INTERNATIONAL TECHNOLOGY CORPORATION

Final Report - Appendices Volume II

U. S. Military Academy Landfill Remediation West Point, New York

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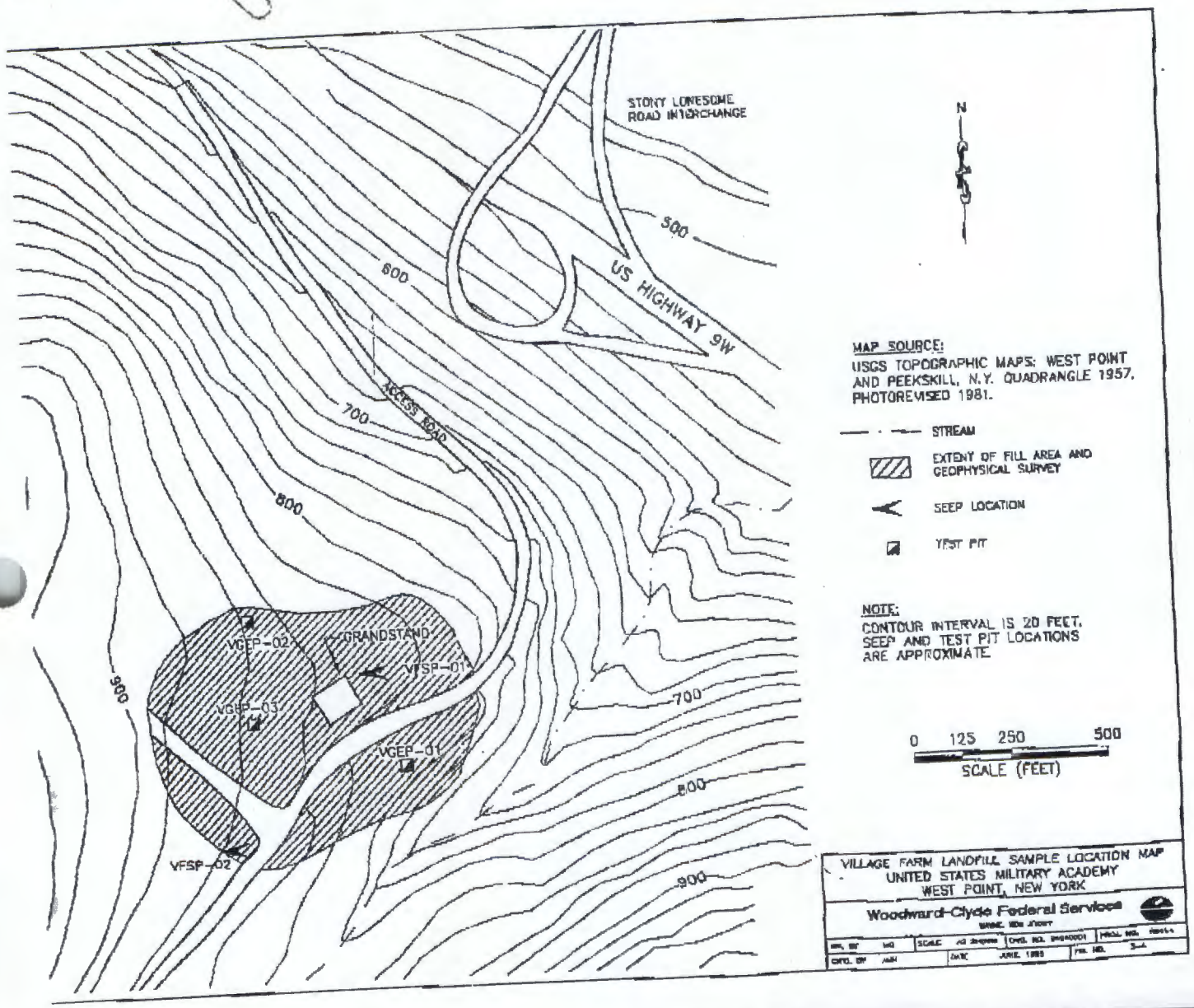
Prepared for:
U.S. Army Corps of Engineers
Omaha District
Building 527 Fairchild Hall
Offutt AFB, Nebraska 68113

Prepared by:
IT Corporation
140 Allen's Creek Road
Rochester, New York 14618
(716) 271-6430

RESPONSIVE TO THE NEEDS OF ENVIRONMENTAL MANAGEMENT


STONY LONESOME ROAD INTERCHANGE
US HIGHWAY 9W
ACCESS ROAD
500
600
700
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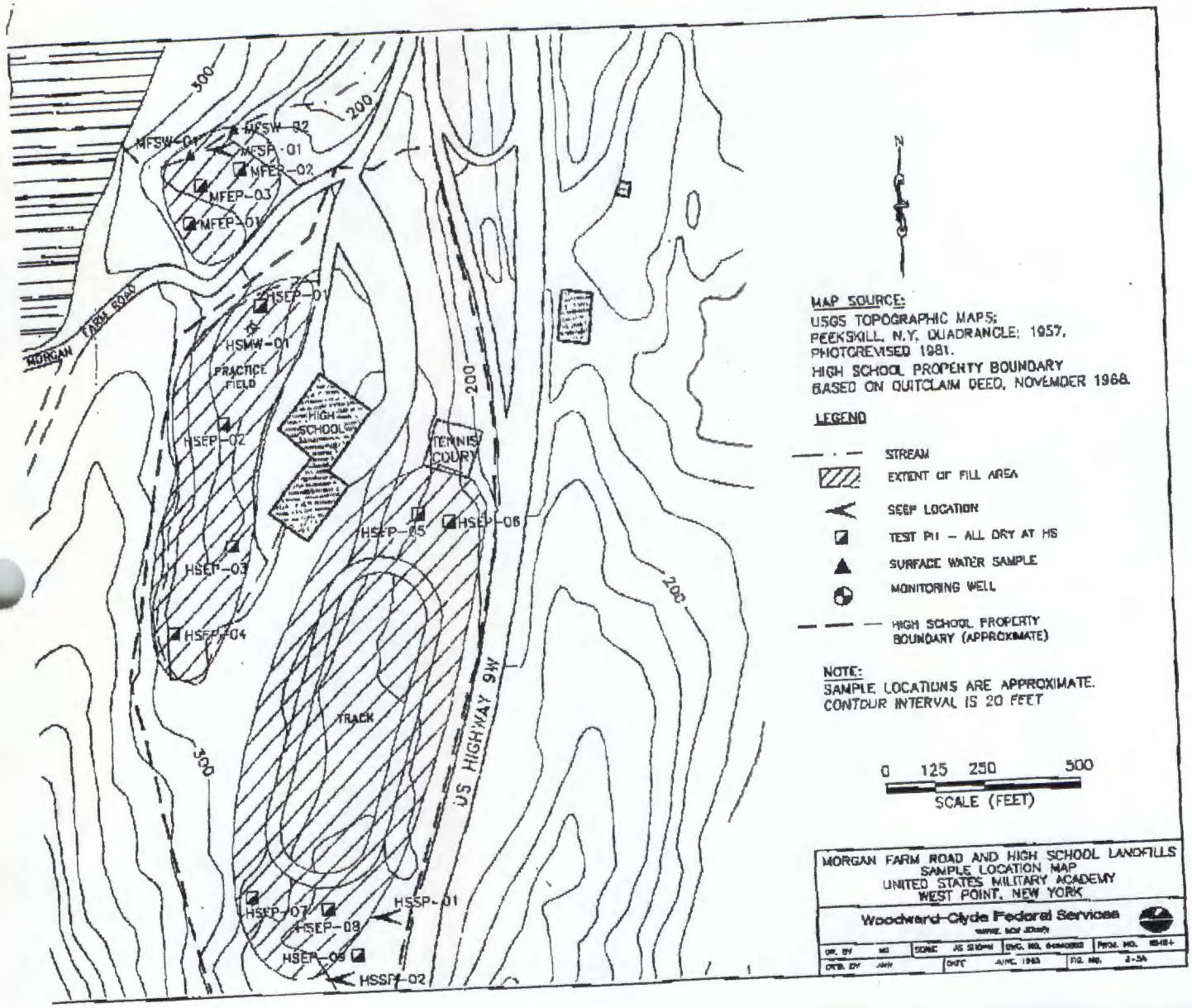
900
GRANDSTAND
VGEP-02
VGEP-03
VGEP-01
VFSP-01
VFSP-02
N
MAP SOURCE:
USGS TOPOGRAPHIC MAPS: WEST POINT AND PEEKSKILL, N.Y. QUADRANGLE 1957, PHOTOREVISED 1981.
STREAM
EXTENT OF FILL AREA AND GEOPHYSICAL SURVEY
SEEP LOCATION
TEST PIT
NOTE:
CONTOUR INTERVAL IS 20 FEET. SEEP AND TEST PIT LOCATIONS ARE APPROXIMATE.
0 125 250 500
SCALE (FEET)
VILLAGE FARM LANDFILL SAMPLE LOCATION MAP
UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK
Woodward-Clyde Federal Services
JUNE, 1995


MFSW-01
MFSW-02
MFSP-01
MFEP-02
MFEP-03
MFEP-04
MORGAN FARM ROAD
HSEP-01
HSMW-01
PRACTICE FIELD
HSEP-02
HIGH SCHOOL
TENNIS COURT
HSEP-05
HSEP-06
HSEP-03
HSEP-04
TRACK
US HIGHWAY 9W
HSEP-07
HSEP-08
HSSP-01
HSEP-09
HSSP-02
300
200
200
200
300
N
MAP SOURCE:
USGS TOPOGRAPHIC MAPS;
PEEKSKILL, N.Y. QUADRANGLE; 1957,
PHOTOREVISED 1981.
HIGH SCHOOL PROPERTY BOUNDARY
BASED ON QUITCLAIM DEED, NOVEMBER 1968.
LEGEND
STREAM
EXTENT OF FILL AREA
SEEP LOCATION
TEST PIT – ALL DRY AT HS
SURFACE WATER SAMPLE
MONITORING WELL
HIGH SCHOOL PROPERTY BOUNDARY (APPROXIMATE)
NOTE:
SAMPLE LOCATIONS ARE APPROXIMATE.
CONTOUR INTERVAL IS 20 FEET
0 125 250 500
SCALE (FEET)
MORGAN FARM ROAD AND HIGH SCHOOL LANDFILLS
SAMPLE LOCATION MAP
UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK
Woodward-Clyde Federal Services

PHOTOGRAPH NO. 31 Exploratory pit VGEP-03: Village Farm landfill: Various debris

PHOTOGRAPH NO. 32 Exploratory pit VGEP-03: Village Farm landfill; Various debris

Landfilling operations were reported to have occurred in the 1950s and early 1960s, but the types of disposed materials are essentially unknown.

6.4.1 Summary of Field Investigation Findings

Three test pits were installed in the Village Farm landfill. Bedrock was encountered at a depth of 10 feet or less at each test pit. Clean fill was observed in two of the three test pits; one test pit (VFEP-03) contained metal, rubber tires, carpet, tile, and glass. Four water samples were collected, two each from test pits and seeps (Figure 6-3 and Table 6-7). The reported analytes did not exceed NYSDEC guidelines for hazardous substances, except for the samples collected at one test pit (VFEP-03), which was the same test pit that contained sanitary waste. The concentrations of several base neutral compounds, cadmium, copper, mercury, and zinc exceeded NYSDEC guidelines.

6.4.2 Conclusions and Recommendations

The landfill is a small, less than four acres, landfill, which is less than 10 feet thick. One sample of test pit water contained analytes that exceed NYSDEC guidelines, but the quality of water emanating directly from the landfill in downgradient seeps satisfies the guidelines. The occurrence of contaminants in the test pit water is considered to be localized. No further action is required at this Solid Waste Management Unit (USMA-13), because there is no evidence of a migration of hazardous constituents from this SWMU, and therefore, the landfill poses no threat to human health or the environment.

6.5 MORGAN FARM ROAD LANDFILL (USMA-15A)

The Morgan Farm Road Landfill is an area of about one acre of land located along Morgan Farm Road, just southwest of the intersection of Route 9W and Route 218. Figure 6-8 shows the approximate boundaries of the landfill, as well as the locations of seeps and the concentrations of compounds identified as exceeding regulatory guidelines. Presently the area is not being used and has small trees growing throughout the area. Disposed materials included scrap metal, tires, steel cable and car parts, which were covered with soil. Some of these material protrude through to the surface. The area is heavily vegetated with trees and shrubs and a small stream (flowing to the

Three of the buildings in this area and along this road are used for officer housing quarters and are the ones most associated with Professor's Row. These buildings were constructed in the 1820s. The landfill was possibly located behind (south) of these buildings where parking areas and gardens are presently located. In many places in the area of and surrounding Professor's Row, bedrock was observed by WCFS to be fairly shallow and cropped out in several locations.

6.3.1 Summary of Field Investigation Findings

Four borings were installed at the Professor's Row landfill. Neither the soils collected nor the field measurements of volatile organic compounds suggested the presence of contaminants. The fill material observed was clean fill.

6.3.2 Conclusions and Recommendations

The disposed material at the Professor's Row landfill is clean fill. No further action is required at this Solid Waste Management Unit (USMA-15A), because there is no evidence of a release or spill of hazardous constituents at this SWMU, and, therefore, it poses no threat to human health or the environment.

6.4 VILLAGE FARM LANDFILL (USMA-13)

The Village Farm Landfill (SWMU Number USMA-13) is located on the southwest side of Route 9W approximately 1,000 feet from the intersection with Stony Lonesome Road. Figure 6-3 shows the approximate boundaries of the landfill, as well as the locations of seeps and the concentrations of compounds identified as exceeding regulatory guidelines. The landfill area (estimated to be no larger than 4 acres), presently is used as an ammunition firing practice range, is located on a highland about 300 feet in elevation above Route 9W and on the west side of Bare Rock Mountain. The area slopes from the south towards the northeast towards an un-named stream that is tributary to the stream providing potable water supplies to the town of Highland Falls.

DEPARTMENT OF THE ARMY
UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK 10996

14 March 1996

REPLY TO
ATTENTION OF

Directorate of Housing and Public Works

SUBJECT: Revised Interim Corrective Measures Sampling and Handling Plan for the Morgan Farm Landfill

Mr. James Yuchniewicz
New York State Department of
Environmental Conservation
Division of Solid and Hazardous Waste
Room 462
50 Wolf Road
Albany, New York 12233-7252

Dear Mr. Yuchniewicz:

Enclosed for your review and approval are the revised sampling and handling procedures (Encl 1) for stockpiled material removed from Morgan Farm Landfill which have samples exhibiting lead results above the Resource Conservation and Recovery Act toxicity characteristic level (Encl 2). Six of the twenty four 250 cubic yard stockpiles have samples which were found to be just above the TCLP lead threshold (Encl 3). The plans have been revised to reflect the changes you discussed with Bill Kavanagh in a phone conversation on March 5, 1996. Based upon your verbal approval of the plan, we have initiated sampling and will notify you of the results.

It is understood that the confirmatory sampling results of soil remaining in place at Morgan Farm (Encl 4) are acceptable, and we have Department of Health and your approval to backfill. We have elected to return screened soil to Morgan Farm.

At your earliest convenience, please provide a letter of approval for the enclosed sampling and handling plan. The continued guidance and cooperation from your office throughout this project are appreciated.

Sincerely,

Eugene E. Rood, P.E.
C, Environmental Management Division

Enclosures

SAMPLING PLAN.

OBJECTIVE: This revised sampling plan attempts to isolate the "hot spots" within each 250 cubic yard pile in order to minimize the amount of material requiring special handling. As the material from the landfill was being excavated, it was "tracked" during the removal activity. The "hot spots" appear to be localized in the center of the landfill (See Encl. 2).

SAMPLING: The six stockpiles will be visually divided into five portions identified by spray paint or survey ribbon boundaries. A grab sample from four locations within each portion will be obtained and composited into one sample. Sampling will be performed in accordance with the previously submitted "Draft Chemical Sampling and Analysis Plan" prepared by IT Corporation for this project. Therefore, each 250 cubic yard stockpile will have a composite sample for each of its five allotted portions. A unique sample identification number will be associated with each corresponding sample location.

ANALYSES: The composite samples will be analyzed for TCLP lead.

STOCKPILE SEGREGATION: The stockpile portion(s) with sample results reported below the TCLP 5.0 mg/l threshold for lead, will be considered non-hazardous and segregated from the hazardous portion(s) of the stockpile. Non-hazardous piles will be processed prior to hazardous piles to avoid the potential for cross contamination. Stockpile portions which have sample results reported above the 5.0 mg/l TCLP threshold for lead will be considered hazardous and staged separately for special handling. Hazardous material will be handled last, after all non-hazardous material has been processed. While awaiting processing, the hazardous piles will be enveloped in polyethylene sheeting.

STOCKPILE PROCESSING: As mentioned, non-hazardous material will be processed first to avoid the possibility of cross contamination. Generally, the stockpiles will be separated into three forms: 1) Salvageable metal; 2.) Waste material; and 3) soil. The same process will be performed on both non-hazardous and hazardous piles. The differences arise after salvageable metal is removed.

METALS RECLAMATION: Stockpiled material will be placed on a mechanical vibratory screen, which shakes and sifts larger pieces (4" diameter) of material (scrap metal) from smaller diameter (1 inch diameter) materials (soil). Scrap metal remaining on the top screen will be removed and placed in roll-offs for transportation to a reputable scrap metal yard for salvage.

SOIL REUSE: Soil which passes through the screen will be collected and staged for reuse. The intermediary material which consists of cobbles, debris, and pieces of metal will be staged separately for disposal. Soil generated from the screening of non-hazardous material will be staged for reuse as fill at the Morgan Farm Landfill. Soil generated from the screening of hazardous stockpiles will be combined with its intermediary phase and undergo stabilization. Stabilized material will be beneficially used as rough grading material to fill in a depression on top of Cragston Landfill. Cragston Landfill is undergoing 6NYCRR Part 360 closure and requires rough grading fill to "crown" the landfill prior to final capping.

STABILIZATION PROCESS: Actual soil mixing will be performed with a Kolberg Model 53 portable pugmill plant or equivalent. Material requiring stabilization will be placed in the feed hopper from the staging area using a loader. Portland cement will be added to attain an approximate 15 percent mixture via a hopper over the feed belt. Water will be added at the mixing chamber. Water will be regulated with a flow meter and valve arrangement.

Mixing in the pugmill is performed by paddles on twin counter-rotating shafts in the 8-foot mixing chamber. The arrangement of the mixing paddles and exit chute determine mixing energy and retention time. Initial operations will include mixing chamber adjustments to maximize energy, retention time, and productivity to assure complete mixing. Sodium polysilicate will be added using a spray bar in the mixing chamber. Trisodium phosphate will be added in liquid form using a hand-held sprayer or by addition to the polysilicate mixture, if necessary. The percentage of additives will be determined by bench scale tests prior to full scale operation.

After leaving the mixing chamber, the treated material will be discharged by the discharge conveyor into manageable piles.

During treatment operations, all ingredients will be weighed or metered to assure proper proportioning. Visual observations of the feed material, mixing chamber, and discharge will be constantly noted to assure proper mixing.

POST-TREATMENT: Mixed material will be segregated into daily batches. A daily batch will vary in size depending on production for the day. During the 10-hour crew workday, it is anticipated that pugmill production will be 8 hours, the remaining time being for startup, cleanup, an maintenance.

Processed material will undergo confirmation analysis for TCLP lead. A composite sample will be obtained for every 200 cubic yards of processed material after curing for 3-7 days. The results will be faxed from the laboratory to the site to ensure the treatment was successful.

Equipment will be decontaminated prior to demobilization. This will be accomplished by scraping and high-pressure washing. Decontamination waters will be stored on site. After decontamination procedures are completed, demobilization of equipment will commence.

SITE RESTORATION: Upon receipt of "clean" confirmatory soil samples from the Morgan Farm Landfill, stockpiled soil determined to be clean will be returned to the site for regrading and seeding in accordance with the approved project plans.

Intermediary material from clean piles and the stabilized intermediary phase and soil from "hot" piles will be placed within the existing cap of Cragston Landfill. Final closure and capping of Cragston Landfill is scheduled for June 1997.

DRAFT (PRELIMINARY DATA)

SOIL METALS DATA SUMMARY
MORGAN FARM LANDFILL
UNITED STATES MILITARY ACADEMY
West Point, New York
(Page 2 of 2)

Analytical Compounds	Sample Identification and Constituent Concentration (mg/l)		Toxicity Characteristic Levels (mg/l)
	MF-S-1	MF-S-2	
TCLP Metals			
Barium	0.608	0.601	100
Lead	0.488	0.998	5.0

Notes:
mg/l - milligrams per liter
TCLP - Toxicity Characteristic Leaching Procedure

TCLP METALS DATA SUMMARY

USMA, MORGAN FARM LANDFILL
West Point, New York

Analytical Compounds	Sample Identification and Constituent Concentration (mg/l)							Toxicity Characteristic Levels (mg/l)
	MF-S-3	MF-S-4	MF-S-4 FD	MF-S-5	MF-S-6	MF-S-7	MF-S-8	
Metals								
Arsenic	ND ≥ 0.026	ND ≥ 0.026	ND ≥ 0.026	ND ≥ 0.026	ND ≥ 0.0053	ND ≥ 0.0053	0.0058	5.0
Barium	0.643	0.811	0.738	0.559	0.705	0.314	0.736	100
Cadmium	0.044	0.111	0.060	0.093	0.097	0.081	0.108	1.0
Chromium	ND ≥ 0.005	ND ≥ 0.005	ND ≥ 0.005	ND ≥ 0.005	ND ≥ 0.005	ND ≥ 0.005	ND ≥ 0.0031	5.0
Lead	2.054	3.62	1.345	1.519	5.820	1.992	3.05	5.0
Mercury	ND ≥ 0.0002	ND ≥ 0.0002	ND ≥ 0.0002	ND ≥ 0.0002	ND ≥ 0.00052	ND ≥ 0.00052	ND ≥ 0.00002	0.2
Selenium	0.364	0.028	ND ≥ 0.025	0.093	0.0098	ND ≥ 0.005	0.097	1.0
Silver	ND ≥ 0.0055	ND ≥ 0.0055	ND ≥ 0.0055	ND ≥ 0.0055	ND ≥ 0.0055	ND ≥ 0.0055	ND ≥ 0.0055	5.0

Notes:
- (BOLD) - Concentration exceeds the RCRA toxicity characteristic level
- FD - Field duplicate
- mg/l - milligrams per liter
- MF - Morgan Farm
- ND - Indicates constituent not detected at or above the stated practical quantitation limit (PQL).
- S - Soil
- TCLP - Toxicity Characteristic Leaching Procedure

DRAFT (PRELIMINARY DATA)

February 14, 1996

TCLP METALS DATA SUMMARY

USMA, MORGAN FARM LANDFILL
West Point, New York

Analytical Compounds	Sample Identification and Constituent Concentration (mg/l)							Toxicity Characteristic Levels (mg/l)
	MF-S-9	MF-S-10	MF-S-11	MF-S-12	MF-S-13	MF-S-14	MF-S-15	
Metals								
Arsenic	ND ≥ 0.00555	ND ≥ 0.0026	ND ≥ 0.0013	ND ≥ 0.0553	ND ≥ 0.0043	ND ≥ 0.0043	ND ≥ 0.0043	5.0
Barium	0.413	0.590	0.958	1.060	0.784	1.010	1.230	100
Cadmium	0.0922	0.107	0.132	0.0705	0.0915	0.410	0.082	1.0
Chromium	ND ≥ 0.0105	ND ≥ 0.0025	0.0115	0.0126	0.0125	0.0125	0.011	5.0
Lead	2.340	3.060	2.840	2.220	1.88	6.540*	12.1*	5.0
Mercury	ND ≥ 0.00072	ND ≥ 0.00032	ND ≥ 0.00032	ND ≥ 0.00032	ND ≥ 0.00032	ND ≥ 0.00032	ND ≥ 0.00032	0.2
Selenium	ND ≥ 0.005	0.0341	ND ≥ 0.059	ND ≥ 0.050	ND ≥ 0.0050	ND ≥ 0.005	ND ≥ 0.050	1.0
Silver	ND ≥ 0.00555	ND ≥ 0.0055	ND ≥ 0.00385	ND ≥ 0.00385	ND ≥ 0.00385	ND ≥ 0.00385	ND ≥ 0.00385	5.0

Notes:
*(BOLD) - Concentration exceeds the RCRA toxicity characteristic level
FD - Field duplicate
mg/l - milligrams per liter
MF - Morgan Farm
ND - Indicates constituent not detected at or above the stated practical quantitation limit (PQL).
S - Soil
TCLP - Toxicity Characteristic Leaching Procedure

DRAFT (PRELIMINARY DATA)

February 14, 1996

TCLP METALS DATA SUMMARY

USMA, MORGAN FARM LANDFILL
West Point, New York
(Page 3 of 3)

Analytical Compounds	Sample Identification and Constituent Concentrations (mg/L)							Toxicity Characteristic Levels (mg/L)
	MF-S-16	MF-S-17	MF-S-18	MF-S-19	MF-S-20	MF-S-21	MF-S-22	
Metals								
Arsenic	ND ≥ 0.043	ND ≥ 0.043	ND ≥ 0.043	ND ≥ 0.043	ND ≥ 0.043	ND ≥ 0.043	ND ≥ 0.043	5.0
Barium	0.537	1.03	0.736	0.696	0.569	0.908	0.582	100
Cadmium	0.537	0.0185	0.0276	0.0505	0.0455	0.0035	0.0085	1.0
Chromium	0.0335	0.0315	0.0250	0.0185	0.0185	0.0135	0.0105	5.0
Lead	2.09	2.95	2.91	2.96	5.80	7.57	2.61	5.0
Mercury	ND ≥ 0.00052	ND ≥ 0.00052	ND ≥ 0.00052	ND ≥ 0.00052	ND ≥ 0.00052	ND ≥ 0.00052	ND ≥ 0.00052	0.2
Selenium	ND ≥ 0.050	ND ≥ 0.050	ND ≥ 0.050	ND ≥ 0.050	ND ≥ 0.050	ND ≥ 0.050	ND ≥ 0.050	1.0
Silver	ND ≥ 0.0085	ND ≥ 0.0085	ND ≥ 0.0085	ND ≥ 0.0085	ND ≥ 0.0085	ND ≥ 0.0085	ND ≥ 0.0085	5.0

Notes:
(PQLD) - Concentration exceeds the RCRA toxicity characteristic level
FD - Field duplicate
mg/L - milligrams per liter
MF - Morgan Farm
ND - Indicates constituent not detected at or above the stated practical quantitation limit (PQL).
S - Soil
TCLP - Toxicity Characteristic Leaching Procedure

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TCLP METALS DATA SUMMARY

USMA, MORGAN FARM LANDFILL
West Point, New York
(Page 4 of 4)

Analytical Compounds	Sample Identification and Constituent Concentration (mg/l)				Toxicity Characteristic Levels (mg/l)
	MF-S-23	MF-S-24	MF-S-25	MF-S-26	
Metals					
Arsenic	ND ≥ 0.043	ND ≥ 0.043	0.051	0.0774	5.0
Barium	0.959 BE	0.713 BE	0.759 BE	1.2 BE	100
Cadmium	0.0122	0.0374	0.0633	0.0282	1.0
Chromium	0.0105 B	0.012 B	ND ≥ 0.0065	0.0073 B	5.0
Lead	11.4*	1.36	2.9	0.657	5.0
Mercury	ND ≥ 0.0002	ND ≥ 0.0002	ND ≥ 0.0002	ND ≥ 0.0002	0.2
Selenium	ND ≥ 0.050	ND ≥ 0.050	ND ≥ 0.050	ND ≥ 0.050	1.0
Silver	ND ≥ 0.0085	ND ≥ 0.0085	ND ≥ 0.0085	ND ≥ 0.0085	5.0

Notes:
*(BOLD) - Concentration exceeds the RCRA toxicity characteristic level
FD - Field duplicate
mg/l - milligrams per liter
MF - Morgan Farm
ND - Indicates constituent not detected at or above the stated practical quantitation limit (PQL).
S - Soil
TCLP - Toxicity Characteristic Leaching Procedure

Sample No.	Grid	Estimated Area	Sample Result (mg/L)
MF-S-6	4	NW Section	5.82
MF-S-14	8	NW Section	6.54
MF-S-15	5	E Section	12.1
MF-S-20	9	N Section	8.8
MF-S-21	9	N Section	7.57
MF-S-23	9	N Section	11.4

February 29, 1996

SOIL METALS DATA SUMMARY
MORGAN FARM LANDFILL
UNITED STATES MILITARY ACADEMY
West Point, New York

DRAFT

Analytical Compounds	Sample Identification and Constituent Concentration (mg/kg)						
	MF-C1-1	MF-C1-1 Duplicate	MF-C1-2	MF-C1-3	MF-C2-1	MF-C2-2	MF-C2-3
Total Metals							
Aluminum	11400	11100	10900	13000	7630	7690	13000
Antimony	ND ≥ 2.3	ND ≥ 2.3	ND ≥ 2.4	ND ≥ 2.9	ND ≥ 2.1	ND ≥ 2.2	ND ≥ 2.4
Arsenic	9.8	9.2	9.8	19	5.8	4.0	4.9
Barium	114	131	109	175	41.4	37.3	56.1
Beryllium	0.46	0.36	0.35	0.30	0.32	0.30	0.36
Cadmium	1.7	2.4	2.0	5.9	0.54	0.75	1.1
Calcium	2900	3660	4370	16800	6590	1810	3230
Chromium	15.6	17	15.1	31.1	8.3	8.7	11.3
Cobalt	10.3	8.4	7.7	13.2	5.7	5.6	4.8
Copper	50	60.5	67.4	142	25.9	21.7	36.9
Iron	23900	22200	33200	61200	13300	15900	16200
Lead	157	228	183	545	39.8	43.3	89.3
Magnesium	3340	31000	2660	3240	1980	2140	19400
Manganese	620	498	367	469	248	257	164
Mercury	0.15	0.12	0.13	0.16	ND ≥ 0.10	ND ≥ 0.11	ND ≥ 0.099
Nickel	31.4	27.9	21.5	60.2	10.6	12.5	11.9
Potassium	788	964	880	1070	733	709	721
Selenium	ND ≥ 0.96	ND ≥ 0.96	ND ≥ 0.99	ND ≥ 1.2	6.7	ND ≥ 0.91	ND ≥ 0.97
Silver	ND > 0.41	0.43	ND ≥ 0.42	0.94	ND ≥ 0.37	ND ≥ 0.39	ND ≥ 0.41
Sodium	673	686	687	1100	575	539	614
Thallium	ND ≥ 2.2	ND ≥ 2.2	ND ≥ 2.2	ND ≥ 2.7	ND ≥ 1.9	ND ≥ 2.0	ND ≥ 2.2
Vanadium	28.9	34.4	45.9	46.3	14	13.9	20.9
Zinc	444	603	439	945	347	147	309

Notes:
MF - Morgan Farm
mg/kg - milligrams per kilogram
ND - Indicates constituent not detected at or above the stated practical quantitation limit (PQL)

SOIL METALS DATA SUMMARY
MORGAN FARM LANDFILL
UNITED STATES MILITARY ACADEMY
West Point, New York
(Page 2 of 2)

DRAFT

Analytical Compounds	Sample Identification and Constituent Concentration (mg/kg)						
	MF-C3-1	MF-C3-2	MF-C3-3	MF-C4-1	MF-C4-2	MF-C4-3	MF-C-BG1 BACK GROUND
Total Metals							
Aluminum	6920	7270	4780	7060	5820	3950	14700
Antimony	ND ≥ 2.3	ND ≥ 2.3	ND ≥ 2.1	ND ≥ 2.2	ND ≥ 2.2	ND ≥ 2.3	ND ≥ 3.4
Arsenic	5.9	6.2	3.1	16.8	8.3	ND ≥ 2.0	7.5
Barium	389	83.2	49.9	36.4	39.3	13.8	51.5
Beryllium	0.26	0.29	0.22	0.29	0.27	0.21	0.95
Cadmium	1.2	1.2	1.6	0.54	0.49	0.26	0.78
Calcium	7430	3970	2120	1370	4720	997	582
Chromium	9.1	9.4	7.0	12.2	7.0	4.2	16.7
Cobalt	7.0	5.9	4.7	5.5	5.5	5.4	7.8
Copper	55.3	36.6	35	24	20.6	13.4	17.4
Iron	14100	13900	11500	14700	10900	6810	22900
Lead	212	204	90.9	78	66.1	22.2	74.2
Magnesium	3850	2680	1980	2380	3520	1580	2400
Manganese	231	220	216	191	306	196	282
Mercury	ND ≥ 0.11	ND ≥ 0.098	0.29	ND ≥ 0.11	ND ≥ 0.092	ND ≥ 0.11	0.18
Nickel	11.8	12.1	12.5	11.4	9.4	5.5	12.8
Potassium	887	930	768	1090	889	602	635
Selenium	ND ≥ 0.95	ND ≥ 0.96	ND ≥ 0.87	ND ≥ 0.89	ND ≥ 0.89	ND ≥ 0.95	ND ≥ 1.4
Silver	ND ≥ 0.40	ND ≥ 0.41	ND ≥ 0.37	ND ≥ 0.38	ND ≥ 0.38	ND ≥ 0.40	ND ≥ 0.60
Sodium	676	649	668	532	600	567	928
Thallium	ND ≥ 2.1	ND ≥ 2.2	ND ≥ 2.0	ND ≥ 2.0	ND ≥ 2.0	ND ≥ 2.1	ND ≥ 3.2
Vanadium	23.6	34.2	11.8	14.5	12	7.0	43.9
Zinc	246	270	1050	159	112	30.1	63.9

Notes:
MF - Morgan Farm
mg/kg - milligrams per kilogram
ND Indicates constituent not detected at or above the stated practical quantitation limit (PQL)

DEPARTMENT OF THE ARMY
UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK 10996

March 14, 1996

REPLY TO
ATTENTION OF

Directorate of Housing and Public Works
SUBJECT: Landfill Consolidation

Mr. Alan A. Fuchs
Regional Solid Waste Engineer
New York State Department of
Environmental Conservation
Region III
21 South Putt Corners Road
New Paltz, New York 12561-1696

Dear Mr. Fuchs:

As you are aware, we are in the process of closing the Cragston Landfill in accordance with 6NYCRR Part 360 Solid Waste Management regulations. The closure design plans estimate that 30,000 cubic yards of rough grading fill is required to "crown" the landfill prior to final capping.

In an attempt to conserve resources while maintaining our environmental stewardship, we would like to consolidate some of the material removed from the Morgan Farm Landfill into Cragston Landfill.

Morgan Farm Landfill is being removed as a proactive measure to prevent further erosion of its embankment and address the lead contamination revealed during its investigation in 1994. The removal action entails the excavation and stockpiling of disposed material. The stockpiles are monitored for organic vapors and composite sampled for TCLP RCRA metals. The stockpiles are then sorted through a vibratory mechanical screen into salvageable scrap metal, miscellaneous debris and soil. The scrap metal is loaded into roll-offs for transportation to a reputable scrap metal yard for reclamation. Soil sifted from non-hazardous stockpiles will be returned to Morgan Farm as backfill. The soil and debris produced from stockpiles which just exceeded the TCLP threshold for lead will be stabilized on site through the use of portable pug mill. A confirmatory composite sample will be obtained for each 200 cubic yards of stabilized material and analyzed for TCLP lead. We request approval to consolidate the non-hazardous debris and stabilized material from Morgan Farm Landfill within the existing cap of Cragston Landfill. Upon completion of stockpile sorting and processing, the cap in the depressed area on the top of Cragston Landfill will be peeled back and the accumulated material deposited and compacted. We anticipate consolidating approximately 5000 cubic yards. The cover material will then be returned to the area. Final capping and closure of Cragston is scheduled to occur in the Spring of 1997.

We request your approval to accomplish this under the Cragston Closure Plan which will enable us to complete the Morgan Farm Landfill project. This safe and cost effective approach will also reduce the amount of fill required at Cragston prior to final capping. We appreciate your continuing cooperation and look forward to your response.

Sincerely,

EUGENE E. ROOD, P.E.
C, Environmental Management Division

New York State Department of Environmental Conservation
Division of Solid & Hazardous Materials
Bureau of Hazardous Compliance & Land Management
50 Wolf Road, Albany, New York 12233-7252

Michael D. Zagata
Commissioner

March 29, 1996

Mr. Bill Kavanagh
Environmental Manager
Department of the Army
United States Military Academy
West Point, New York 10996

Re: Revised Interim Corrective Measures Sampling and Handling Plan for the Morgan Farm Landfill.

Dear Mr. Kavanagh:

The New York State Department of Environmental Conservation (Department) has completed a review of the revised Interim Corrective Measures Sampling and Handling Plan for the Morgan Farm Landfill. The Department has approved the Plan and the Academy should proceed as planned.

If you have any further concerns or questions please call me at (518) 457-9361.

Sincerely,

James Yuchniewicz

James Yuchniewicz
Engineering Geologist
Bureau of Haz. Compliance and Land Management

CC: D. Wolterding
P. Patel
R. Aldrich, Reg.3

DEPARTMENT OF THE ARMY
UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK 10996

June 17, 1996

REPLY TO
ATTENTION OF

Directorate of Housing and Public Works

SUBJECT: Morgan Farm Landfill Disposal Extension

Mr. Rod Aldrich, P.E.
New York State Department of
Environmental Conservation
Division of Hazardous Substance Regulation
21 South Putt Corners Road
New Paltz, New York 12501-1696

Dear Mr. Aldrich:

The United States Military Academy has decided to dispose of the hazardous waste generated from the Morgan Farm Landfill Interim Corrective Measure Project, at an authorized hazardous waste disposal facility. Our original plans to stabilize the material on-site were changed after we were notified by Mr. James Yuchniewicz of your District Office, that a Hazardous Waste Treatment Permit would be required. We are requesting a 30-day extension to the ninety-day storage limit which will expire on May 24, 1996.

The fifty cubic yards of material awaiting disposal is staged on and covered with polyethylene sheeting and surrounded with hay bales at the Cragston Landfill.

A waste information profile has been prepared and we are awaiting its approval. Transportation and disposal will occur by June 23, 1996. Copies of the manifests will be provided to you.

Mr. Bill Kavanagh of my office is available at (914) 938-4459 to answer any questions you may have regarding this request. We appreciate your continuing cooperation throughout this project.

Sincerely,

E Rood

Eugene E. Rood, P.E.
C, Environmental Management Division

CF:
Steve Parisio, New York State Department of Environmental Conservation, Region 3
Mr. James Yuchniewicz, New York State Department of Environmental Conservation, District Office

Appendix M

Photographs

MORGAN FARM LANDFILL

AUGUST 10, 1995
SITE WALK - MORGAN FARM ROAD LANDFILL

AUGUST 10, 1995
SITE WALK - MORGAN FARM ROAD LANDFILL
LANDFILL TOE AT STREAM BOUNDARY

AUGUST 10, 1995
SITE WALK - MORGAN FARM ROAD LANDFILL
TEST PIT

AUGUST 10, 1995
SITE WALK - MORGAN FARM ROAD LANDFILL
PROTRUDING DEBRIS

SURVEY LIMITS OF THE LANDFILL AND
INSTALLATION OF GRADE STAKES

SURVEY LIMITS OF THE LANDFILL AND
INSTALLATION OF GRADE STAKES

PRE-CONSTRUCTION STREAM BED
AND LEADING EDGE OF LANDFILL TOE

PRE-CONSTRUCTION STREAM BED
AND LEADING EDGE OF LANDFILL TOE

PRE-CONSTRUCTION STREAM BED
AND LEADING EDGE OF LANDFILL TOE

CONSTRUCTION OF ENTRANCE ROAD

CLEARING AREA TO BE EXCAVATED

CLEARING AREA FOR SCREENING AND
STAGING MATERIAL

INSTALLATION OF SILT FENCE
AT LANDFILL TOE

INSTALLATION OF SILT FENCE
AT LANDFILL TOE

COMPLETION OF SILT FENCE INSTALLATION

COMPLETION OF SILT FENCE INSTALLATION

MATERIAL REMOVAL

TRANSPORTING MULCH FROM TREE REMOVAL ACTIVITIES

MATERIAL REMOVAL AND SCREENING OPERATIONS

MATERIAL REMOVAL

CONSTRUCTION OF STAGING PAD FOR ROLL-OFFS

THREE ROLL-OFFS FOR SCRAP METAL

LOADING ROLL-OFFS WITH SCRAP METAL

MATERIAL REMOVAL

MATERIAL REMOVAL AND SLOPE RE-GRADE

MATERIAL REMOVAL AND SCREENING OPERATIONS

TEST PIT

MATERIAL REMOVAL AND SLOPE RE-GRADE

SAMPLING 2-100 YD. SCREENED SOIL PILES

MATERIAL REMOVAL AND SLOPE RE-GRADE

SLOPE RE-GRADE

TEMPORARY REMOVAL OF SILT FENCE
AND RE-GRADE AT TOE BOUNDARY

TEMPORARY REMOVAL OF SILT FENCE
AND RE-GRADE AT TOE BOUNDARY

TEMPORARY REMOVAL OF SILT FENCE
AND RE-GRADE AT THE TOE BOUNDARY

RE-INSTALLATION OF SILT FENCE (90% COMPLETE)
AND FINAL GRADE

BEGIN REMOVAL OF ENTIRE LANDFILL

LANDFILL MATERIAL

CONTINUE REMOVAL OF LANDFILL MATERIAL

DEEPEST SECTION OF THE LANDFILL
-APPROXIMATELY 10-12 FEET DEEP

FLOOR OF THE LANDFILL

SCREENING PROCESS OF LANDFILL MATERIAL

LOADING EXCAVATED LANDFILL MATERIAL
INTO ARTICULATED DUMP TRUCK

LOADING EXCAVATED LANDFILL MATERIAL
INTO ARTICULATED DUMP TRUCK

TRANSPORTING LANDFILL MATERIAL UP TO
CRAGSTON LANDFILL FOR PROCESSING

SEGREGATION OF THE SEVERAL STOCKPILES

FINAL STAGE OF THE MATERIAL REMOVAL PROCESS

FINAL STAGE OF THE MATERIAL REMOVAL PROCESS

ENTIRE LANDFILL REMOVED AND TRANSPORTED
TO THE CRAGSTON LANDFILL FOR PROCESSING

ENTIRE LANDFILL REMOVED AND TRANSPORTED
TO THE CRAGSTON LANDFILL FOR PROCESSING

STREAM RUNNING THROUGH THE LANDFILL

STOCKPILING PROCESSED SOIL

LANDFILL MATERIAL PROCESSING OPERATIONS
-CRAGSTON LANDFILL

CONFIRMATORY SAMPLE LOCATION POINTS
-FLOOR OF THE MORGAN FARM LANDFILL

CONFIRMATORY SAMPLE LOCATION POINTS
-FLOOR OF THE MORGAN FARM LANDFILL

LANDFILL MATERIAL PROCESSING OPERATIONS
AFTER A HEAVY RAIN STORM

LANDFILL MATERIAL PROCESSING OPERATIONS
-CRAGSTON LANDFILL

LANDFILL MATERIAL PROCESSING OPERATIONS
-CRAGSTON LANDFILL

STREAM RUNNING DOWN THE MIDDLE
OF THE LANDFILL

EXCAVATING FRENCH TYPE DRAIN FOR THE STREAM

OVER EXCAVATED A 12'x12'x1' VOLUME AROUND
CONFIRMATORY SOIL GRAB SAMPLE MF-C1-3

EXCAVATING FRENCH TYPE DRAIN FOR THE STR

CONSTRUCTING THE FRENCH DRAIN USING
6-12 INCH RIP RAP WRAPPED IN GEOTEXTILE FABRIC

PLACING 6-12 INCH RIP RAP INTO GEOTEXTILE
LINED TRENCH

ENCLOSED RIP RAP INSIDE THE GEOTEXTILE FABRIC

FRENCH TYPE DRAIN WITH STREAM RUNNING THROUGH

BACKFILLING THE FRENCH TYPE DRAIN

TRANSPORTING "CLEAN" PROCESSED SOIL FROM CRAGSTON LANDFILL TO MORGAN FARM LANDFILL FOR BACKFILL

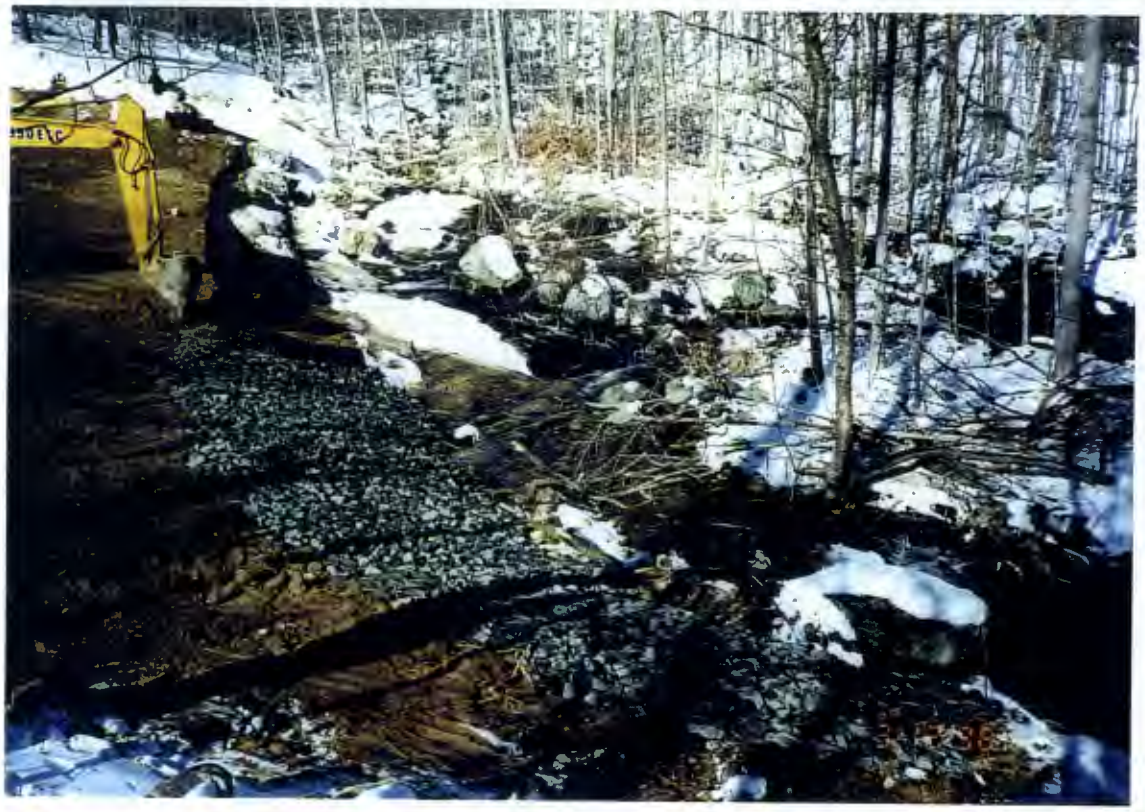
GRADING MORGAN FARM LANDFILL

RECEIVING RIP RAP FOR STREAM BANK STABILIZATION

ANCHORING GEOTEXTILE FABRIC FOR
STREAM BANK STABILIZATION

ANCHORING GEOTEXTILE FABRIC FOR
STREAM BANK STABILIZATION

PLACING RIP RAP ON TOP OF GEOTEXTILE FABRIC



PLACING RIP RAP ON TOP OF GEOTEXTILE FABRIC

PLACING RIP RAP ON TOP OF GEOTEXTILE FABRIC

STREAM BANK STABILIZATION COMPLETE

PLACING FERTILIZER AND SEED ON THE DISTURBED AREA

RE-GRADE OF THE MORGAN FARM LANDFILL

RE-GRADE OF THE MORGAN FARM LANDFILL

PLACING MULCH ON THE DISTURBED AREA

PLACING MULCH ON THE DISTURBED AREA

REMOVAL OF MORGAN FARM ROAD LANDFILL COMPLETE

SEPARATING SCRAP METAL AND PLACING INTO ROLL-OFFS

TRANSPORTING DEBRIS PILE OVER TO TEMPORARY STAGING AREA

UNLOADING DEBRIS INTO TEMPORARY STAGING AREA

PUSHING MATERIAL INTO TEMPORARY STAGING AREA
USING THE D-6 DOZER

CONTINUE PLACING MATERIAL INTO TEMPORARY STAGING
AREA, LOADING ROLL-OFFS AND GRADING DISTURBED AREAS

COMPLETION OF MATERIAL SEGREGATION

POST SCHOOL LANDFILL

AUGUST 10, 1995
SITE WALK - POST SCHOOL LANDFILL

VEGETATION REMOVAL EFFORTS

VEGETATION REMOVAL
AND CHIPPING ACTIVITIES

VEGETATION REMOVAL
AND CHIPPING ACTIVITIES

VEGETATION REMOVAL EFFORTS

DELIVERY OF RIPRAP

TREE STUMP REMOVAL

EXCAVATING SOUTH END OF
DRAINAGE SWALE

EXCAVATING NORTH END OF
DRAINAGE SWALE

EXCAVATION ACTIVITIES COMPLETE

EXCAVATION ACTIVITIES COMPLETE

PREPARATION OF GEOTEXTILE INSTALLATION

INSTALLATION OF GEOTEXTILE LINER

INSTALLATION OF GEOTEXTILE LINER

INSTALLATION OF GEOTEXTILE LINER

COMPLETION OF GEOTEXTILE LINER

COMPLETION OF GEOTEXTILE LINER

PLACING RIPRAP IN SOUTH END
OF DRAINAGE SWALE

RECEIVING ADDITIONAL RIPRAP

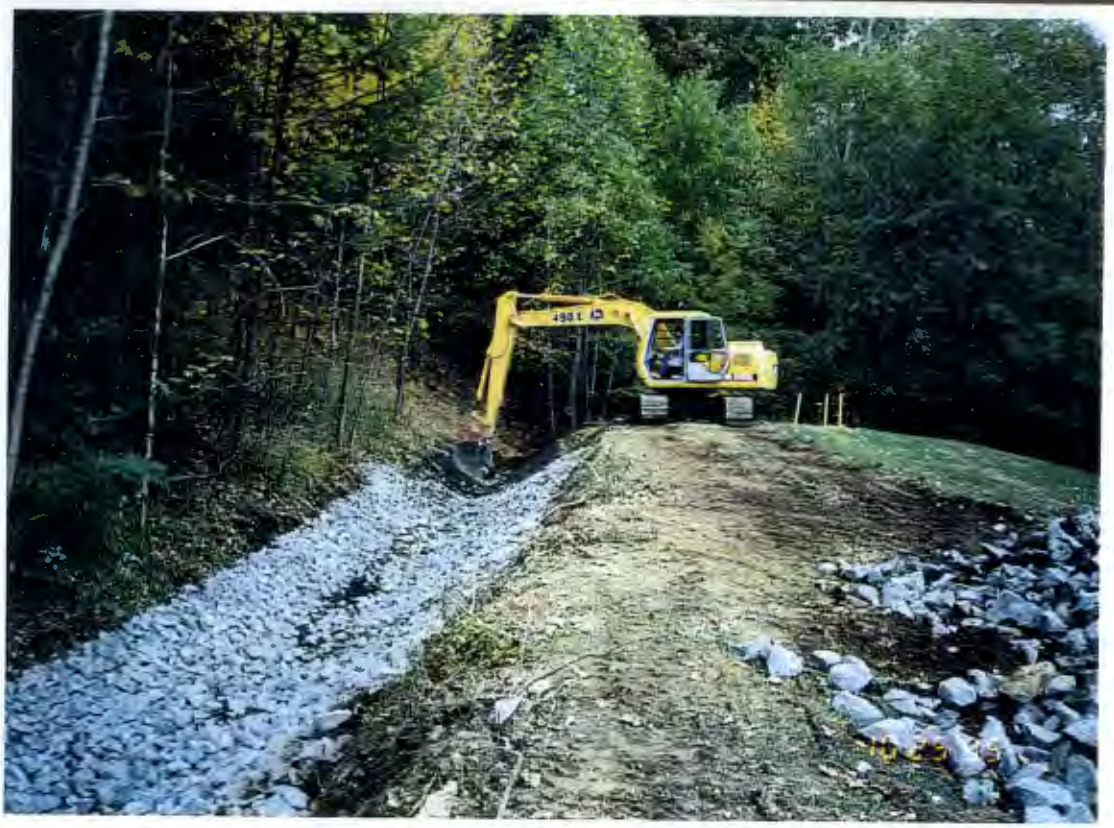
TRANSPORTING RIPRAP FROM EAST END
OF FIELD TO THE WEST END

PLACING RIPRAP IN MIDDLE
OF THE DRAINAGE SWALE

PLACING RIPRAP IN MIDDLE
OF THE DRAINAGE SWALE

PLACING RIPRAP IN THE NORTH
END OF THE DRAINAGE SWALE

PLACING RIPRAP IN THE NORTH
END OF THE DRAINAGE SWALE



PLACING RIPRAP IN THE NORTH
END OF THE DRAINAGE SWALE

PLACING RIPRAP IN TRIBUTARY ON
THE NORTH END OF THE DRAINAGE SWALE

COMPLETION OF DRAINAGE SWALE
CONSTRUCTION ACTIVITIES

COMPLETION OF DRAINAGE SWALE
CONSTRUCTION ACTIVITIES

COMPLETION OF DRAINAGE SWALE
CONSTRUCTION ACTIVITIES

RE-SEEDING AREAS DISTURBED
DURING CONSTRUCTION ACTIVITIES

RE-SEEDING AREAS DISTURBED
DURING CONSTRUCTION ACTIVITIES

RE-SEEDING AREAS DISTURBED
DURING CONSTRUCTION ACTIVITIES

CONDITION OF DRAINAGE SWALE
DURING RAIN STORM

CONDITION OF DRAINAGE SWALE
DURING RAIN STORM

AUGUST 10, 1995
SITE WALK - POST SCHOOL LANDFILL

SEEPAGE AT ROCK OUTCROP

CONSTRUCTION OF CONCRETE BLOCK/BRICK
COLLECTION BOX

CONSTRUCTION OF CONCRETE BLOCK/BRICK
COLLECTION BOX

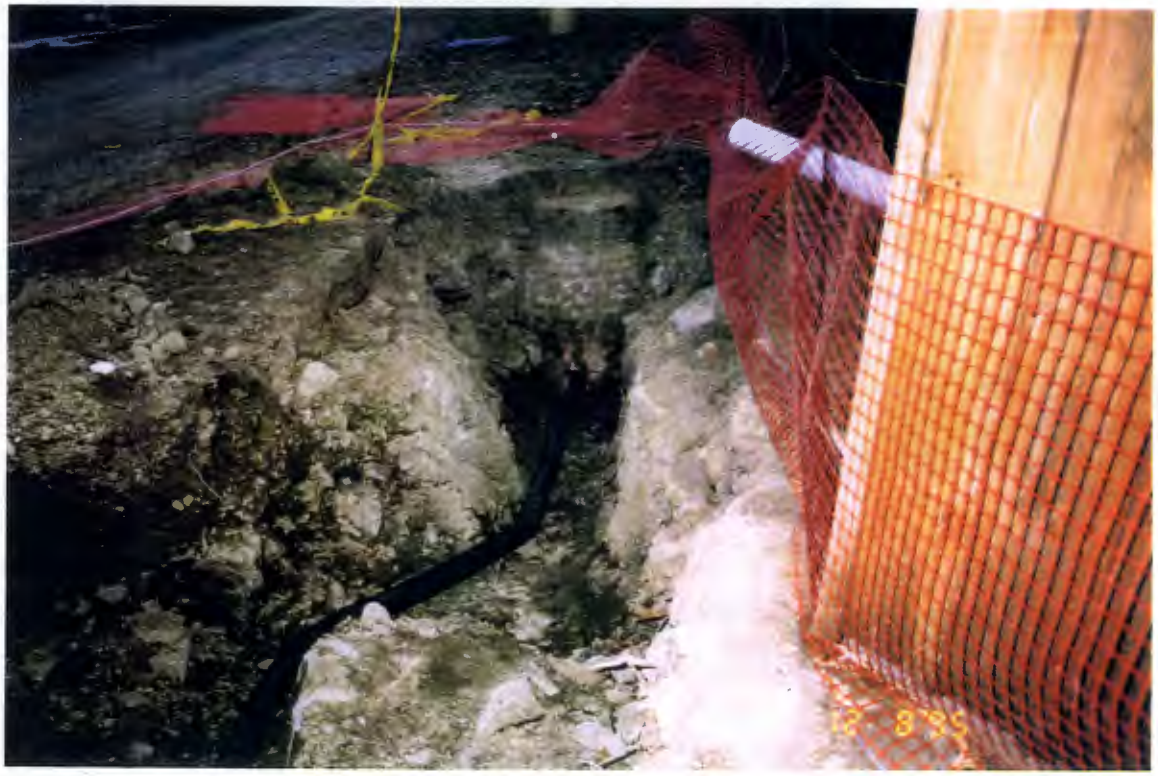
CONSTRUCTION OF CONCRETE BLOCK/BRICK
COLLECTION BOX

CONSTRUCTION OF CONCRETE BLOCK/BRICK
COLLECTION BOX

EXCAVATING TRENCH FROM CATCH BASIN
TO NEARBY SANITARY MANHOLE

COMPLETION OF CONCRETE BLOCK/BRICK
COLLECTION BOX

TAPPING INTO SANITARY MANHOLE



CONNECTING CATCH BASIN TO THE SANITARY
MANHOLE WITH SIX INCH FLEXIBLE PIPE

REMOVAL OF 1000 GALLON CONCRETE
COLLECTION TANK

GALVANIZED DIAMOND BACK TOP FOR THE
COLLECTION BOX

TRIMMED THE DIAMOND BACK TOP TO FIT
FLUSH WITH THE COLLECTION BOX

RE-GRADING THE DISTURBED AREA

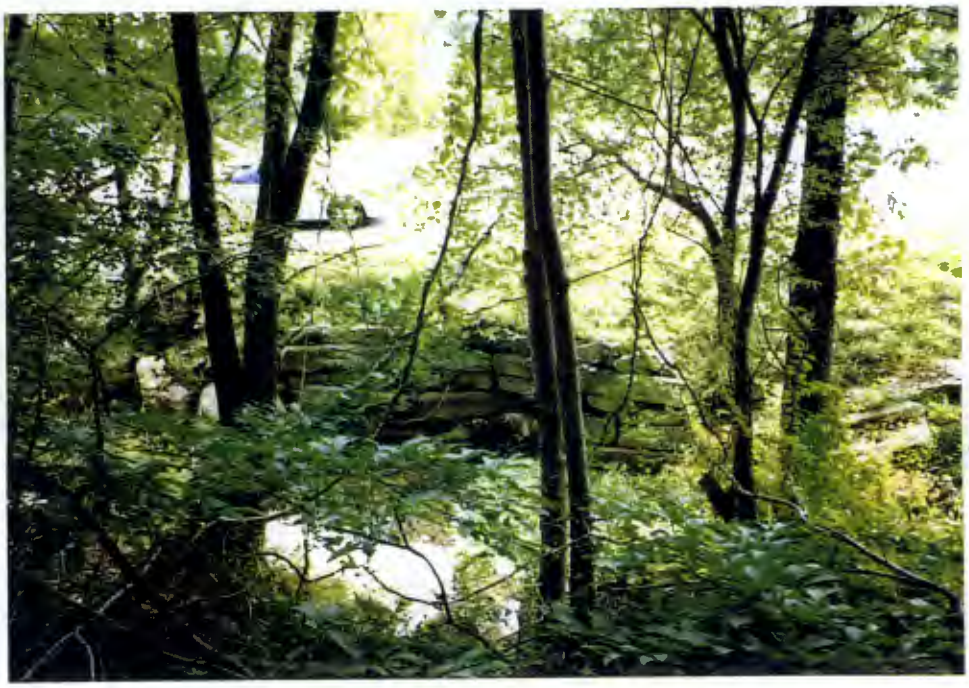
RE-GRADING THE DISTURBED AREA

PLACED FERTILIZER, SEED AND MULCH ON
THE DISTURBED AREA

POST SCHOOL COLLECTION BOX COMPLETE

LOT "F" LANDFILL

AUGUST 10, 1995
SITE WALK - LOT F LANDFILL



DRAINAGE CULVERT AT BOTTOM
OF THE SLOPE

LOWER HALF OF IRON STAINED SLOPE

UPPER HALF OF IRON STAINED SLOPE

SEEPAGE AT ROCK OUTCROP IN THE
MIDDLE OF THE IRON STAINED SLOPE

COMPLETION OF TREE REMOVAL ACTIVITIES

ESTIMATED PATH FOR CONSTRUCTION
OF DRAINAGE TRENCH

EXCAVATION OF "Y" COLLECTION TRENCH

EXCAVATION OF "Y" COLLECTION TRENCH

CONSTRUCTION OF COLLECTION BOX
AND EXITING SIX INCH PIPE

COMPLETION OF GEOTEXTILE LINER
AND RIPRAP INSIDE OF DRAINAGE TRENCH

COMPLETION OF DRAINAGE TRENCH

TWO CONCRETE COLLECTION BOXES AT
THE TOP OF THE LOT "F" LANDFILL SLOPE

TWO CONCRETE COLLECTION BOXES AT
THE TOP OF THE LOT "F" LANDFILL SLOPE

REMOVING CONCRETE HEAD WALL

CUTTING GEOTEXTILE FABRIC LINER
TO BE PLACED IN THE DRAINAGE SWALE

DRESSING THE DRAINAGE SWALE USING
THE 690E LC EXCAVATOR

CULVERT BENT IN AND RESTRICTING FLOW

ASSEMBLY OF GABIAN BASKETS

REMOVAL OF THE CONCRETE HEAD WALL

CONSTRUCTION OF THE GABIAN BASKET HEAD WALL

CONSTRUCTION OF THE GABIAN BASKET HEAD WALL

COMPLETION OF THE GABIAN BASKET HEAD WALL

CONTINUE DRESSING THE DRAINAGE SWALE

EXCAVATED THE UP GRADIENT DRAINAGE SWALE

PLACING RIP RAP INTO THE DRAINAGE SWALE

PLACING GEOTEXTILE LINER AND
RIP RAP INTO THE DRAINAGE SWALE

PLACING GEOTEXTILE LINER AND
RIP RAP INTO THE DRAINAGE SWALE

COMPLETION OF THE DRAINAGE SWALE

COMPLETION OF THE DRAINAGE SWALE

RE-GRADING THE DISTURBED AREAS

RE-GRADING THE DISTURBED AREA

PLACING PEA GRAVEL OVER THE
RE-GRADED AREA

LOT "F" DRAINAGE SWALE AND PARKING AREA

LOT "F" ENTRANCE ROAD PRIOR TO
CONSTRUCTION ACTIVITIES

EXCAVATING LOT "F" ENTRANCE ROAD
DRAINAGE SWALE

EXCAVATING LOT "F" ENTRANCE ROAD
DRAINAGE SWALE

COMPLETE EXCAVATING LOT "F" ENTRANCE
ROAD DRAINAGE SWALE

BEGIN PLACING GEOTEXTILE LINER INTO THE
DRAINAGE SWALE

CONSTRUCTION OF THE LOT "F" ENTRANCE
ROAD DRAINAGE SWALE

CONSTRUCTION OF THE LOT "F" ENTRANCE
ROAD DRAINAGE SWALE

PLACING RIP RAP INTO ENTRANCE ROAD
DRAINAGE TRENCH

SKI SLOPE

SKI SLOPE - 275 GALLON BLOW DOWN TANK
FOR A COMPRESSOR

REMOVAL OF 275 GALLON BLOW DOWN TANK

INSTALLED GEOTEXTILE LINER AND
PEA GRAVEL FOR BEDDING

INSTALLATION OF 500 GALLON
DOUBLE WALLED TANK

INSTALLATION OF 500 GALLON TANK
AND SURROUNDING WITH PEA GRAVEL

INSTALLATION OF GABIAN BASKET
WALL FOR STABILIZATION OF THE TANK

COMPLETION OF GABIAN BASKET WALL

COMPLETE INSTALLATION OF 500 GALLON TANK

REPAIR OF CONCRETE PAD ABOVE 500 GALLON TANK

INSTALLATION OF THE HIGH LEVEL LOW LEVEL ALARM

IDW DRUMS

BUILDING 795 IDW DRUM REMOVAL ACTIVITIES

BUILDING 795 IDW DRUM REMOVAL ACTIVITIES

DISCHARGING IDW DRUM CONTENTS INTO THE
SANITARY SEWER VIA AN OIL/WATER SEPARATOR

GREENHOUSE

GREENHOUSE WITH BUILDING 713A IN THE BACKGROUND

BUILDING 713A WITH GREENHOUSE (B-713) IN THE BACKGROUND

REMOVING MOLDING AND GLASS PANES

REMOVING GLASS PANES FROM THE ROOF

REMOVING METAL AND WOOD FRAMING

STAGING WOOD FRAMING IN POLY COVERED CONTAINMENT AREA

REMOVING METAL FRAMING

REMOVING METAL FRAMING

REMOVING CONCRETE FOOTER

STAGING CONCRETE AND WOOD IN
POLY COVERED CONTAINMENT AREAS

GREENHOUSE BUILDING DEMOLISHED

LOCATING ELECTRIC LINE ON THE WEST SIDE
OF BUILDING 713A

ELECTRICAL CONDUIT IN AREA LOCATED BY USMA
UTILITY DEPT. AS MANHOLE LOCATION

ELECTRIC LINE EXITING BUILDING 713A
AND FEEDING BUILDING 733

RE-ROUTE OF THE ELECTRIC LINE

EXISTING ELECTRIC LINE BEING RE-ROUTED

EXCAVATING TRENCH FOR NEW ELECTRIC LINE
AND MANWAY

INSTALLATION OF MANWAY

INSTALLATION OF SPLICE BOX

COMPLETE INSTALLATION OF MANWAY

COMPLETE INSTALLATION OF FENCING

DEMOLITION OF CHIMNEY

DEMOLITION OF CHIMNEY

DEMOLITION OF BUILDING 713A

PLACING DEBRIS INTO ROLL-OFFS

DEMOLISHING THE FOUNDATION OF
BUILDING 713A

SEGREGATING DEBRIS AND SCRAP METAL

BACKFILLING THE BASEMENT WITH BRICK, CONCRETE
AND FILL MATERIAL

PLACING FILL MATERIAL INTO THE BASEMENT

RE-GRADE OF THE DISTURBED AREAS