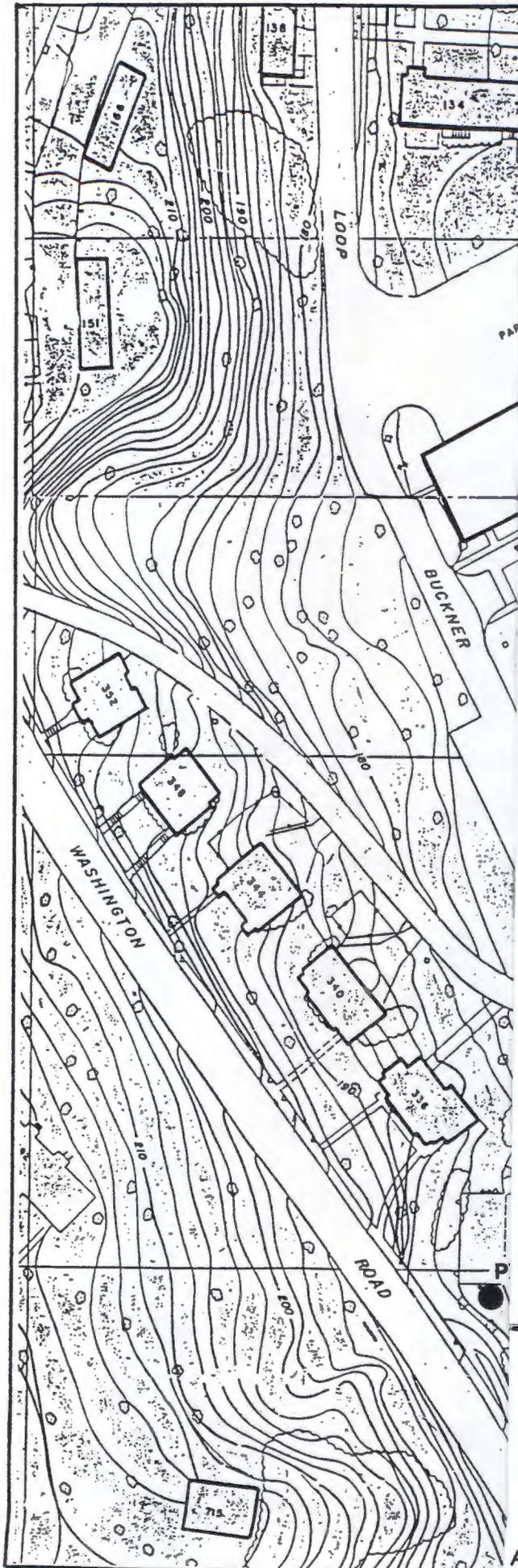
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UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK

**CAMP BRUCKNER LANDFILL
WELL LOCATION MAP**

SCALE AS NOTED

FIGURE 2-2



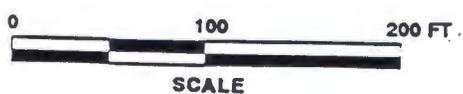
LEGEND:

-  MONITORING WELL
-  SOIL BORING LOCATION
(ATTEMPTED MONITORING WELL LOCATION)

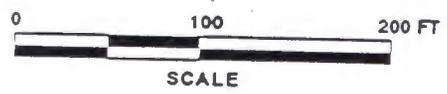
NOTES:

1. LOCATIONS OF MONITORING WELLS WERE SURVEYED BY J. W. DELANO SURVEYORS, WHITE PLAINS, N.Y. ON TO THE WEST POINT TOPOGRAPHIC GRID SYSTEM.
2. PX LANDFILL AREA INCLUDES THE PARKING LOT, PX SERVICE STATION, AND POST EXCHANGE.

SOURCE: WCFS, 1994 RFA



MAP SOURCE:
TOPOGRAPHIC SURVEY MAPS BY DESIGN AND PLANNING ASSOCIATES AND AERIAL MAPPING SERVICES, INC., MIDDLETOWN, NY; SHEETS E-25 AND F-25; JANUARY, 1976.



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**PX LANDFILL
WELL LOCATION MAP**

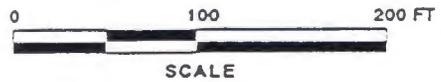
AS NOTED

FIGURE 2-3



LEGEND:

PXSP-02 SEEP SAMPLE LOCATION MAP



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WEST POINT, NEW YORK
SEEP SAMPLE LOCATION MAP
PX LANDFILL**

AS NOTED

FIGURE 2-4

3.0 RESULTS

3.1 Groundwater Analytical Results

The groundwater samples that were analyzed for filtered and unfiltered TAL metals in accordance with the Phase II Work Plan Addendum Scope of Work, were compared to the New York State Department of Environmental Conservation Water Quality Regulations Surface Water and Groundwater Classifications and Standards (water quality standards) New York State Codes, Rules and Regulations, Title 6, Chapter X parts 700-705, water class GA. Water class GA is for fresh groundwater.

Metal constituents that exceeded water quality standards for the one round of groundwater sampling at the Michie Stadium Parking Lots B and E monitoring wells (LBMW-03 and LEMW-01 through LEMW-05) include cadmium, iron, lead, manganese, and sodium (Table 3-1). Cadmium was detected at concentrations above the class GA water quality standard at 33.5 ug/l in LBMW-03 (filtered) and 460 ug/l (unfiltered). Cadmium was also detected slightly above the standard in the filtered and unfiltered samples collected from LEMW-05. Lead was detected above the class GA water quality standard in LBMW-03 and LEMW-04, but only in the unfiltered samples. Non-hazardous constituents iron, manganese, and sodium were detected in most of the Michie Stadium Parking Lots B and E monitoring wells above the class GA water quality standards. The concentrations of these non-hazardous constituents are similar and in the same order of magnitude to those reported by Woodward-Clyde in the 1995 RFA Report and Malcolm Pirnie in the 1997 Final RCRA Facility Investigation (RFI) of Ten Landfills Report.

The analytical results of four rounds of quarterly groundwater sampling at the Camp Buckner Landfill monitoring well CBMW-03, conducted as part of the Phase II Work Plan Addendum Scope of Work, are summarized in Table 3-2. Both filtered and unfiltered samples were collected and analyzed for TAL Metals. Non-hazardous constituents iron and manganese have been detected in CBMW-03 above the class GA water quality standard in

both filtered and unfiltered samples in the four rounds of sampling. Chromium and lead have only been detected in the February 12, 1999 unfiltered groundwater sample from CBMW-03 above the water quality standards. The concentrations of these two constituents are lower than the concentrations detected in 1996.

The analytical results of the four rounds of quarterly sampling at the PX Landfill monitoring wells (PXMW-01, PXMW-02, PXMW-03, and PXMW-04) are summarized in Tables 3-3 to 3-6. A filtered groundwater sample from the background monitoring well at the PX Landfill (PXMW-01) was not collected on the third (May 1999) and fourth (August 1999) round of sampling due to insufficient sample volume. For all the other PX Landfill monitoring wells, filtered and unfiltered samples were collected during the four quarterly sampling events. All groundwater samples were analyzed for TAL Metals. The following metals have been detected in the PX Landfill monitoring wells above the NYSDEC class GA water quality standards: arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, selenium, and sodium. The concentrations of most of these detected constituents have decreased compared to the 1997 RFI of Ten Landfills Report data. Most of the observed exceedances above the class GA water quality standards have been detected in the unfiltered groundwater samples. Selenium was detected above the class GA water quality standard of 10 ug/l in the filtered and unfiltered samples collected from PXMW-03 during the four quarterly sampling rounds.

3.2 Groundwater Seep Analytical Results

During the first round of quarterly sampling, none of the groundwater seeps (Figure 2-4) at the PX area could be found. A water sample was collected from a culvert located adjacent to PXMW-02 monitoring well in lieu of the seep samples. Only the groundwater seep PXSP-02 was found and sampled during the second, third, and fourth rounds of quarterly sampling. The analytical results for the unfiltered water sample from the culvert and the PXSP-02 samples are summarized in Table 3-7. The non-hazardous constituents iron, manganese, and sodium were detected above the NYSDEC class GA water quality

standards. Lead was detected in PXSP-02 (67.9 ug/l) above the class GA water quality standard of 25 ug/l.

TABLE 3-1
United States Military Academy West Point
Ten Landfills Phase II RFI
Michie Stadium Parking Lot B and Lot E Landfills
Metals Groundwater Results for LBMW-03 and LEMW-01 through LEMW-05

Sample Location Location ID Date Collected Units	NYSDEC* Water Quality Regulations	Michie Stadium Parking Lot Landfills					
		LBMW-03-F 11/11/1998 ug/l	LBMW-03-NF 11/11/1998 ug/l	LEMW-01-F 11/11/1998 ug/l	LEMW-01-NF 11/11/1998 ug/l	LEMW-02-F 11/11/1998 ug/l	LEMW-02-NF 11/11/1998 ug/l
Aluminum	N/A	472	8160	< 200	236	341	541
Antimony	3	< 5	< 5	< 5	< 5	< 5	< 5
Arsenic	25	< 5	16.3	< 5	< 5	< 5	< 5
Barium	1000	< 200	< 200	< 200	< 200	< 200	< 200
Beryllium	N/A	< 5	< 5	< 5	< 5	< 5	< 5
Cadmium	5	33.5	460	< 4	< 4	4.5	4.6
Calcium		25200	118000	62300	60000	7600	7630
Chromium	50	< 10	22.5	< 10	< 10	< 10	< 10
Cobalt	N/A	< 50	< 50	< 50	< 50	< 50	< 50
Copper	200	< 25	50.7	< 25	< 25	< 25	< 25
Iron	300	11900	96900	53800	53800	1450	2110
Lead	25	8.5	114	7.5	< 3	3.8	3.2
Magnesium	N/A	< 5000	52800	11900	11500	< 5000	< 5000
Manganese	300	665	1630	1640	1580	90.2	101
Mercury	0.7	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Nickel	100	< 40	50.3	< 40	< 40	< 40	< 40
Potassium		< 5000	< 5000	< 5000	< 5000	< 5000	< 5000
Selenium	10	< 5	< 5	< 5	< 5	< 5	< 5
Silver	50	< 10	< 10	< 10	< 10	< 10	< 10
Sodium	20000	133000	140000	158000	153000	61500	62800
Thallium	N/A	< 5	< 5	< 5	< 5	< 5	< 5
Vanadium	N/A	< 50	< 50	< 50	< 50	< 50	< 50
Zinc	N/A	99.1	1310	< 20	25.9	43.8	< 20

* = NYSDEC Water Quality Standards for class GA Waters

"-F" suffix on Location ID denotes filtered sample.

"-NF" suffix on Location ID denotes non-filtered sample.

Exceedances of the water quality standards are bolded and underlined.

TABLE 3-1 (CONTINUED)
United States Military Academy West Point
Ten Landfills Phase II RFI
Michie Stadium Parking Lot B and Lot E Landfills
Metals Groundwater Results for LBMW-03 and LEMW-01 through LEMW-05

Sample Location Location ID Date Collected Units	NYSDEC* Water Quality Regulations	Michie Stadium Parking Lot Landfills					
		LEMW-03-F 02/11/1999 ug/l	LEMW-03-NF 02/11/1999 ug/l	LEMW-04-F 11/11/1998 ug/l	LEMW-04-NF 11/11/1998 ug/l	LEMW-05-F 11/11/1998 ug/l	LEMW-05-NF 11/11/1998 ug/l
Aluminum	N/A	2000 J	8040	1850	6780	1050	1340
Antimony	3	< 5	< 5	< 5	< 5	< 5	< 5
Arsenic	25	< 5	6.3	< 5	< 5	< 5	< 5
Barium	1000	< 200	< 200	297	393	< 200	< 200
Beryllium	N/A	< 5	< 5	< 5	< 5	< 5	< 5
Cadmium	5	< 4	< 4	< 4	< 4	5.8	5.6
Calcium		25200	25000	124000	124000	25700	25000
Chromium	50	< 10	18.5	< 10	15	< 10	< 10
Cobalt	N/A	< 50	< 50	< 50	< 50	50.2	< 50
Copper	200	< 25	26.4	< 25	< 25	< 25	< 25
Iron	300	20900	27500	58900	97200	20100	20400
Lead	25	< 3	8.8	8.7	46.9	11.2	7.1
Magnesium	N/A	6270	7500	31900	31700	5670	5620
Manganese	300	270	377 J	1220	1340	1180	1140
Mercury	0.7	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Nickel	100	< 40	< 40	< 40	< 40	< 40	< 40
Potassium		< 5000	5520 J	28900	29600	< 5000	< 5000
Selenium	10	< 5	< 5	< 5	< 5	< 5	< 5
Silver	50	< 10	< 10	< 10	< 10	< 10	< 10
Sodium	20000	41800	42500 J	176000	171000	122000	119000
Thallium	N/A	< 5	< 5	< 5	< 5	< 5	< 5
Vanadium	N/A	< 50	< 50	< 50	< 50	< 50	< 50
Zinc	N/A	78.6	185	29.4	105	40.1	42.5

Note:

J - Estimated value. See Appendix C for additional notes.

* = NYSDEC Water Quality Standards for class GA Waters

"-F" suffix on Location ID denotes filtered sample.

"-NF" suffix on Location ID denotes non-filtered sample.

Exceedances of the water quality standards are bolded and underlined.

TABLE 3-2
United States Military Academy West Point
Ten Landfills Phase II RFI
Camp Buckner Landfill
Metals Groundwater Results for CBMW-03

Sample Location Location ID Date Collected Units	NYSDEC* Water Quality Regulations	Camp Buckner Landfill								
		CBMW-03 8/5/1996** ug/l	CBMW-03-F 11/09/1998 ug/l	CBMW-03-F 02/12/1999 ug/l	CBMW-03-F 05/12/1999 ug/l	CBMW-03-F 08/18/1999 ug/l	CBMW-03-NF 11/09/1998 ug/l	CBMW-03-NF 02/12/1999 ug/l	CBMW-03-NF 05/12/1999 ug/l	CBMW-03-NF 08/18/1999 ug/l
Aluminum	N/A	74,300	819	2320 J	2350	10600	6740	54200	17100	9320
Antimony	3	< 60	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Arsenic	25	46	< 5	< 5	< 5	< 5	< 5	23.2	5.1	< 5
Barium	1000	448	< 200	< 200	< 200	242	< 200	418	214	274
Beryllium	N/A	4	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Cadmium	5	< 5	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Calcium		156,000	91300	85600	80200	98700	87400	95700	89100	126000
Chromium	50	101	< 10	< 10	< 10	14.4	< 10	64	24.4	12.4
Cobalt	N/A	73	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Copper	200	183	< 25	< 25	< 25	< 25	< 25	90.5	38.3	< 25
Iron	300	170,000	2990 J	4490	4350	27200	15500 J	88700	38600	24400
Lead	25	212	< 3	< 3	< 3	11.6	4.6	35.8	14.8 J	9.7
Magnesium	N/A	56,000	14800	14300	13900	19000	16300	34200	21800	18900
Manganese	300	4,340	635	652	537	1490	762	2210 J	1320	2050
Mercury	0.7	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.4
Nickel	100	151	< 40	< 40	< 40	< 40	< 40	74.9	< 40	< 40
Potassium		8,260	< 5000	< 5000	< 5000	< 5000	< 5000	9640 J	< 5000	< 5000
Selenium	10	< 25	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Silver	50	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Sodium	20000	4,740	5210	5180	5470	5320 J	5010	6620 J	5470	5220 J
Thallium	N/A	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Vanadium	N/A	110	< 50	< 50	< 50	< 50	< 50	84	< 50	< 50
Zinc	N/A	500	71.3	< 20	23.7	70.9	31.9	235	88.4	66

Notes:

** Taken from Malcolm Pirnie 1997 Final RFI of Ten Landfills report (for comparison purposes).

J - Estimated value. See Appendix C for additional notes.

* = NYSDEC Water Quality Standards for class GA Waters

"-F" suffix on Location ID denotes filtered sample.

"-NF" suffix on Location ID denotes non-filtered sample.

Exceedances of the water quality standards are bolded and underlined.

TABLE 3-3
 United States Military Academy West Point
 Ten Landfills Phase II RFI
 PX Landfill
 Metals Groundwater Results for PXMW-01

Sample Location Location ID Date Collected Units	NYSDEC* Water Quality Regulations	PX Landfill								
		PXMW-01 8/5/1996** ug/l	PXMW-01-F 11/10/1998 ug/l	PXMW-01-F 02/11/1999 ug/l	PXMW-01-F 05/13/1999 ug/l	PXMW-01-F 08/18/1999 ug/l	PXMW-01-NF 11/10/1998 ug/l	PXMW-01-NF 02/11/1999 ug/l	PXMW-01-NF ¹ 05/13/1999 ug/l	PXMW-01-NF 08/18/1999 ug/l
Aluminum	N/A	160,000	464	5990 J	NS	NS	761	50100	15100	28000
Antimony	3	51	< 5	< 5	NS	NS	< 5	< 5	< 5	< 5
Arsenic	25	52	5.1	6.1	NS	NS	< 5	32.5	14.8	32.1
Barium	1000	734	< 200	< 200	NS	NS	< 200	473	< 200	336
Beryllium	N/A	16	< 5	< 5	NS	NS	< 5	5.5	< 5	< 5
Cadmium	5	19	< 4	< 4	NS	NS	< 4	8.6	5.2	6.7
Calcium		109,000	18000	21900	NS	NS	18000	49000	37300	45500
Chromium	50	213	< 10	< 10	NS	NS	< 10	53.7	20	51
Cobalt	N/A	106	< 50	< 50	NS	NS	< 50	< 50	< 50	< 50
Copper	200	840	47.9	62.2	NS	NS	46.1	337	166	406
Iron	300	217,000	3190 J	10900	NS	NS	3860 J	81000	29600	53700
Lead	25	1,510	11.1	35.6	NS	NS	14.1	304	112 J	192
Magnesium	N/A	50,700	< 5000	5100	NS	NS	< 5000	15600	9030	12700
Manganese	300	1,860	78	152	NS	NS	82.5	593 J	309	521
Mercury	0.7	6	< 0.2	< 0.2	NS	NS	< 0.2	1.2	0.38	0.85
Nickel	100	224	< 40	< 40	NS	NS	< 40	58.6	< 40	54.3
Potassium		22,700	21100 J	12000	NS	NS	21600 J	15400 J	11400	18600
Selenium	10	< 25	< 5	< 5	NS	NS	< 5	8.9	9.9	17.8
Silver	50	< 10	< 10	< 10	NS	NS	< 10	< 10	< 10	< 10
Sodium	20000	34,200	62200	54100	NS	NS	63900	51600 J	46800	35800 J
Thallium	N/A	< 10	< 5	< 5	NS	NS	< 5	< 5	< 5	< 5
Vanadium	N/A	220	< 50	< 50	NS	NS	< 50	96.4	< 50	89.7
Zinc	N/A	3,620	55	190	NS	NS	59.8	1250	641	1290

Notes:

** Taken from Malcolm Pirnie 1997 Final RFI of Ten Landfills report (for comparison purposes).

NS = Sample was not collected due to insufficient sample volume.

J - Estimated value. See Appendix C for additional notes.

* = NYSDEC Water Quality Standards for class GA Waters

"-F" suffix on Location ID denotes filtered sample.

"-NF" suffix on Location ID denotes non-filtered sample.

Exceedances of the water quality standards are bolded and underlined.

TABLE 3-4
 United States Military Academy West Point
 Ten Landfills Phase II RFI
 PX Landfill
 Metals Groundwater Results for PXMW-02

Sample Location Location ID Date Collected Units	NYSDEC* Water Quality Regulations	PX Landfill								
		PXMW-02 8/5/1996** ug/l	PXMW-02-F 11/11/1998 ug/l	PXMW-02-F 02/11/1999 ug/l	PXMW-02-F 05/12/1999 ug/l	PXMW-02-F 08/18/1999 ug/l	PXMW-02-NF 11/10/1998 ug/l	PXMW-02-NF 02/11/1999 ug/l	PXMW-02-NF 05/12/1999 ug/l	PXMW-02-NF 08/18/1999 ug/l
Aluminum	N/A	13,300	4420	1120 J	1560	988	20300	17500	3590	2200
Antimony	3	< 60	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Arsenic	25	25	10.5	< 5	< 5	< 5	22.2	14.2	< 5	< 5
Barium	1000	118	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200
Beryllium	N/A	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Cadmium	5	9.1	7.6	< 4	< 4	< 4	29.7	9.9	< 4	< 4
Calcium		85,900	83600	76700	89400	80700	87800	78500	91400	77500
Chromium	50	14	< 10	< 10	< 10	< 10	21.3	16.1	< 10	< 10
Cobalt	N/A	17	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Copper	200	37	< 25	< 25	< 25	< 25	42.1	35.3	< 25	< 25
Iron	300	24,700	5250 J	1600	2290	1300	28900 J	20900	5890	3600
Lead	25	48	13.5	< 3	8.6 J	5.8	46	28	9.8 J	8.6
Magnesium	N/A	22,800	20400	18500	22800	19200	24200	21100	23600	18700
Manganese	300	605	111	40.4	58.3	34.3	641	597 J	206	136
Mercury	0.7	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Nickel	100	23	< 40	< 40	< 40	< 40	< 40	< 40	< 40	< 40
Potassium		10,500	9450 J	8410	9720	8580	12600 J	11900 J	10300	8550
Selenium	10	3.0	5.6	7.2	6	< 5	8.7	5.1	7.1	5.4
Silver	50	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Sodium	20000	139,000	163000	118000	133000	145000 J	162000	124000 J	136000	138000 J
Thallium	N/A	< 50	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Vanadium	N/A	21	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Zinc	N/A	552	93.7	< 20	36.5	36.6	299	149	50.3	30.4

Notes:

** Taken from Malcolm Pirnie 1997 Final RFI of Ten Landfills report (for comparison purposes).

J - Estimated value. See Appendix C for additional notes.

* = NYSDEC Water Quality Standards for class GA Waters

"-F" suffix on Location ID denotes filtered sample.

"-NF" suffix on Location ID denotes non-filtered sample.

Exceedances of the water quality standards are bolded and underlined.

TABLE 3-5
 United States Military Academy West Point
 Ten Landfills Phase II RFI
 PX Landfill
 Metals Groundwater Results for PXMW-03

Sample Location Location ID Date Collected Units	NYSDEC* Water Quality Regulations	PX Landfill								
		PXMW-03 8/5/1996** ug/l	PXMW-03-F 11/10/1998 ug/l	PXMW-03-F 02/11/1999 ug/l	PXMW-03-F 05/12/1999 ug/l	PXMW-03-F 08/18/1999 ug/l	PXMW-03-NF 11/10/1998 ug/l	PXMW-03-NF 02/11/1999 ug/l	PXMW-03-NF 05/12/1999 ug/l	PXMW-03-NF 08/18/1999 ug/l
Aluminum	N/A	2,730	914	704 J	2600	1370	< 200	4460	16300	4100
Antimony	3	< 60	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Arsenic	25	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Barium	1000	37	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200
Beryllium	N/A	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Cadmium	5	< 5	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Calcium		258,000	195000	203000	196000	234000	187000	189000	204000	230000
Chromium	50	5	< 10	< 10	< 10	< 10	< 10	< 10	39	< 10
Cobalt	N/A	5	< 50	< 50	< 50	< 50	< 50	< 50	< 50	< 50
Copper	200	14	< 25	< 25	< 25	< 25	< 25	< 25	37.5	< 25
Iron	300	<u>5,990</u>	<u>1310 J</u>	<u>1240</u>	<u>4540</u>	<u>2430</u>	269 J	<u>6100</u>	<u>32200</u>	<u>7640</u>
Lead	25	< 10	3.2	< 3	5.2 J	7.9	< 3	< 3	11.7 J	10.9
Magnesium	N/A	83,500	65000	63400	65200	68400	59500	62200	73200	68700
Manganese	300	<u>65</u>	17.4	16.6	45.3	29.5	< 15	59.6 J	287	103
Mercury	0.7	<u>1.5</u>	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Nickel	100	<u>8</u>	< 40	< 40	< 40	< 40	< 40	< 40	< 40	< 40
Potassium		5,570	5330	5630	6140	6320	5030	6720 J	9970	6890
Selenium	10	< 25	<u>16.4</u>	<u>16.1</u>	<u>18.6</u>	<u>18.5</u>	<u>14.4</u>	<u>14</u>	<u>18.2</u>	<u>16.8</u>
Silver	50	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Sodium	20000	<u>329,000</u>	<u>535000</u>	<u>488000</u>	<u>388000</u>	<u>383000 J</u>	<u>521000</u>	<u>572000 J</u>	<u>395000</u>	<u>374000 J</u>
Thallium	N/A	< 50	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Vanadium	N/A	10	< 50	< 50	< 50	< 50	< 50	< 50	52.2	< 50
Zinc	N/A	61	45	< 20	21	154	< 20	22.2	78.9	46.8

Notes:

** Taken from Malcolm Pirnie 1997 Final RFI of Ten Landfills report (for comparison purposes).

J - Estimated value. See Appendix C for additional notes.

* = NYSDEC Water Quality Standards for class GA Waters

"-F" suffix on Location ID denotes filtered sample.

"-NF" suffix on Location ID denotes non-filtered sample.

Exceedances of the water quality standards are bolded and underlined.

TABLE 3-6
 United States Military Academy West Point
 Ten Landfills Phase II RFI
 PX Landfill
 Metals Groundwater Results for PXMW-04

Sample Location Location ID Date Collected Units	NYSDEC* Water Quality Regulations	PX Landfill								
		PXMW-04 8/5/1996** ug/l	PXMW-04-F 11/10/1998 ug/l	PXMW-04-F 02/11/1999 ug/l	PXMW-04-F 05/12/1999 ug/l	PXMW-04-F 08/18/1999 ug/l	PXMW-04-NF 11/10/1998 ug/l	PXMW-04-NF 02/11/1999 ug/l	PXMW-04-NF 05/12/1999 ug/l	PXMW-04-NF 08/18/1999 ug/l
Aluminum	N/A	49,900	7110	2350 J	4700	4510	2800	51000	26600	28100
Antimony	3	38	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Arsenic	25	2	< 5	< 5	< 5	< 5	< 5	17	< 5	< 5
Barium	1000	405	< 200	< 200	< 200	< 200	< 200	404	248	409
Beryllium	N/A	3	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Cadmium	5	4	< 4	< 4	< 4	< 4	< 4	< 4	< 4	< 4
Calcium		93,600	71900	74300	70400	69500	69800	79100	77300	79700
Chromium	50	101	11.5	< 10	< 10	< 10	< 10	87.5	53.8	52.7
Cobalt	N/A	61	< 50	< 50	< 50	< 50	< 50	50.2	< 50	< 50
Copper	200	172	< 25	< 25	< 25	< 25	< 25	160	102	108
Iron	300	110,000	11800 J	5080	9290	9660	5160 J	97100	60800	61700
Lead	25	160	7.3	< 3	6.1 J	7.8	< 3	30.4	20.5 J	34.8
Magnesium	N/A	48,300	22200	21400	23300	20300	20600	39600	34900	31000
Manganese	300	1,770	171	73.9	134	138	75.5	1470 J	960	1220
Mercury	0.7	< 0.5	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Nickel	100	74	< 40	< 40	< 40	< 40	< 40	62.2	40.3	43.3
Potassium		18,800	< 5000	< 5000	< 5000	< 5000	< 5000	15200 J	10900	9990
Selenium	10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	7.2	< 5
Silver	50	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Sodium	20000	171,000	240000	225000	224000	206000 J	236000	210000 J	192000	206000 J
Thallium	N/A	< 10	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Vanadium	N/A	144	< 50	< 50	< 50	< 50	< 50	138	83.5	81.8
Zinc	N/A	307	41.9	20.1	29.5	36.5	< 20	194	126	172

Notes:

** Taken from Malcolm Pirnie 1997 Final RFI of Ten Landfills report (for comparison purposes).

J - Estimated value. See Appendix C for additional notes.

* = NYSDEC Water Quality Standards for class GA Waters

"-F" suffix on Location ID denotes filtered sample.

"-NF" suffix on Location ID denotes non-filtered sample.

Exceedances of the water quality standards are bolded and underlined.

TABLE 3-7
United States Military Academy West Point
Ten Landfills Phase II RFI
PX Landfill

Metals Groundwater Seep Results for PXSP-02 and PXCulvert

Sample Location Location ID Date Collected Units	NYSDEC* Water Quality Regulations	PX Seep			
		PXCulvert - NF 11/10/1998 ug/l	PXSP-02 - NF 02/11/1999 ug/l	PXSP-02 - NF 05/12/1999 ug/l	PXSP-02 - NF 08/18/1999 ug/l
Aluminum	N/A	204	< 200	1940	< 200
Antimony	3	< 5	< 5	< 5	< 5
Arsenic	25	< 5	< 5	< 5	< 5
Barium	1000	< 200	< 200	< 200	< 200
Beryllium	N/A	< 5	< 5	< 5	< 5
Cadmium	5	< 4	< 4	< 4	< 4
Calcium		14800	92000	80100	70300
Chromium	50	< 10	< 10	< 10	< 10
Cobalt	N/A	< 50	< 50	< 50	< 50
Copper	200	< 25	< 25	28.3	< 25
Iron	300	217 J	109	3600	233
Lead	25	< 3	3.2	67.9 J	7.5
Magnesium	N/A	< 5000	22200	21100	17400
Manganese	300	< 15	18 J	683	40.4
Mercury	0.7	< 0.2	< 0.2	< 0.2	< 0.2
Nickel	100	< 40	< 40	< 40	< 40
Potassium		< 5000	5430 J	< 5000	< 5000
Selenium	10	< 5	< 5	< 5	< 5
Silver	50	< 10	< 10	< 10	< 10
Sodium	20000	36300	506000 J	237000	162000 J
Thallium	N/A	< 5	< 5	< 5	< 5
Vanadium	N/A	< 50	< 50	< 50	< 50
Zinc	N/A	< 20	59.4	248	46.1

Note:

J - Estimated value. See Appendix C for additional notes.

* = NYSDEC Water Quality Standards for class GA Waters

"-F" suffix on Location ID denotes filtered sample.

"-NF" suffix on Location ID denotes non-filtered sample.

4.0 QUALITY ASSURANCE/QUALITY CONTROL

4.1 Data Quality Objectives

The data quality objectives (DQOs) that were determined for the Phase II Work Plan Addendum have been achieved. The DQOs were developed to support a certain level of data quality useful to the investigation. The data quality level that was determined for the objectives of this report are stated below.

The groundwater and groundwater seep samples submitted for laboratory analyses were of Level III data quality. A Level III data quality is defined as follows:

Level III - Analyses performed in an off-site laboratory using standard documented procedures. Level III analyses may or may not use contract laboratory procedures (CLP); but, although QA/QC may be rigorous, Level III analyses do not usually use the validation or documentation procedures required of Level IV CLP analysis.

4.2 Quality Assurance/Quality Control Parameters

To ensure that the DQOs have been met, the quality assurance and quality control parameters of precision, accuracy, comparability, completeness, representativeness, and sensitivity were utilized in the interpretation of the analytic samples collected.

4.3 Data Validation

All analytical samples were validated in accordance with the Level III requirements. The data was reviewed for contractual and technical compliance. Qualifications were applied following the intent of the National Functional Guidelines with Region II modifications. Samples were qualified based on the following guidelines:

1. Sample Integrity
2. Holding Time
3. Initial and Continuing Calibration
4. Blank Contamination
5. Interference Check Samples (ICS)
6. Matrix Spike
7. Laboratory Duplicate
8. Laboratory Control Sample
9. ICP Serial Dilution

Details of the validation are included in Attachment C.

4.4 Data Usability

The results of the data validation have shown that the DQO's and the quality assurance and quality control parameters have been met. The data is therefore considered to be valid and usable for this investigation.

4.5 Sample Handling/Shipping and Chain-of-Custody

The sample handling and sample custody procedures described in the Phase II Work Plan Addendum were followed during all sampling events. These procedures are similarly described in the RFA Work Plan and CDAP and are summarized in Table 3-1 of the Phase II Work Plan Addendum. After each sample was collected and appropriately identified, entries were made on the chain-of-custody form which included: sampler names and signatures, sampling station identification, date, time, type of sample and the required analysis.

The sample containers were placed into coolers with ice packs to keep the samples cold (4°C). Packing materials were placed in the coolers and around the containers to prevent the sample containers from moving and breaking.

The samples were either transported to the laboratory under custody of sampling personnel or turned over to laboratory personnel. The sampler signed and dated the "relinquished by" blank space on the chain-of-custody form. The laboratory personnel who assumed custody of the samples signed and dated the next "received by" blank on the chain-of-custody form.

The holding time of a sample is defined as the maximum allowable time between sample collection and analysis and/or extraction, based on the analyte of interest, stability factors, preservatives (if any) and sample matrix. Holding times are specified in the USEPA SW-846 methods and in USACE and NYSDEC guidance documents. All samples were received in the laboratory within the required holding time.

4.6 Decontamination

Dedicated disposable polyethylene bailers were used in purging and collecting samples from the monitoring wells. The groundwater seep samples were collected directly into the sample containers. The filter apparatus was decontaminated before entering the sample location, between each use, and before leaving the site, following the protocol outlined in section 3.4 of the Phase II Work Plan Addendum.

5.0 FINDINGS AND RECOMMENDATIONS

5.1 Michie Stadium Parking Lot B and Lot E Landfills

One round of groundwater samples for filtered and unfiltered metals from monitoring well LBMW-03 located downgradient of Michie Lot B was requested by the NYSDEC in its February 17, 1998 letter to get more accurate groundwater data. Cadmium was detected in LBMW-03 above the class GA water quality standard in the unfiltered and filtered samples. Lead was detected above the water quality standard only in the unfiltered sample.

These constituents were either not detected or detected at concentrations below the water quality standards as reported in the 1997 Final RFI of Ten Landfills Report. The June 1995 RFA of Ten Landfills Report showed that metals were not sampled from well LBMW-03. Based on these findings, one round of groundwater sampling from well LBMW-03 for filtered and unfiltered metals is recommended for Michie Parking Lot B Landfill to confirm the presence of these constituents.

One round of groundwater samples for filtered and unfiltered metals from monitoring wells LEMW-01 to LEMW-05 located on Michie Lot E was requested by the NYSDEC in its February 17, 1998 letter to get more accurate groundwater data. Cadmium was detected slightly above the class GA water quality standard of 5 ug/l in LEMW-05 at 5.8 ug/l (filtered) and 5.6 ug/l (unfiltered). Lead was detected above the water quality standard (25 ug/l) in LEMW-04 (46.9 ug/l, but only in the unfiltered sample). No hazardous constituents were detected above the class GA water quality standards in LEMW-01, LEMW-02, and LEMW-03. No further action is recommended for the Michie Stadium Parking Lot E Landfill because the exceedance for cadmium was only slightly above the water quality standard and lead was detected above the standard in just one unfiltered sample out of the ten samples collected (five filtered and five unfiltered). In addition, cadmium was not detected and lead was detected below the water quality standard in LEMW-01 to LEMW-05, as reported in the 1997 Final RFI of Ten Landfills Report. The June 1995 RFA of Ten Landfills Report showed that lead was detected below the class GA water quality standard in LEMW-02 and LEMW-04.

5.2 Camp Buckner Landfill

Four rounds of quarterly groundwater sampling was conducted on well CBMW-03 in accordance with the Phase II Work Plan Addendum Scope of Work. The NYSDEC, in its February 17, 1998 letter, had requested that filtered and unfiltered groundwater samples be collected from well CBMW-03 because of the high turbidity of the well water. Chromium and lead have been detected in CBMW-03 above the class GA water quality standards in the unfiltered samples only once during the four rounds of quarterly groundwater sampling. These constituents were either not detected or had concentrations below the water quality standards in the unfiltered samples in the other three rounds. These constituents were detected above the standards in the 1996 sampling. However, the concentrations have decreased. Chromium and lead were also either not detected or detected below the water quality standards in the filtered samples in all four rounds of quarterly groundwater sampling. No further action is recommended for the Camp Buckner Landfill because these results indicate that in all the samples, except one unfiltered sample, chromium and lead were either not detected or had concentrations below the class GA water quality standards.

5.3 PX Landfill

Four rounds of quarterly groundwater sampling were conducted on wells PXMW-01, PXMW-02, PXMW-03, and PXMW-04 in accordance with the Phase II Work Plan Addendum Scope of Work. The NYSDEC, in its February 17, 1998 letter, had requested that filtered and unfiltered groundwater samples be collected from these wells because it appears that the high levels of turbidity may have affected the concentrations of constituents reported in the 1997 Final RFI of Ten Landfills Report. The analytical results of the four rounds of quarterly sampling have shown that most of the exceedances above the class GA water quality standards have been detected in the unfiltered samples. Most of the filtered samples have constituent concentrations that were either not detected or detected below the class GA water quality standards. The unfiltered groundwater samples generally had high levels of turbidity. It is likely that the elevated concentrations of the unfiltered samples may

be attributed to metals adsorbed onto suspended particulates. The exceedances for arsenic, cadmium, chromium, lead, and mercury mentioned in the NYSDEC's February 17, 1998 letter and detected mostly in upgradient well PXMW-01, had been reduced to a one-time exceedance of lead (PXMW-01) and cadmium (PXMW-02) water quality standards, in the filtered samples in the four sampling rounds. The other constituents of concern cited in the February 17, 1998 NYSDEC letter were mostly either not detected or detected below the water quality standards in the filtered samples collected from the four PX Landfill wells during the four sampling rounds. In addition, the concentrations of these constituents have generally dropped below the concentrations reported in the 1997 Final RFI of Ten Landfills Report. This reduction in constituent concentrations was observed in the four PX Landfill wells not only in the filtered samples but also in the unfiltered samples as well during the four sampling rounds. Selenium was detected above the class GA water quality standard only in PXMW-03. The non-hazardous constituents iron, manganese, and sodium were detected in the unfiltered groundwater seep samples collected from PXSP-02 (located directly downgradient of the PX Landfill) during the second, third, and fourth sampling rounds. Lead was detected in the unfiltered groundwater seep samples above the class GA water quality standard only once during the three sampling events. No other potential hazardous metal constituents have been detected in the groundwater seep samples. No further action is being recommended for the PX Landfill because these findings show that the more significant metal concentration exceedances above the class GA water quality standards are pretty much limited to the area of the landfill footprint; moreover, most of these exceedances have been detected in the unfiltered samples. Lastly, the concentrations of the constituents of concern cited in the NYSDEC February 17, 1998 letter were observed to have generally dropped not only in the filtered but also in the unfiltered samples during the four rounds of quarterly sampling.

ATTACHMENT A
SOIL BORING LOGS

ATTACHMENT B
GROUNDWATER SAMPLE COLLECTION LOGS

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 8001216 DATE: 11-11-98
 PROJECT NAME: Dover Municipal Well #4 SAMPLERS: T DEK
 SITE LOCATION: Dover, NJ P RABIDEAU

 SITE CONTACT: Edgo Garcia WEATHER
 CONDITIONS: _____

WELL IDENTIFICATION NUMBER: LBMW-03
 WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 10.69 FEET FROM TOP OF CASING
 WELL DEPTH = 11.08 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = .39 FEET
 WATER IN ONE WELL VOLUME = .25 GALLONS
 PURGE TIME (start/finish) = N/A
 WELL EVACUATION DEVICE: _____
 SAMPLING TIME (start/finish) = 0915/0920
 SAMPLE COLLECTION DEVICE: POLY BAITER
 SAMPLE APPEARANCE: _____

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)					
specific conductivity (umhos/cm)					
redox (eh)					
turbidity (ntu)					
pH (SU)					
dissolved oxygen (mg/l)					
water level					
volume purged (gallons)					

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____
 LABORATORY: _____
 CONTACT: _____

NOTES: Not enough sample volume to collect field parameters

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 0001270 DATE: 11-11-98
 PROJECT NAME: Dover Municipal Well #4 SAMPLERS: Jeff Nelson
 SITE LOCATION: ~~Dover, NJ~~ West Point
 SITE CONTACT: Diego Garcia WEATHER CONDITIONS: _____

WELL IDENTIFICATION NUMBER: LE MW 01
 WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 9.61 FEET FROM TOP OF CASING 4" WELL
 WELL DEPTH = 21.47 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 11.86 FEET
 WATER IN ONE WELL VOLUME = 7.7 GALLONS
 PURGE TIME (start/finish) = 1300/1320
 WELL EVACUATION DEVICE: Bailer
 SAMPLING TIME (start/finish) = 1320
 SAMPLE COLLECTION DEVICE: Poly BAILER
 SAMPLE APPEARANCE: _____

FIELD PARAMETERS	2nd 2 nd	1st 1 st	THIRD	FOURTH	FIFTH
temperature (degrees C)	14.7	14.7	14.5		
specific conductivity (umhos/cm)	1.34	1.28	1.34		
redox (eh)					
turbidity (ntu)	NA	NA	N/A		
pH (SU)	6.18	6.17	6.21		
dissolved oxygen (mg/l)	AND 3.02	2.36	2.70		
water level					
volume purged (gallons)					

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____
 LABORATORY: _____
 CONTACT: _____

NOTES: _____

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 8807210 DATE: 11-11-98
 PROJECT NAME: Dover Municipal Well #4 SAMPLERS: J DEKOSKIE
 SITE LOCATION: Dover, NJ PATRABIDEAN
 WEATHER CONDITIONS: OVERCAST, LT BREEZE

SITE CONTACT: Steve Camp
WELL IDENTIFICATION NUMBER: LEMW-02

WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 18.50 FEET FROM TOP OF CASING
 WELL DEPTH = 29.32 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 10.82 FEET
 WATER IN ONE WELL VOLUME = ~7.1 GALLONS
 PURGE TIME (start/finish) = 10 15 / 10 30
 WELL EVACUATION DEVICE: BAILER
 SAMPLING TIME (start/finish) = 11 00
 SAMPLE COLLECTION DEVICE: Poly BAILER
 SAMPLE APPEARANCE: _____

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	12.7				
specific conductivity (umhos/cm)	274				
redox (eh)					
turbidity (ntu)	∅				
pH (SU)	5.86				
dissolved oxygen (mg/l)	3.85				
water level					
volume purged (gallons)					

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____
 LABORATORY: _____
 CONTACT: _____

NOTES: Dry @ ~7 gal (1 volume)

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: ~~0800~~ DATE: 11-11-98
 PROJECT NAME: Dover Municipal Well #4 SAMPLERS: J DEKOCKIE
 SITE LOCATION: Dover, NJ PAT RABIDEAU

 WEATHER
 CONDITIONS:

WELL IDENTIFICATION NUMBER: LE MW 03

WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 42.41 FEET FROM TOP OF CASING
 WELL DEPTH = 42.80 FEET FROM TOP OF CASING 4' WELL
 HEIGHT OF WATER IN WELL = 0.39 FEET
 WATER IN ONE WELL VOLUME = .25 GALLONS
 PURGE TIME (start/finish) = 11 05
 WELL EVACUATION DEVICE: _____
 SAMPLING TIME (start/finish) = NOT SAMPLED: INSUFFICIENT WATER
 SAMPLE COLLECTION DEVICE: POLY BAKER
 SAMPLE APPEARANCE: _____

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)					
specific conductivity (umhos/cm)					
redox (eh)					
turbidity (ntu)					
pH (SU)					
dissolved oxygen (mg/l)					
water level					
volume purged (gallons)					

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: 0800 11-12-98 92.75 WL
 LABORATORY: _____
 CONTACT: _____

NOTES: DRY AFTER 200 ml.
NOT ENOUGH H₂O to collect field parameters.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 8001210 DATE: 11-11-98
 PROJECT NAME: Dover Municipal Well #4 SAMPLERS: _____
 SITE LOCATION: Dover, NJ _____

 SITE CONTACT: Diego Garcia WEATHER CONDITIONS: _____

WELL IDENTIFICATION NUMBER: LE MW 04

WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 12.61 FEET FROM TOP OF CASING
 WELL DEPTH = 20.25 FEET FROM TOP OF CASING 4" well
 HEIGHT OF WATER IN WELL = 7.64 FEET
 WATER IN ONE WELL VOLUME = NS GALLONS
 PURGE TIME (start/finish) = 1330 / 1345
 WELL EVACUATION DEVICE: _____
 SAMPLING TIME (start/finish) = 14:00
 SAMPLE COLLECTION DEVICE: Bailer (Poc)
 SAMPLE APPEARANCE: _____

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	15.0	15.1	14.6		
specific conductivity (umhos/cm)	1.88	1.74	1.68		
redox (eh)	—	—	—		
turbidity (ntu)	NA	NA	NA		
pH (SU)	6.42	6.35	6.40		
dissolved oxygen (mg/l)	2.03	2.11	2.09		
water level					
volume purged (gallons)					

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____
 LABORATORY: _____
 CONTACT: _____

NOTES: ~~any other (signed)~~

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 8001218 DATE: 11-11-98
 PROJECT NAME: Dover Municipal Well #4 SAMPLERS: JDEK
 SITE LOCATION: Dover, NJ P RABIDEAU
 WEATHER
 CONDITIONS:
 SITE CONTACT: Diego Garcia

WELL IDENTIFICATION NUMBER: LEMW-05

WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 33.65 FEET FROM TOP OF CASING 4" well
 WELL DEPTH = 36.22 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 2.57 FEET
 WATER IN ONE WELL VOLUME = 1.7 GALLONS
 PURGE TIME (start/finish) = 10:00 / 10:00
 WELL EVACUATION DEVICE: _____
 SAMPLING TIME (start/finish) = 11:50
 SAMPLE COLLECTION DEVICE: POLY BAILER
 SAMPLE APPEARANCE: _____

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	<u>11.6</u>				
specific conductivity (umhos/cm)	<u>1741</u>				
redox (eh)	<u>-</u>				
turbidity (ntu)	<u>>1000</u>				
pH (SU)	<u>6.08</u>				
dissolved oxygen (mg/l)	<u>3.80</u>				
water level					
volume purged (gallons)					

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____
 LABORATORY: _____
 CONTACT: _____

NOTES: DRY @ ~1.7 gallons

Casing Diameter (In)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 0285659 000216 DATE: 11-9-98
 PROJECT NAME: Dover Municipal Well #44 SAMPLERS: JEFF DEKOSKIE
 SITE LOCATION: DOVER, NJ PAT RABBI DEAU
WEST POINT
 SITE CONTACT: Bill KAVANUGH WEATHER CONDITIONS: CLR, 250° F
Diego Garcia

WELL IDENTIFICATION NUMBER: CB MW-03

WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 7.39 FEET FROM TOP OF CASING
 WELL DEPTH = 15.80 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 8.41 FEET
 WATER IN ONE WELL VOLUME = _____ GALLONS
 PURGE TIME (start/finish) = 9:45 / 10:10
 WELL EVACUATION DEVICE: DISPOSABLE POLY BAILER
 SAMPLING TIME (start/finish) = 10:10
 SAMPLE COLLECTION DEVICE: _____
 SAMPLE APPEARANCE: _____

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	12.6	12.6	12.7		
specific conductivity (umhos/cm)	.389	.397	.395		
redox (eh)	-	-	-		
turbidity (ntu)	999	999	869		
pH (SU)	7.37	7.44	7.46		
dissolved oxygen (mg/l)	10.4	1.74	2.21		
water level					
volume purged (gallons)	1 gal	2 gal	3.9 gal		

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____
 LABORATORY: _____
 CONTACT: _____

NOTES: _____

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: B001216
 PROJECT NAME: WEST POINT Dover Municipal Well #4
 SITE LOCATION: 10 LANDEXILL Dover, NJ

DATE: 11-10-98
 SAMPLERS: J DEKOSKE
P RABIDEAU

SITE CONTACT: Diego Garcia

WEATHER CONDITIONS: CLDY 240°F
COOL calm

WELL IDENTIFICATION NUMBER: PX-MW-01

WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____

DEPTH TO WATER (Before Purging) = 3.52 FEET FROM TOP OF CASING

WELL DEPTH = 9.85 FEET FROM TOP OF CASING

HEIGHT OF WATER IN WELL = 6.33 FEET

WATER IN ONE WELL VOLUME = 24 GALLONS

PURGE TIME (start/finish) = 09 40 / 09 48

WELL EVACUATION DEVICE: _____

SAMPLING TIME (start/finish) = 10 45

SAMPLE COLLECTION DEVICE: POLY BAILER

SAMPLE APPEARANCE: _____

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	<u>14.0</u>				
specific conductivity (umhos/cm)	<u>1.04</u>	<u>DRY @ 4 gal</u>			
redox (eh)					
turbidity (ntu)	<u>0.02</u>				
pH (SU)	<u>7.09</u>				
dissolved oxygen (mg/l)	<u>2.08</u>				
water level					
volume purged (gallons)	<u>4</u>	<u>8</u>	<u>24</u>		

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____
 LABORATORY: _____
 CONTACT: _____

NOTES: DRY @ 4 gal

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 8004216 DATE: 11-10-98
 PROJECT NAME: Dover Municipal Well #4 SAMPLERS: J DEKOSKIE
 SITE LOCATION: Dover, NJ P RABIDEAU
 SITE CONTACT: Diego Garcia WEATHER CONDITIONS: CLDY 40°F

WELL IDENTIFICATION NUMBER: PX MW 02

WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 64.50 FEET FROM TOP OF CASING
 WELL DEPTH = 67.97 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 3.47 FEET
 WATER IN ONE WELL VOLUME = 2.5 GALLONS
 PURGE TIME (start/finish) = 09 05 / 9:35
 WELL EVACUATION DEVICE: DISPOSABLE BAILER.
 SAMPLING TIME (start/finish) = 10 30
 SAMPLE COLLECTION DEVICE: BAILER. poly
 SAMPLE APPEARANCE: _____

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	10.4	11			
specific conductivity (umhos/cm)	1.5	1.4			
redox (eh)					
turbidity (ntu)	373	99			
pH (SU)	7.68	8.2			
dissolved oxygen (mg/l)	8.0	0.0 7.8			
water level					
volume purged (gallons)	.5	DRY			

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____
 LABORATORY: _____
 CONTACT: _____

NOTES: Dry @ 1gal

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 8001216 DATE: 11-10-98
 PROJECT NAME: Dover Municipal Well #4 SAMPLERS: T DEKOSKIE
 SITE LOCATION: Dover, NJ P RABIDEAU
 WEATHER
 SITE CONTACT: Diego Garcia CONDITIONS: CLDY CALM 240°F

WELL IDENTIFICATION NUMBER: PX MW-03

WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 53.87 FEET FROM TOP OF CASING
 WELL DEPTH = 60.34 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 6.47 FEET
 WATER IN ONE WELL VOLUME = 4.2 GALLONS
 PURGE TIME (start/finish) = 0825 0855
 WELL EVACUATION DEVICE: _____
 SAMPLING TIME (start/finish) = 10:15
 SAMPLE COLLECTION DEVICE: DRSP Poly BALLER
 SAMPLE APPEARANCE: _____

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	12.7	12.7	12.7		
specific conductivity (umhos/cm)	3.68	3.76	3.81		
redox (eh)	-	-	-		
turbidity (ntu)	150	576	>1000		
pH (SU)	6.91	6.89	6.89		
dissolved oxygen (mg/l)	7.83	6.79	7.18		
water level					
volume purged (gallons)	4	8	12 DRY		

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____
 LABORATORY: _____
 CONTACT: _____

NOTES: _____

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 8001216 DATE: 11-10-98
 PROJECT NAME: Dover Municipal Well #4 SAMPLERS: JEFF DUKOSKIE
 SITE LOCATION: Dover, NJ P. RABIDEAU

SITE CONTACT: Diego Garcia WEATHER CONDITIONS: _____

WELL IDENTIFICATION NUMBER: APX MW-04

WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 46.14 FEET FROM TOP OF CASING
 WELL DEPTH = 53.60 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 7.46 FEET
 WATER IN ONE WELL VOLUME = 1.2 GALLONS
 PURGE TIME (start/finish) = 0810 / 0820
 WELL EVACUATION DEVICE: _____
 SAMPLING TIME (start/finish) = 10:00 /
 SAMPLE COLLECTION DEVICE: DISP POLY BAILER
 SAMPLE APPEARANCE: _____

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	13.2	14.3	14.5		
specific conductivity (umhos/cm)	1.66	1.66	1.67		
redox (eh)					
turbidity (ntu)	>1000	>1000	>1000		
pH (SU)	7.18	7.65	7.01		
dissolved oxygen (mg/l)	6.78	7.02	7.61		
water level					
volume purged (gallons)	1.2 gal	2.4	3.6		

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____
 LABORATORY: _____
 CONTACT: _____

NOTES: _____

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 0285059 DATE: 2-11-99
 PROJECT NAME: _____ SAMPLERS: J DEK
 SITE LOCATION: _____ E AGUILAR

 SITE CONTACT: BILL KAMRASH WEATHER CONDITIONS: Clear Mild LT Breeze ^{N 50°}

WELL IDENTIFICATION NUMBER: LEMW-03 WELL PERMIT NUMBER - _____
 WELL HEADSPACE READING - 4.4 PID MODEL/LAMP MINI RAE #

DEPTH FROM TOP OF CASING TO TOP OF SCREEN _____
 DEPTH TO WATER (Before Purging) (FEET FROM TOC) = 38.90 AT TIME: 1425
 WELL DEPTH (FEET FROM TOC) = 42.75 PURGE INFORMATION
 HEIGHT OF WATER IN WELL = 3.85 TIME START: 1425 - 1535
 AMOUNT OF WATER IN ONE WELL VOLUME (GALLONS) = 2.51 gal TIME FINISH: _____
 DEPTH TO WATER (After Purging) _____
 DEPTH TO WATER (Before Sampling) _____
 TIME OF WELL SAMPLING: Start/Finish 1535
 WELL EVACUATION DEVICE: _____

SAMPLE COLLECTION DEVICE: _____
 SAMPLE APPEARANCE: 1A30 1A44 1A55

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	AFTER SAMPLING
temperature (degrees C)	11.3	11.1	10.8		
specific conductivity (umhos/cm)	439	441	0.44		
pH (SU)	5.81	5.84	5.90		
dissolved oxygen (mg/l)	3.06	0.68	1.5		
volume purged (gallons)	<u>174</u>	<u>2.5 gal > 1000</u>	<u>50</u>	<u>> 1000</u>	

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____
 LABORATORY: _____
 CONTACT: _____
 NOTES: Free Product Present? (YES/NO/NOT MEASURED) _____
 Purge Rate - _____

Casing Diameter (in)	Casing Volume (Gallons per Linear Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: _____ DATE: 2-12-98
 PROJECT NAME: _____ SAMPLERS: JD
 SITE LOCATION: _____

 WEATHER CONDITIONS: _____

WELL IDENTIFICATION NUMBER: CB MW-03 WELL PERMIT NUMBER - _____
 WELL HEADSPACE READING - 0.4 PID MODEL/LAMP MINI RAE

DEPTH FROM TOP OF CASING TO TOP OF SCREEN _____ 2" well

DEPTH TO WATER (Before Purging) (FEET FROM TOC) = 7.24 AT TIME: 0950

WELL DEPTH (FEET FROM TOC) = 15.96 PURGE INFORMATION
 TIME START: 1000

HEIGHT OF WATER IN WELL = 8.72 TIME FINISH: 1010
 DEPTH TO WATER (After Purging) 10

AMOUNT OF WATER IN ONE WELL VOLUME (GALLONS) = 1.4 gal DEPTH TO WATER (Before Sampling) _____

WELL EVACUATION DEVICE: DISP 1024 BAILER TIME OF WELL SAMPLING: Start/Finish 1020/1025

SAMPLE COLLECTION DEVICE: same

SAMPLE APPEARANCE: 1200 1005 1010 1010

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	AFTER SAMPLING
temperature (degrees C)	<u>8.8</u>	<u>8.0</u>	<u>7.7</u>	<u>7.40</u>	
specific conductivity (umhos/cm)	<u>390</u>	<u>378</u>	<u>384</u>	<u>397</u>	
pH (SU)	<u>6.10</u>	<u>6.61</u>	<u>6.13</u>	<u>6.74</u>	
dissolved oxygen (mg/l)	<u>1.21</u>	<u>1.81</u>	<u>1.90</u>	<u>1.71</u>	
volume purged (gallons)	<u>1.800</u>	<u>1.4 gal / 71000</u>	<u>2.8 gal / > 1000</u>	<u>4.2 gal / > 1000</u>	

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____

LABORATORY: _____

CONTACT: _____

NOTES: Free Product Present? (YES/NO/NOT MEASURED) _____
 Purge Rate - _____

Casing Diameter (in)	Casing Volume (Gallons per Linear Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: _____
 PROJECT NAME: _____
 SITE LOCATION: _____

DATE: 2-11-98
 SAMPLERS: _____

SITE CONTACT: _____

WEATHER CONDITIONS: _____

WELL IDENTIFICATION NUMBER: PX MW 01 WELL PERMIT NUMBER - _____
 WELL HEADSPACE READING - _____ PID MODEL/LAMP _____

DEPTH FROM TOP OF CASING TO TOP OF SCREEN _____

DEPTH TO WATER (Before Purging)
 (FEET FROM TOC) = 3.50

AT TIME: _____

WELL DEPTH (FEET FROM TOC) = 9.85

PURGE INFORMATION
 TIME START: 1210

HEIGHT OF WATER IN WELL = 6.35

TIME FINISH: 1240

AMOUNT OF WATER IN ONE
 WELL VOLUME (GALLONS) = 4.14 gal

DEPTH TO WATER (After Purging)

DEPTH TO WATER (Before Sampling)

TIME OF WELL SAMPLING: Start/Finish 1410

WELL EVACUATION DEVICE: DISPOSABLE BAILER (Poly)

SAMPLE COLLECTION DEVICE: _____

SAMPLE APPEARANCE: _____

FIELD PARAMETERS	FIRST 210	SECOND 225	THIRD 235	FOURTH	AFTER SAMPLING
temperature (degrees C)	8.7	8.2	8.2		
specific conductivity (mS/cm) (umhos/cm)	0.568	0.570	0.574		
pH (SU)	7.02	6.82	6.95		
dissolved oxygen (mg/l)	2.95	2.91	3.51		
volume purged (gallons)	initial / >1000	4.2 / >1000	5.2 / >1000		

NTU

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____

LABORATORY: _____

CONTACT: _____

NOTES: Free Product Present? (YES/NO/NOT MEASURED)
 Purge Rate - Purged log after ~ 5.2 gallons

Casing Diameter (In)	Casing Volume (Gallons per Linear Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 0285055 DATE: 2-12-98
 PROJECT NAME: _____ SAMPLERS: J DEKOSKIE
 SITE LOCATION: _____

 SITE CONTACT: _____ WEATHER CONDITIONS: _____

WELL IDENTIFICATION NUMBER: PX MW 01 WELL PERMIT NUMBER - _____
 WELL HEADSPACE READING - _____ PID MODEL/LAMP _____

DEPTH FROM TOP OF CASING TO TOP OF SCREEN _____

DEPTH TO WATER (Before Purging) (FEET FROM TOC) = 3.50 AT TIME: 11 10

WELL DEPTH (FEET FROM TOC) = 9.85 PURGE INFORMATION TIME START: 11 15

HEIGHT OF WATER IN WELL = 6.35 TIME FINISH: 11 30
 DEPTH TO WATER (After Purging) _____

AMOUNT OF WATER IN ONE WELL VOLUME (GALLONS) = 4.1 gal DEPTH TO WATER (Before Sampling) _____

WELL EVACUATION DEVICE: Bailer (Disposable) TIME OF WELL SAMPLING: Start/Finish _____

SAMPLE COLLECTION DEVICE: _____

SAMPLE APPEARANCE: _____

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	AFTER SAMPLING
temperature (degrees C)					
specific conductivity (umhos/cm)					
pH (SU)					
dissolved oxygen (mg/l)					
volume purged (gallons)					

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: Coliform TOTAL/FECAL

LABORATORY: NOTE: WELL DRY @ 5 gal @ 11 30

CONTACT: _____

NOTES: Free Product Present? (YES/NO/NOT MEASURED)
 Purge Rate - _____

Casing Diameter (In)	Casing Volume (Gallons per Linear Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: _____
 PROJECT NAME: _____
 SITE LOCATION: _____

DATE: 2-11-98
 SAMPLERS: JD
EA

SITE CONTACT: _____

WEATHER CONDITIONS: Clear WARM LT BREEZE

WELL IDENTIFICATION NUMBER: PX MW 02 WELL PERMIT NUMBER - _____
 WELL HEADSPACE READING - _____ PID MODEL/LAMP _____

DEPTH FROM TOP OF CASING TO TOP OF SCREEN _____

2" well

DEPTH TO WATER (Before Purging) (FEET FROM TOC) = 64.46

AT TIME: _____

WELL DEPTH (FEET FROM TOC) = 68.10

PURGE INFORMATION
 TIME START: 12:00

HEIGHT OF WATER IN WELL = 3.64

TIME FINISH: 12:35 DRY @ 1.5 gal
 DEPTH TO WATER (After Purging) _____

AMOUNT OF WATER IN ONE WELL VOLUME (GALLONS) = 0.6 gal

DEPTH TO WATER (Before Sampling) _____

TIME OF WELL SAMPLING: Start/Finish 13:20/13:22

WELL EVACUATION DEVICE: _____

SAMPLE COLLECTION DEVICE: _____

SAMPLE APPEARANCE: 12.05 17.10

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	AFTER SAMPLING
temperature (degrees C)	10.9	10.5	10.6	DRY	
specific conductivity (umhos/cm)	1.17/560	1.13/654	1.12/632	@ 1.5 gal	
pH (SU)	7.40	7.45	7.49		
dissolved oxygen (mg/l)	7.93	8.71	7.44		
volume purged (gallons)	initial	.6 gal	1.2 gal		

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____

LABORATORY: NOTE: DTW 64.50' @ 13:20

CONTACT: _____

NOTES: Free Product Present? (YES/NO/NOT MEASURED) _____
 Purge Rate - _____

Casing Diameter (In)	Casing Volume (Gallons per Linear Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: _____ DATE: 2-11-99
 PROJECT NAME: _____ SAMPLERS: _____
 SITE LOCATION: Westpoint
PX
 WEATHER CONDITIONS: Clear mild ~ 45°F
 SITE CONTACT: _____

WELL IDENTIFICATION NUMBER: PX MW3 WELL PERMIT NUMBER - _____
 WELL HEADSPACE READING - _____ PID MODEL/LAMP _____

DEPTH FROM TOP OF CASING TO TOP OF SCREEN _____
 DEPTH TO WATER (Before Purging) (FEET FROM TOG) = 53.48 AT TIME: _____
 WELL DEPTH (FEET FROM TOG) = 60.40 PURGE INFORMATION
 HEIGHT OF WATER IN WELL = 6.92 TIME START: 11 00
 AMOUNT OF WATER IN ONE WELL VOLUME (GALLONS) = 4.52 gal TIME FINISH: 11 41
 DEPTH TO WATER (After Purging) _____
 DEPTH TO WATER (Before Sampling) _____
 TIME OF WELL SAMPLING: Start/Finish 12 50 / 12 54

WELL EVACUATION DEVICE: _____
 SAMPLE COLLECTION DEVICE: _____
 SAMPLE APPEARANCE: H 00

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	AFTER SAMPLING
temperature (degrees C)	<u>12.4</u>	<u>13.2</u>	<u>13.1</u>		
specific conductivity (umhos/cm)	<u>3.68</u>	<u>3.68</u>	<u>3.77</u>		
NTU / pH (SU)	<u>>1000 /</u>	<u>>1000 / 6.75</u>	<u>>1000 / 6.83</u>		
dissolved oxygen (mg/l)	<u>7.26</u>	<u>7.85</u>	<u>6.63</u>		
volume purged (gallons)	<u>0</u>	<u>4.5</u>	<u>9.0</u>	<u>13.9</u>	

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____
 LABORATORY: 1240 DTW = 56.70'
 CONTACT: _____
 NOTES: Free Product Present? (YES/NO/NOT MEASURED) DRY @ ~ 9 gal 11:41
 Purge Rate - _____

Casing Diameter (In)	Casing Volume (Gallons per Linear Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: _____
 PROJECT NAME: _____
 SITE LOCATION: _____

 SITE CONTACT: _____

DATE: 2-11-99
 SAMPLERS: EA

 WEATHER CONDITIONS: _____

WELL IDENTIFICATION NUMBER: Px mw4-444 WELL PERMIT NUMBER - _____
 WELL HEADSPACE READING - 0 PID MODEL/LAMP 20115

DEPTH FROM TOP OF CASING TO TOP OF SCREEN _____

DEPTH TO WATER (Before Purging) (FEET FROM TOC) = 45.22

AT TIME: _____

WELL DEPTH (FEET FROM TOC) = 53.70

PURGE INFORMATION
 TIME START: 1100

HEIGHT OF WATER IN WELL = 8.48

TIME FINISH: _____

AMOUNT OF WATER IN ONE WELL VOLUME (GALLONS) = 1.38 ≈ 1.4 gal

DEPTH TO WATER (After Purging) _____

DEPTH TO WATER (Before Sampling) _____

TIME OF WELL SAMPLING: Start/Finish 1145

WELL EVACUATION DEVICE: _____

SAMPLE COLLECTION DEVICE: _____

SAMPLE APPEARANCE: _____

FIELD PARAMETERS	FIRST 100	SECOND 110	THIRD 18	FOURTH 30 AFTER SAMPLING
temperature (degrees C)	13.7	14.2	14.2	14.6
specific conductivity (mS/cm) - (umhos/cm)	1.72	1.69	1.67	1.70
pH (SU)	6.40	6.68	6.82	6.88
dissolved oxygen (mg/l)	6.66	9.16	9.02	9.38
volume purged (gallons)	initial / >1000	1.4 / >1000	2.8 / >1000	4.2 / >1000

NTA

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____

LABORATORY: _____

CONTACT: _____

NOTES: Free Product Present? (YES/NO/NOT MEASURED)
 Purge Rate - _____

Casing Diameter (in)	Casing Volume (Gallons per Linear Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 0285659 DATE: 5-12-99
 PROJECT NAME: Ten Landfills SAMPLERS: Jeffrey DeKoskie
 SITE LOCATION: USMA John Ifkovits
West Point, NY
 WEATHER
 SITE CONTACT: Bill Kavanaugh CONDITIONS: SUNNY, CALM, ~50°F

WELL IDENTIFICATION NUMBER: CB-MW-03
 WELL HEADSPACE READING = 9 PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 7.35 FEET FROM TOP OF CASING
 WELL DEPTH = 16.13 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 8.78 FEET
 WATER IN ONE WELL VOLUME = 1.4 GALLONS
 PURGE TIME (start/finish) = 0815 / 0848
 WELL EVACUATION DEVICE: 2" DISPOS. BAILER
 SAMPLING TIME (start/finish) = 0850 / 0854
 SAMPLE COLLECTION DEVICE: SAME: BAILER
 SAMPLE APPEARANCE: SEE NTU'S
0825 0833 0841 0848

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	10.0	9.6	9.4	9.3	
specific conductivity (umhos/cm)	433	379	387	404	
Turbidity (ntu)	583	>1000	>1000	>1000	
Salinity %	.01	.01	.01	.01	
Redox (eh)	-	-	-	-	
pH (SU)	6.47	7.07	7.26	7.25	
dissolved oxygen (mg/l)	0.61	1.43	1.71	2.04	
Depth to Water					
volume purged (gallons)	0	1.4	2.8	3.2	

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: TAL METALS: FILTERED [10 MICRON] & UNFILTERED
 LABORATORY: ACCUTEST
 CONTACT: _____

NOTES: MATRIX SPIKE [UNFILTERED] COLLECTED @ THIS LOCATION

Casing Diameter (in)	Casing Volume (Gallons per Foot)
<u>2.0</u>	<u>0.1632</u>
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 0285659 DATE: 5-12-99
 PROJECT NAME: Ten Landfills SAMPLERS: Jeffrey DeKoskie
 SITE LOCATION: USMA John Ifkovits
West Point, NY
 WEATHER
 SITE CONTACT: Bill Kavanaugh CONDITIONS: CLEAR, WINDY, ~65° F

WELL IDENTIFICATION NUMBER: PX MW 01

WELL HEADSPACE READING = ∅ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 7.71 FEET FROM TOP OF CASING
 WELL DEPTH = 10.05 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 2.34 FEET
 WATER IN ONE WELL VOLUME = 1.5 GALLONS
 PURGE TIME (start/finish) = 12 30 / 12 45
 WELL EVACUATION DEVICE: 2" DISPOS. BAILER
 SAMPLING TIME (start/finish) = * 5/13/99 10 00
 SAMPLE COLLECTION DEVICE: 2" DISPOS. BAILER.
 SAMPLE APPEARANCE: BLACK H₂O.

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	14.5	14.2			
specific conductivity (umhos/cm)	.454	.430			
Turbidity (ntu)	352	628			
Salinity %	.01	.01			
Redox (eh)	-	-			
pH (SU)	6.58	6.47			
dissolved oxygen (mg/l)	0.98	2.10			
Depth to Water	-	-			
volume purged (gallons)	∅	1.5			

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: TAL METALS & TOTAL/FECAL COLIFORM
 LABORATORY: ACCUTEST / STL ENVIROTEST FOR COLIFORM
 CONTACT: * 5/13/99 COLLECTED TOTAL/FECAL COLIFORM & TAL METALS, UNFILTERED

NOTES: WELL DRY: 1.5 gals @ 1245 hrs / 1330 hrs: DRY / 1500 DRY
1640: DRY

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
<u>4.0</u>	<u>0.6528</u>
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 0285659 DATE: 5-12-99
 PROJECT NAME: Ten Landfills SAMPLERS: Jeffrey DeKoskie
 SITE LOCATION: USMA John Ifkovits
West Point, NY
 SITE CONTACT: Bill Kavanaugh WEATHER
 CONDITIONS: SUNNY, LT BREEZE, ~55°

WELL IDENTIFICATION NUMBER: PX MW-02

WELL HEADSPACE READING = 0 PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 64.48 FEET FROM TOP OF CASING
 WELL DEPTH = 68.28 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 3.80 FEET
 WATER IN ONE WELL VOLUME = 0.6 GALLONS
 PURGE TIME (start/finish) = 10 30 / 10 46
 WELL EVACUATION DEVICE: DISPOS. BAILER 2"
 SAMPLING TIME (start/finish) = 10 55 / 10 59
 SAMPLE COLLECTION DEVICE: SAME BAILER
 SAMPLE APPEARANCE: SLIGHTLY TURBID

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	11.6	11.0	11.1	10.7	
specific conductivity (umhos/cm)	1.48	1.43	1.43	1.43	
Turbidity (ntu)	78	159	207	212	
Salinity %	0.06	0.06	0.06	0.06	
Redox (eh)	-	-	-	-	
pH (SU)	6.47	6.87	7.41	7.29	
dissolved oxygen (mg/l)	7.12	7.23	11.14	7.43	
Depth to Water					
volume purged (gallons)	-	0.6	1.2	1.8	

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: TAL METALS 10 UM FILTER & UNFILTERED
 LABORATORY: ACCUTEST
 CONTACT: _____

NOTES:

DUP: PX-MW-07 NON FILTERED COLLECTED.

Casing Diameter (in)	Casing Volume (Gallons per Foot)
<u>2.0</u>	<u>0.1632</u>
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 0285659 DATE: 5-12-99
 PROJECT NAME: Ten Landfills SAMPLERS: Jeffrey DeKoskie
 SITE LOCATION: USMA John Ifkovits
West Point, NY
 WEATHER
 SITE CONTACT: Bill Kavanaugh CONDITIONS: SUNNY, BREEZY, ~ 60°F

WELL IDENTIFICATION NUMBER: PX MW-03

WELL HEADSPACE READING = 0 PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 53.13 FEET FROM TOP OF CASING
 WELL DEPTH = 61.60 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 8.47 FEET
 WATER IN ONE WELL VOLUME = 5.5 GALLONS
 PURGE TIME (start/finish) = 10 30 / 11 19
 WELL EVACUATION DEVICE: 2" DISPOS BAILER
 SAMPLING TIME (start/finish) = 12 40 / 12 45
 SAMPLE COLLECTION DEVICE: SAME: BAILER
 SAMPLE APPEARANCE:
 TIME 10 30 10 58 11 19

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	14.0	14.9	15.0		
specific conductivity (umhos/cm)	3.75	3.76	3.79		
Turbidity (ntu)	0	>1000	>1000		
Salinity %	0.18	0.18	0.19		
Redox (eh)	-	-	-		
pH (SU)	6.89	7.12	7.23		
dissolved oxygen (mg/l)	6.20	7.50	7.62		
Depth to Water	-	-	-		
volume purged (gallons)	0	5.5	11.0		

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: TAL METALS FILTERED / UN-FILTERED
 LABORATORY: ACCUTEST
 CONTACT: _____

NOTES: WELL DRY: 11 GALS @ 11 19 hrs

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
<u>4.0</u>	<u>0.6928</u>
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 0285659 DATE: 5-12-99
 PROJECT NAME: Ten Landfills SAMPLERS: Jeffrey DeKoskie
 SITE LOCATION: USMA John Ifkovits
West Point, NY
 SITE CONTACT: Bill Kavanaugh WEATHER CONDITIONS: CLEAR, LT BREEZE, ~60°F

WELL IDENTIFICATION NUMBER: PX MW 04

WELL HEADSPACE READING = ∅ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 44.87 FEET FROM TOP OF CASING
 WELL DEPTH = 53.67 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 8.80 FEET
 WATER IN ONE WELL VOLUME = 1.4 GALLONS
 PURGE TIME (start/finish) = 11 12 / 11 32
 WELL EVACUATION DEVICE: 2" DISPOS. BAILER
 SAMPLING TIME (start/finish) = 1300 / 1310
 SAMPLE COLLECTION DEVICE: SAME BAILER
 SAMPLE APPEARANCE: CLOUDY H₂O

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	16.2	15.6	15.4	15.4	
specific conductivity (umhos/cm)	1.65	1.64	1.63	1.64	
Turbidity (ntu)	172	999	>1000	>1000	
Salinity %	.07	.07	.07	.07	
Redox (eh)	-	-	-	-	
pH (SU)	7.04	6.97	6.90	6.94	
dissolved oxygen (mg/l)	6.72	7.60	7.66	7.73	
Depth to Water	-	-	-	-	
volume purged (gallons)	∅	1.4	2.8	4.2	

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: TAL METALS FILTERED / UNFILTERED
 LABORATORY: ACCUTEST
 CONTACT: _____

NOTES:

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 0285659 DATE: 8-18-99
 PROJECT NAME: TED LANDFILLS SAMPLERS: J DEKOSKIE
 SITE LOCATION: CAMP BULKNER J CARAGINE
USMA
 WEATHER
 SITE CONTACT: JEFF CONDITIONS: SUNNY, H+H, LT BREEZE

WELL IDENTIFICATION NUMBER: CB-MW-03

WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 7.79 FEET FROM TOP OF CASING
 WELL DEPTH = 16.25 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 8.46 FEET
 WATER IN ONE WELL VOLUME = 1.4 GALLONS
 PURGE TIME (start/finish) = 1305/1320
 WELL EVACUATION DEVICE: DISPOSABLE BAIER
 SAMPLING TIME (start/finish) = 1325/1330
 SAMPLE COLLECTION DEVICE: DISPOSABLE BAIER
 SAMPLE APPEARANCE: CLOUDY H₂O
1306 1310 1315 1320

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	16.6	15.3	14.2	13.5	
specific conductivity (umhos/cm)	.673	.610	.603	.605	
Turbidity (ntu)	>1000	>1000	>1000	>1000	
Salinity %	.02	.02	.02	.02	
Redox (eh)					
pH (SU)	6.91	6.60	6.58	6.61	
dissolved oxygen (mg/l)	1.98	2.47	2.19	2.16	
Depth to Water					
volume purged (gallons)	0	1.4	2.8	4.2	

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: TOTAL & DISSOLVED [10mm FILTER] METALS.
 LABORATORY: ACCUTEST
 CONTACT: _____

NOTES: COLLECTED BLIND DUP: "CB-MW-04" TOTAL METALS

8.46
 .16
 5076
 846
 13536

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 0285659 DATE: 8-18-99
 PROJECT NAME: TEN LANDFILLS SAMPLERS: J DEKOSKIE
 SITE LOCATION: PX LANDFILL E CARBONATE
 WEATHER
 SITE CONTACT: JEFF CONDITIONS: SUNNY WARM

WELL IDENTIFICATION NUMBER: PX-MW-1

WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 6.23 FEET FROM TOP OF CASING PVC
 WELL DEPTH = 10.18 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 3.95 FEET
 WATER IN ONE WELL VOLUME = 2.6 GALLONS
 PURGE TIME (start/finish) = 0850 / 0909
 WELL EVACUATION DEVICE: DISPOSABLE BAILER
 SAMPLING TIME (start/finish) = * 8-19-99 @ 0845
 SAMPLE COLLECTION DEVICE: DISPOSABLE BAILER
 SAMPLE APPEARANCE: 857 904 909

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	23.7	23.6			
specific conductivity (umhos/cm)	.717	.692			
Turbidity (ntu)	>1000	>1000			
Salinity %	.03	.02			
Redox (eh)					
pH (SU)	6.02	6.07			
dissolved oxygen (mg/l)	1.58	2.32			
Depth to Water	-	DRY	DRY @ 3gal		
volume purged (gallons)	0	2.5			

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: TOTAL/DISSOLVED [10 UM FILTER] METALS; TOTAL/FECAL COLIFORM
 LABORATORY: ALLTEST
 CONTACT: _____

NOTES: WELL DRY ~ 3gal @ 0909 // 8-19-99 COLLECTED COLIFORM & ~ 600ML FOR TOTAL METALS.

5
3.95
.65
1975
2370.5675

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: _____ DATE: 8-18-99
 PROJECT NAME: _____ SAMPLERS: _____
 SITE LOCATION: _____

 SITE CONTACT: _____ WEATHER CONDITIONS: _____

WELL IDENTIFICATION NUMBER: Px MW-02

WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 54.46 FEET FROM TOP OF CASING
 WELL DEPTH = 58.35 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 3.89 FEET
 WATER IN ONE WELL VOLUME = 0.62 GALLONS
 PURGE TIME (start/finish) = 0920 / 0935
 WELL EVACUATION DEVICE: _____
 SAMPLING TIME (start/finish) = _____
 SAMPLE COLLECTION DEVICE: _____
 SAMPLE APPEARANCE: _____

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	13.9	12.9	12.7	12.6	
specific conductivity (umhos/cm)	1.41 1.41	1.35	1.38	1.37	
Turbidity (ntu)	175	158	512	235	
Salinity %	0.05	0.06	0.06	0.06	
Redox (eh)	-	-	-	-	
pH (SU)	6.87	6.99	6.97	6.99	
dissolved oxygen (mg/l)	7.87	7.98	8.02	7.99	
Depth to Water					
volume purged (gallons)	1	1	2	3	

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____
 LABORATORY: _____
 CONTACT: _____

NOTES:

3.89
 .16
 2034
 389
 .6224

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 0285659 DATE: 8-18-99
 PROJECT NAME: TEN LANDFILLS SAMPLERS: J DEKOSKIE
 SITE LOCATION: PX LANDFILL J CARAGINE
 WEATHER
 CONDITIONS:

WELL IDENTIFICATION NUMBER: PX MW-03
 WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 53.40 FEET FROM TOP OF CASING
 WELL DEPTH = 60.70 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 7.30 FEET
 WATER IN ONE WELL VOLUME = 4.7 GALLONS
 PURGE TIME (start/finish) = 1050/1115
 WELL EVACUATION DEVICE: _____
 SAMPLING TIME (start/finish) = 1230/1235
 SAMPLE COLLECTION DEVICE: _____
 SAMPLE APPEARANCE: 10 SS

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	15.2	14.7	14.5	14.5	
specific conductivity (umhos/cm)	4.06	4.05	4.09	4.07	
Turbidity (ntu)	51	143	343	388	
Salinity %	0.20	0.20	0.20	0.20	
Redox (eh)	-	-	-		
pH (SU)	6.94	6.59	6.58	6.58	
dissolved oxygen (mg/l)	7.82	7.67	7.63	7.62	
Depth to Water					
volume purged (gallons)	0	5	10	13 (Dry)	

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: _____
 LABORATORY: _____
 CONTACT: _____

NOTES:

$$\begin{array}{r}
 7.3 \\
 6.5 \\
 \hline
 36.5 \\
 4.38 \\
 \hline
 4.745
 \end{array}$$

Casing Diameter (in)	Casing Volume (Gallons per Foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 0285659 DATE: 8-18-99
 PROJECT NAME: TEN LANDFILLS SAMPLERS: J DEKOSKIE
 SITE LOCATION: PX LANDFILL J CARAGINE
 WEATHER: LT BREEZE
 SITE CONTACT: JEFF CONDITIONS: SUNNY, WARM ~ 85 HOM

WELL IDENTIFICATION NUMBER: PX-MW-04

WELL HEADSPACE READING = _____ PID MODEL/LAMP: _____
 DEPTH TO WATER (Before Purging) = 46.20 FEET FROM TOP OF CASING
 WELL DEPTH = 53.98 FEET FROM TOP OF CASING
 HEIGHT OF WATER IN WELL = 7.78 FEET
 WATER IN ONE WELL VOLUME = 1.2 GALLONS
 PURGE TIME (start/finish) = 10 05 / 10 30
 WELL EVACUATION DEVICE: DISPOSABLE BAILER
 SAMPLING TIME (start/finish) = 10 40 / 10 45
 SAMPLE COLLECTION DEVICE: _____
 SAMPLE APPEARANCE: _____

10 15 10 20 10 25 10 30

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
temperature (degrees C)	16.5	16.2	16.1	16.2	
specific conductivity (umhos/cm)	1.68	1.70	1.70	1.70	
Turbidity (ntu)	>1000	>1000	>1000	>1000	
Salinity %	.07	.07	.07	.07	
Redox (eh)					
pH (SU)	6.78	6.71	6.71	6.83	
dissolved oxygen (mg/l)	7.24	7.75	7.84	7.98	
Depth to Water					
volume purged (gallons)	0	1.2	2.4	4.6	

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: TOTAL & DISSOLVED [10um FILTER] METALS
 LABORATORY: ACCUTEST
 CONTACT: _____

NOTES: COLLECTED MS @ THIS LOCATION

7.78
 16
46.68
 7.78
124.48

Casing Diameter (in)	Casing Volume (Gallons per Foot)
<u>2.0</u>	<u>0.1632</u>
4.0	0.6528
6.0	1.4687

ATTACHMENT C
DATA VALIDATION ASSESSMENT

Memorandum

To: Teri Haelen/Joseph Claypoole
From: Valerie A. Smith
Date: 12/15/99
Re: Validatin of West Point Phase II RFI Inorganic Data

Four data packages received from Accutest were validated for TAL Metals. A limited review (i.e., reporting forms) of the following quality controls were performed on each data package, to evaluate the usability of the data. Qualifications were applied following the intent of the National Functional guidelines with Region II modifications.

The samples associated with the four data packages are as follows:

E42004 (samples collected 11/9-11/98)

<u>Lab ID No.</u>	<u>Client ID No.</u>
E42004-1	CBMW-03-NF
E42004-2	CBMW-03-F
E42004-9	PXMW-01-NF
E42004-10	PXMW-01-F
E42004-11	PXMW-02-NF
E42004-12	PXMW-02-F
E42004-13	PXMW-03-NF
E42004-14	PXMW-03-F
E42004-15	PXMW-04-NF
E42004-16	PXMW-04-F
E42004-17	MW-20-NF
E42004-18	PX-CULVERT-NF
E42004-19	LBMW-03-NF
E42004-20	LBMW-03-F
E42004-21	LEMW-01-NF
E42004-22	LEMW-01-F
E42004-23	LEMW-02-NF
E42004-24	LEMW-02-F
E42004-25	LEMW-04-NF
E42004-26	LEMW-04-F
E42004-27	LEMW-05-NF
E42004-28	LEMW-05-F
E42004-29	FIELD BLANK

E42004A (samples collected 11/9/98)

<u>Lab ID No.</u>	<u>Client ID No.</u>
E42004-3A	VFMW-01-NF
E42004-4A	VFMW-01-5
E42004-5A	VFMW-02-NF
E42004-6A	VFMW-02-F
E42004-7A	VFMW-03-NF
E42004-8A	VFMW-03-F

E45568 (samples collected 2/11-12/99)

<u>Lab ID No.</u>	<u>Client ID No.</u>
E45568-1	PX-MW-01
E45568-2	PX-MW-02
E45568-3	PX-MW-03
E45568-4	PX-MW-04
E45668-5	LE-MW-03
E45668-6	CB-MW-03
E45568-7	PX SEEP 2 (SP-02)
E45568-7	FB-1
E45568-9	PX-MW-01 filtered
E45568-10	PX-MW-02 filtered
E45568-11	PX-MW-03
E45568-12	PX-MW-04
E45568-13	LE-MW-03
E45668-14	CB-MW-03

E49817 (samples collected 5/12/99)

<u>Lab ID No.</u>	<u>Client ID No.</u>
E49817-1	CB-MW-03
E49817-2	CB-MW-03 filtered
E49817-4	PX-MW-01
E49817-5	PX-MW-02
E49817-6	PX-MW-02 filtered
E49817-7	PX-MW-03
E49817-8	PX-MW-03 filtered
E49817-9	PX-MW-04
E49817-10	PX-MW-04 filtered
E49817-11	PX-MW-07
E49817-12	FB-1
E49817-13	PX SEEP 02

E54422 (samples collected 8/18-19/99)

<u>Lab ID No.</u>	<u>Client ID No.</u>
E54422-1	PX-MW-02
E54422-2	PX-MW-04
E54422-3	PX-MW-03
E54422-4	CB-MW-03
E54422-5	CB-MW-04
E54422-6	FB-1
E54422-7	PX-SEEP-2
E54422-8	PX-MW-01
E54422-9	PX-MW-02 filtered
E54422-10	PX-MW-04 filtered
E54422-11	PX-MW-03 filtered
E54422-12	CB-MW-03 filtered

The following information was used to validate the analytical results:

Inorganics

Sample Integrity
 Holding Time
 Initial and Continuing Calibration
 Blank Contamination
 Interference Check Samples (ICS)
 Matrix Spike
 Laboratory Duplicate
 Laboratory Control Sample (LCS)
 ICP Serial Dilution

Sample Integrity: Samples were received at the laboratory intact, in the appropriate sample bottles showing no evidence of tampering. Sample paperwork was reviewed to determine that the samples being validated were indeed the ones collected from the site. The Chain of Custody was properly filled out including sampler signature, date and time of sampling and analyses requested. Custody transfers between different parties was maintained.

Holding Time: All samples were digested and analyzed within 28 days for mercury and 6 months for all other analytes.

Initial and Continuing Calibration: The initial and continuing calibration verification standards have met the QC criteria.

Blank Contamination: All blanks (field, initial, continuing, preparation) have met the QC criteria.

Interference Check Samples: The ICS have met the QC criteria.

Matrix Spike: The matrix spike QC criteria have been met for all data sets, with the exceptions listed below:

E45568

Aluminum should be qualified estimated "J" in samples listed below due high matrix spike recovery:

Aluminum "J" -	PX-MW-01 filtered	PX-MW-02 filtered
	PX-MW-03 filtered	PX-MW-04 filtered
	LW-MW-03 filtered	CB-MW-03 filtered

Laboratory Duplicate: The laboratory duplicate QC criteria have been met for all data sets, with the exceptions listed below:

E42004

Positive Iron results should be qualified estimated "J" in samples listed below due to high RPD:

Iron "J" -	CBMW-03-NF	CBMW-03-F
	PXMW-01-NF	PXMW-01-F
	PXMW-02-NF	PXMW-02-F
	PXMW-03-NF	PXMW-03-F

Laboratory Duplicate (continued):**E42004**

Iron "J" -	PXMW-04-NF	PXMW-04-F
	MW-20-NF	PX-CULVERT-NF

E42004A

Positive Iron results should be qualified estimated "J" in samples listed below due to high RPD:

Iron "J" -	VFMW-01-NF	VFMW-01-F
	VFMW-02-NF	VFMW-02-F
	VFMW-03-NF	VFMW-03-F

E45568

Positive Manganese results should be qualified estimated "J" in samples listed below due to high RPD:

Manganese "J" -	PX-MW-01	PX-MW-02
	PX-MW-03	PX-MW-04
	LE-MW-03	CB-MW-03
	PX-SEEP-2	FB-1

E49817

Positive Lead results should be qualified estimated "J" in samples listed below due to high RPD:

Lead "J" -	CB-MW-03	PX-MW-01
	PX-MW-02	PX-MW-02 filtered
	PX-MW-03	PX-MW-03 filtered
	PX-MW-04	PX-MW-04 filtered
	PX-MW-07	PX SEEP 02

Laboratory Control Sample: The LCS met the QC criteria.

ICP Serial Dilution: The ICP Serial Dilution QC criteria have been met for all data sets, with the exceptions listed below:

E42004

Potassium should be considered estimated "J" in the samples listed below due to RPD >10% and sample results greater than 50 x IDL:

Potassium "J" -	PXMW-01-NF	PXMW-01-F
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ICP Serial Dilution (continued):**E42004**

Potassium "J" -	PXMW-03-NF	PXMW-03-F
	MW-20-NF	PX-MW-02-NF
	PX-MW-02-F	

E42004A

Potassium should be considered estimated "J" in the samples listed below due to RPD >10% and sample results greater than 50 x IDL:

Potassium "J" -	VFMW-01-NF	VFMW-01-F
	VFMW-02-NF	VFMW-03-NF
	VFMW-03-F	

E45568

Potassium and Sodium should be considered estimated "J" in the samples listed below due to RPD >10% and sample results greater than 50 x IDL:

Potassium "J" and Sodium "J" -	PX-MW-01	PX-MW-02
	PX-MW-03	PX-MW-04
	LW-MW-03	CB-MW-03
	PX-SEEP-2	

E54422

Sodium should be considered estimated "J" in the samples listed below due to RPD >10% and sample results greater than 50 x IDL:

Sodium "J" -	PX-MW-02	PX-MW-04
	PX-MW-03	CB-MW-03
	CB-MW-04	PX-SEEP-2
	PX-MW-01	PX-MW-02 filtered
	PX-MW-04 filtered	PX-MW-03 filtered
	CB-MW-03 filtered	

DATA USEABILITY

Samples were found to be valid and acceptable based upon a limited Data Validation. Due to various QC problems some analytes may have been qualified with "J" (estimated). All action is detailed above.