

**US NAVY NORTHERN DIVISION
REMEDIAL ACTION CONTRACT (RAC)
CONTRACT NO. N62472-94-D-0398
DELIVERY ORDER NO. 0034
FOSTER WHEELER ENVIRONMENTAL CORPORATION**

WORK PLAN

FOR

**SKEET RANGE CLOSURE
AT
NAVAL WEAPONS STATION EARLE**

COLTS NECK, NEW JERSEY

MAY 1998

Prepared for

U.S. Navy Northern Division

<u>Revision</u>	<u>Date</u>	<u>Prepared By</u>	<u>Approved By</u>	<u>Pages Affected</u>
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WORK PLAN

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1. INTRODUCTION

Foster Wheeler Environmental Corporation (FWENC) is pleased to submit this work plan to the Department of the Navy (Navy) in response to the Delivery Order 0034. This work plan describes work that will be performed to close the skeet range at the Site 5 Landfill located at the Naval Weapons Station Earle (NWS Earle). Work described includes site preparation, soil excavation, soil stockpiling, soil characterization, soil disposal and site restoration.

1.1 PROJECT BACKGROUND

NWS Earle is located in Monmouth County, New Jersey, approximately 47 miles south of New York City. The station consists of two areas, the 10,248-acre Main Base (Mainside) area, located inland, and the 706-acre Waterfront area as shown on the Site Vicinity Map, Figure 1 (Attachment 3). The two areas are connected by a Navy-controlled right-of-way. Commissioned in 1943, the facilities primary mission is to supply ammunition to the naval fleet.

FWENC is currently capping the Site 5 landfill in accordance with the Record of Decision (ROD) dated July 1997 for OU-1. The skeet range occupied approximately 2.5 acres located within the Site 5 landfill cap. The skeet range shotfall area encompasses approximately 5 acres extending beyond the limits of the cap.

In January 1998, the U.S. Navy decided to shut down future operation of the skeet range. Sampling conducted in the shotfall area exhibited elevated levels of lead. Table 1 (Attachment 4) summarizes sampling results. The Project Location Map is included as Figure 2 (Attachment 3).

1.2 OBJECTIVES

The objective of the remedial action is the removal of lead contaminated soil which exceeds the New Jersey residential cleanup standards for direct contact exposure from the skeet range shotfall area. In addition, the area will be sample to confirm that the New Jersey residential cleanup standards for direct exposure for polynucleararomatic hydrocarbons (PAHs) is not exceeded.

2. PROJECT MANAGEMENT

The Project Management Team will be responsible for all technical and administrative aspects of the remediation project. Technical responsibilities include completion of the required remediation and construction activities in accordance with good engineering practices. Included among the team's administrative responsibilities are project communications, project controls and scheduling, document control, and project meetings.

2.1 PROJECT TEAM ORGANIZATION

The project organization chart is included in Attachment 1. The following personnel are considered to be key team members for the performance of this project:

Senior Project Engineer / Manager, C. Tippmann: The responsibility of the Senior Project Engineer / Manager (SPEM) is general oversight of all facets of the project. He is responsible for the oversight, resource allocation, scheduling and quality control of the project. He reports to the Program Manager and is the first point of contact for the Contracting Officer's Technical Representative (COTR) and the Design Navy Technical Representative (NTR).

Project Superintendent, D. Sullivan: The Superintendent is responsible for all on site construction activities including supervision of craft labor and subcontractors and control of materials and equipment. The Project Superintendent reports directly to the SPEM and Design NTR and interfaces with the Project Engineer and Quality Control Representative on a daily basis to ensure that quality control standards are being met.

Craft Supervisor, J. Carroll: The Craft Supervisor is responsible for construction activities in the absence of the project superintendent and supervises craft labor and subcontractors. The Craft Supervisor reports directly to the Project Superintendent and interfaces with the Project Engineer and Quality Control Representative.

Project Engineer, B. Conley: The responsibility of the Project Engineer is to provide guidance to the field construction staff relating to compliance with the contract plans and specifications and to prepare technical plans and submittals. The Project Engineer reports directly to the Project Superintendent.

Project Procurement Engineer, E. Federico: The Project Procurement Engineer is responsible for procurement of materials and equipment and reports directly to the Project Superintendent.

Project Controls Engineer, M. Olson: The Project Controls Engineer is responsible for project controls, including scheduling, invoicing, and financial reporting and reports directly to the Project Superintendent.

Health and Safety Manager, G. Coppi: The Health and Safety Manager (HSM) is responsible for oversight of the health and safety procedures used on this project. He will consult with, and give direction to, the Site Health and Safety Officer.

Site Health and Safety Officer, T. Brennan: The Site Health and Safety Officer (SHSO) is responsible for the overall health and safety of FWENC employees on site. The SHSO is responsible for daily health and safety monitoring, implementation of all health and safety procedures and requirements, and maintenance of health and safety records. The SHSO will have the authority to shut-down any operation that is deemed by him to be unsafe. He will report to the HSM and will interface closely with the Project Superintendent.

Quality Control Manager, A. Aziz: The Quality Control Manager (QCM) is responsible for approval and oversight of quality control activities and procedures used on the project. He will provide direction to the site quality control representative.

Quality Control Representative, M. Miller: The Quality Control Representative is responsible for performing inspection and surveillance activities and for documenting results of these activities as required to achieve the quality of construction required by the technical specifications and drawings. He will report to the QCM and will interface with the Project Engineer and Project Superintendent.

2.2 PROJECT COMMUNICATION

Lines of communication between FWENC and other Project Team members are shown in the Project Organization Chart in Attachment 1. Communication between NWS Earle Security, Public Works, Explosive Ordnance Disposal, Environmental, and other departments will be through the construction NTR in the office of the Resident Officer in Charge of Construction (ROICC).

2.3 PROJECT SCHEDULE

The Construction Schedule is included in Attachment 2.

2.4 DOCUMENT CONTROL

Quality control records, test reports, submittals and approvals, record drawings, changes to the contract, updated construction schedules, invoices, daily reports, and all other project record documents, as required, will be maintained in the project files. The files will be located in the site office and will be available for review by the Navy.

2.5 PROJECT MEETINGS

Pre-construction

Before any physical work begins on the site, the FWENC project staff and the Navy and their representatives will meet to discuss coordination of the project. Items to be discussed in this meeting will include access to the site, working hours, specific health and safety issues and general scheduling of the work.

Bi-weekly QC/ Progress Meeting

QC/Progress Meetings will be conducted every other week. The meetings will be held at the ROICC office or as otherwise requested by the Navy.

3. DESCRIPTION OF ACTIVITIES

3.1 ANTICIPATED TASKS

The following major activities will be performed:

- Delineate contaminated area.
- Install erosion and sediment control measures.
- Clear contaminated area.
- Remove and stockpile soils from the contaminated area.
- Perform confirmatory sampling to ensure bottom of excavation complies with cleanup goal.
- Sample stockpiles.
- Dispose of stockpiled soil off site.
- Restore the site with topsoil and seed, ensure the area is graded to drain.

3.2 RADIO WAVE EMITTING EQUIPMENT

Radio wave emitting equipment to be used on this project may include two-way radios, cell phones, surveying equipment, sampling equipment, and other similar devices. Equipment will be identical to that used during Site 5 Landfill cap construction and has been approved by the Navy for use on site.

3.3 CONSTRUCTION QUALITY CONTROL

The landfill construction Quality Control Plan will be used for this task. Construction quality control (CQC) will be performed by the QC Representative, Mark Miller. He will be responsible for material testing, documentation of results, reporting results to the project superintendent, reporting deficiencies and certifying that all submittals are in compliance with contract requirements.

3.4 HEALTH AND SAFETY REQUIREMENTS

The site-specific Health and Safety Plan (HASP) provides requirements and guidelines that will be utilized in the field to protect the health and safety of workers. The SHSO will provide oversight of activities to ensure conformance with the HASP. The SHSO will supervise operations and be responsible for conducting site health and safety training/briefings, air and dust monitoring during operations, personnel monitoring, enforcing/modifying levels of PPE, ensuring compliance with decontamination procedures, maintaining monitoring equipment, and documenting and reporting all health and safety related incidents.

The SHSO will conduct site safety inspections. Weekly and monthly reports will be prepared and submitted to the Health and Safety Manager.

The following are specific components of the HASP that affect the daily activities of workers:

- A hazard assessment has been prepared for the major aspects of the project. Chemical, physical, and biological hazards associated with the project have been identified. Activity hazard analyses have been prepared to define the specific risks and means of mitigation that are associated with daily construction activities.
- Control measures to reduce the risk of exposure to chemical, physical, and biological hazards.
- Specific training requirements that will enable workers to operate at the site and improve their awareness of health and safety are presented in the HASP.
- Control of site operations, use of PPE, site safety equipment, and on-site communications.
- Real-time air monitoring and medical surveillance procedures are included in the HASP.
- Decontamination procedures, including contamination prevention, personnel decontamination, equipment decontamination, and disposal procedures, have been defined for site work.

3.5 PROCEDURES FOR DECONTAMINATION

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination. Detailed decontamination procedures are included in the HASP.

3.5.1 Personnel Decontamination

The following site activities present an opportunity for personnel contamination:

- Clearing.
- Excavation and stockpiling of contaminated soil.
- Decontamination of equipment.

FWENC will apply engineering and/or work practice controls as a means of protecting personnel in performance of site-specific tasks. Engineering controls will be implemented to reduce and maintain employee exposure below safe levels for those tasks that include possible exposure to contaminants. When engineering controls are impractical or insufficient to protect employees during site operations, FWENC will use personal protection equipment (PPE).

Any personnel exposed to possible contamination during daily activities will follow proper decontamination procedures. Decontamination procedures will ensure that material which workers may have contacted in the Exclusion Zone (EZ) does not result in personal exposure and is not spread to clean areas of the site. The EZ will be limited to the delineated lead-contaminated area.

3.5.2 Equipment Decontamination

All contaminated equipment will be decontaminated when switching from a contaminated task to a clean one and before leaving the site. Decontamination procedures may include sweeping, wiping or scraping the exterior of the equipment. Personnel performing this task will wear the proper PPE as specified in the HASP.

3.5.3 Disposal

Solid and liquid decontamination residuals and PPE will be containerized and disposed off site.

4. REMEDIAL CONSTRUCTION

This section provides a description of the major tasks that will be performed to accomplish the objectives of the remedial action.

4.1 PRE-CONSTRUCTION ACTIVITIES

The horizontal extent of the contaminated area has been delineated based on previous soil sampling. These sampling results are outlined in Table 1 (Attachment 4). Sketch 02 (Attachment 5) shows the sample locations and outlines the contaminated area. Sample points with lead levels above 400 ppm are considered contaminated.

Prior to site disturbance, perimeter soil erosion and sediment control devices will be constructed as shown on Sketch 01 (Attachment 5). Silt fence will be maintained during construction and will be cleaned out when sediment reaches half the height of the fence. Any sediment that accumulates prior to the completion of removal activities will be placed in a soil stockpile. Subsequent to removal activities, accumulated sediment will be spread on the ground surface. Clearing will be performed in areas within the delineated limits of contamination. Clearing debris will be chipped and disposed off-site.

4.2 EXCAVATION AND STOCKPILING

FWENC will lay out grids, approximately 90 foot by 90 foot, encompassing the contaminated area. Surface soil in each grid will be excavated and soil from each grid will be stockpiled within the grid where it was removed. Approximately 3 inches of soil will be removed from each grid, resulting in stockpiles containing approximately 75 cubic yards of soil. FWENC estimates that a total of approximately 3,000 cubic yards of soil will be stockpiled.

Stockpiles will be roughly conical in shape with a diameter of 26 feet and a height of 12 feet. FWENC will place plastic sheeting under and over each individual soil pile. In addition, piles will be surrounded by silt fence.

4.3 CONFIRMATION AND STOCKPILE SAMPLING

After completion of excavation, FWENC will sample the bottom of the excavation area to verify that cleanup standards have been met. If this sampling indicates that the contamination levels at the bottom of the excavation are above the cleanup standards, approximately 3 more inches will be removed and stockpiled separately. This will continue until surface samples of soil remaining in all grids exhibit concentrations below the cleanup standards.

FWENC will sample each stockpile to determine whether or not it will be classified as hazardous waste. Sampling methods are described in more detail in Section 5.0 – Sampling and Analysis and cleanup standards are shown in Table 2 (Attachment 4).

4.4 SOIL DISPOSAL

Subsequent to the receipt of soil stockpile sampling results and waste profiling, soil stockpiles will be loaded into hauling trucks for transportation off site. Trucks will either remain on the access road and be loaded there or will be loaded at the stockpiles, depending on site conditions. FWENC will make efforts to recycle the non-hazardous material by offering use as landfill cover or asphalt plant material. Hazardous soil will be sent off site to an approved facility for final disposal.

4.4.1 Hazardous Soil Disposal Requirements

Hazardous soil sent off site for disposal will be evaluated to ensure that it meets the waste acceptance criteria and packaging requirements for the proposed treatment, storage, and disposal (TSD) facilities prior to transport.

The disposal facility will be approved under FWENC subcontracting procedures that require that the disposal facility:

- Is in physical compliance with RCRA or other applicable federal and state laws;
- Is not releasing any hazardous wastes, hazardous constituents or hazardous substances;
- Meets minimum technology requirements; and
- All releases, including environmentally significant releases at non-receiving units, at the facility will be addressed by a corrective action program.

The facility must demonstrate a properly designed system, and must presently operate (and historically have operated) in a manner that controls the types of materials accepted for disposal. Invoices will be returned by the landfill operators verifying that the waste was received and properly disposed. FWENC will provide a copy of the facility compliance check documentation to the Navy with the Waste Profile.

FWENC will be responsible for preparation of the waste disposal manifests. All manifests and bills of coding shall be typed. The manifests will be reviewed and signed by the Navy as generator of the waste. Manifests will be carried by the transporters and will include the following:

- The generator's name, mailing address, site address if different from the mailing address, and phone number;
- The generator's EPA I.D. number;
- The hauler (or haulers) name, phone number;
- The hauler (or haulers) EPA I.D. number;

- The treatment, storage or disposal facility's name, address, and telephone number (designated facility);
- The treatment, storage, or disposal facility's EPA I.D. number;
- The name, type, and quantity of hazardous waste being shipped, proper DOT shipping name, hazard class, and I.D. number;
- Special handling instructions and any other information required on the form to be supplied by the generator;
- When shipping hazardous waste to a waste reuse facility, the generator will enter the waste reuse facility I.D. number in section G; and,
- The proper codes that accurately describe the shipment of hazardous waste.

Before allowing the manifested waste to leave the property, the appropriate Navy representative must:

- Sign the manifest certification by hand;
- Obtain the handwritten signature of the initial hauler and date of acceptance on the manifest;
- Retain one copy; and
- Give the remaining copies of the manifest form to the hauler.

FWENC will provide corresponding copies of analysis for any shipments leaving the facility. To ensure safe transport of the waste, only transporters who have demonstrated competence and the required license and permits for transporting waste will be used. FWENC policies and procedures for subcontracting will be followed. Transporter EPA/State identification numbers will be kept in project and compliance files. Trucks will be covered to prevent fugitive releases of material during transport.

4.4.2 DOT Requirements

For any hazardous materials sent off site for disposal FWENC will follow the following requirements. Hazardous material will be properly classed, described, packaged, marked, labeled and in condition for shipment as required by 49 CFR 171.

Waste that does not exhibit one of the nine DOT hazard class characteristics (i.e., explosive, flammable, poison, combustible, etc.) is not regulated under DOT rules for the transportation of hazardous material. If waste is suspected to be hazardous, then it will be shipped under the suspected hazard class. If a particular hazard class is unable to be determined, then the soil or water may be shipped under either of the following:

Shipping Name	Hazard Class	ID Number	Packing Group	Label
Environmentally hazardous substances, liquid, n.o.s.	9	UN3082	III	CLASS 9
Environmentally hazardous substances, solid, n.o.s.	9	UN3077	III	CLASS 9

When using either one of these "n.o.s." (not otherwise specified) shipping names, at least two technical names must follow (i.e., "Environmentally hazardous substances, liquid, n.o.s. [Benzene and Acetone]").

The shipping name, identification number, packing group, instructions, cautions, weights, EPA waste code numbers and consignee/consignor designations will be marked on packages for shipment. Labeling provides information regarding the DOT hazard class.

The label to be placed on material will depend upon the results of sampling. Once the waste is characterized, reference should be made to the Hazardous Materials Table in 49 CFR 172.101 to determine the appropriate label. The package (or drum) will be marked and labeled as specified in 49 CFR 172.301.

The person offering hazardous material for shipment will offer placards (49 CFR 172.506). Any quantity of material listed in Table 1 of the regulations will be placarded. However, if there is less than 1,000 lb. of a Table 2 material, no placard is required. No Class 9 placard is required for domestic shipments. If a placard is required, the label referenced above will be affixed on each side and each end of the vehicle(s).

Hazardous material shipping papers will have the following description of the hazardous material, in the following order:

- Proper shipping name;
- Hazard class or division;
- Identification number;
- Packaging group;
- Total quantity (must appear either before or after the above information); and,
- Technical and chemical group names may be entered in parentheses between the proper shipping name and hazard class or following the basic description (e.g., "Flammable liquids, n.o.s. [contains xylene and benzene], 3 UN1993, PG II").

Other required information includes:

- Certification. EPA identification (manifests);

- Emergency Response Guidebook numbers;
- Twenty-four (24) hour emergency response number, supplied by the generator and answered by a knowledgeable person;
- Signatures; and
- Shipper's insurance

4.5 SITE RESTORATION

Upon completion of the project, FWENC will remove temporary constructed features, such as haul roads, material lay-down areas and erosion control features. The excavated area will be graded, covered with 3 inches of topsoil and hydroseeded. The limits of hydroseeding are shown on Sketch 01, Attachment 5.

4.5.1 Seeding

Hydroseeding will be done in accordance with notes on drawing C-2 for the Site 4 and 5 Landfill Caps (Attachment 6), except that additional straw/hay mulch will be applied at a rate of 2 tons per acre and the seed mixture will be as follows:

Perennial Ryegrass	-	26 pounds/acre
Annual Ryegrass	-	26 pounds/acre
Tall Fescue	-	39 pounds/acre
Hard or Sheep Fescue	-	39 pounds/acre

4.5.2 Topsoil

Topsoil will be in accordance with the New Jersey Department of Transportation Standard Specifications for road and bridge construction, section 909.10.

4.6 DUST CONTROL

Dust control measures will be implemented during excavation and soil loading. Water will be applied with a water truck to work areas, haul roads and access roads as often as required to prevent excessive dust emissions.

4.7 SUBCONTRACTED WORK

FWENC subcontractors will perform the following tasks:

- Clearing
- Off-site transportation and disposal

- Laboratory testing
- Seeding and planting

FWENC will self-perform all other work.

5. SAMPLING AND ANALYSIS

5.1 OBJECTIVE

The objectives of the surface soil sampling program are: (1) to collect samples from stockpiled soils, (2) to collect samples from predetermined grade locations, see Sketch 01 (Attachment 5), and (3) analyze collected samples for total lead, TCLP lead and polynuclear aromatic hydrocarbons (PAHs), as appropriate and compare these results to established limits.

5.2 SAMPLE LOCATION AND PARAMETERS

The designated sample area will be divided into a surveyed grid area with each grid approximately 90 foot by 90 foot in overall size. Each grid will be given a unique identifier and this identifier will be used as part of the sample identification system protocol.

A stockpile will be formed in each grid area from removal of the top 3 inches of material. A sample will be taken from each of these stockpiles. The stockpile samples will be analyzed for TCLP lead and other parameters required by the disposal facilities. Analytical results will be used for waste classification.

Once the stockpiles have been removed, a sample will be obtained from the existing surface within each grid. This is a confirmation sample to ensure that cleanup standards have been met within each grid. The confirmation samples will be analyzed for total lead and total PAHs. Cleanup standards are listed in Table 2 (Attachment 4). Holding times for PAHs are 7 days until extraction, 40 days after extraction and 180 days for lead. Preservatives are not required, but the samples will be maintained at 4 degrees Celsius for shipment.

In the event that the confirmation sample in a particular grid shows that the cleanup standards have not been met, a stockpile will be formed in this grid from the removal of an additional 3 inches of material. A sample will then be obtained from this stockpile. Following removal of the additional 3 inches of material, another confirmation sample will be obtained. The process will be repeated (if necessary) in each grid until the cleanup standards have been achieved.

5.3 SAMPLING EQUIPMENT AND PROCEDURES

The samples will be collected with a decontaminated stainless steel trowel or disposable trowel and placed into sample jars. The samples will be labeled using project procedures.

Surface soil samples will be obtained by first removing any surface debris from a 6 inch by 6 inch area inside the surveyed grid. Surface debris includes vegetation, rocks, sticks, roots, garbage, and any other object that may interfere with the integrity of the sample. Next, the sample will be collected by breaking up the soil from 0-6 inches below the surface and placing a homogenized aliquot of soil into the properly labeled sample jar.

Samples from the stockpiles will be obtained by removing soil from the approximate mid point of the pile height. For example, if the stockpile is estimated as being 12 feet high, the sample will be obtained from a location of 6 feet above the existing surface. The sample will then be placed into a properly labeled sample jar.

5.4 SAMPLE HANDLING AND ANALYSIS

The samples will be packaged at the end of each day for shipment to the designated analytical laboratory. Proper chain of custody procedures will be followed. Samples tested for lead will be analyzed in accordance with EPA Method 7240, TCLP extraction will be performed in accordance with EPA Method 3011 and samples analyzed for PAHs will be analyzed in accordance with EPA Method 8270.

6. FINAL REPORT

A final engineering report will be written and finalized within 30 days of project completion and furnished to the Navy. The 30 days will commence on the first day after the final inspection has been completed and the work is accepted by the Navy. The final engineering report will contain the following items:

- Summary of Record Documents
- Discussion of Remediation Activities Performed
- Analytical Data
- Off-site Disposal Documentation

7. FIELD ADMINISTRATIVE PROCEDURES

7.1 DAILY SAFETY MEETING

FWENC supervisory personnel will hold daily tailgate safety meetings to advise the workers of proper methods of performing the work planned for the day. The topics of discussion will be listed on a sign-in sheet and the sheet will be kept as a record of the meeting.

7.2 STATUS REPORTS

FWENC will prepare monthly status reports of the current condition of the project. The status reports will include a Technical Progress Report, Non-Compliance Report, Cost Performance Report, Project Schedule, updated Submittal Register, Government Materials Tracking Report, Variance Analysis Report, and a Waste Materials Report.

7.3 DAILY REPORT/CQC REPORT

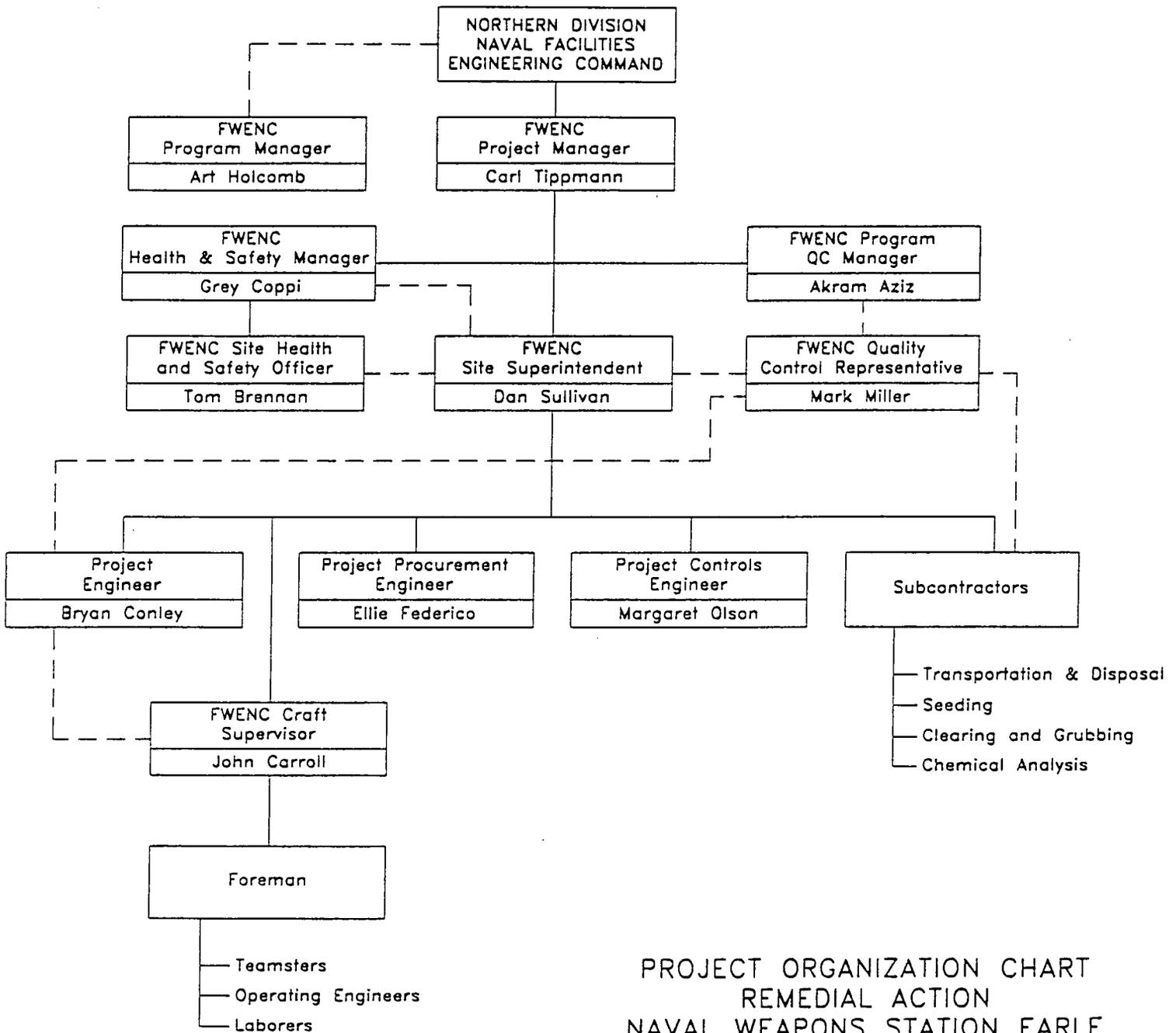
Every day that work is performed, FWENC will prepare and submit the Daily Report/CQC Report to the Navy. The report will be submitted the following business day.

7.4 REGULATORY AGENCY PERSONNEL SITE VISITS

Regulatory agency personnel who visit the site and who have questions or comments concerning the work will give those questions or comments, in writing, to the project superintendent, who will then forward it to the Navy NTR.

ATTACHMENT 1
PROJECT ORGANIZATION CHART

ATTACHMENT 1



LEGEND:
 ————— Reports to
 - - - - - Interfaces with

PROJECT ORGANIZATION CHART
 REMEDIAL ACTION
 NAVAL WEAPONS STATION EARLE
 COLTS NECK, NEW JERSEY
 prepared for
 DEPARTMENT OF THE NAVY
 NORTHERN DIVISION
 NAVAL FACILITIES ENGINEERING COMMAND
 LESTER, PENNSYLVANIA

ATTACHMENT 2
CONSTRUCTION SCHEDULE

Early Start	Early Finish	Percent Complete	1998											
			FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
			2 9 16 23	2 9 16 23 30 6	6 13 20 27 4	11 18 25 1	8 15 22 29 6	13 20 27 3	10 17 24 31 7	14 21 28 5	12 19 26 2	9 16 23 30 7		
02MAR98A	16MAR98A	100		██████████ Clearing Overshot Area										
05MAY98	11MAY98	0				██████████ Install Erosion Control								
18MAY98	05JUN98	0				██████████ Excavate Contaminated Soil								
25MAY98	05JUN98	0				██████████ Sample Stockpiles								
01JUN98	12JUN98	0				██████████ Receive Stockpile Analyses								
08JUN98	19JUN98	0				██████████ Dispose of Stockpiled Soil								
15JUN98	22JUN98	0				██████████ Sample Pile Locations								
22JUN98	10JUL98	0				██████████ Topsoil and Hydroseed Overshot Area								
22JUN98	29JUN98	0				██████████ Receive Pile Location Analyses								

Project Start 01FEB98
Project Finish 10JUL98
Data Date 27MAR98
Run Date 12MAY98

██████████ Early Bar
██████████ Progress Bar
██████████ Critical Activity

SKRC

Sheet 1 of 1

D.O. 34 - NWS Earle
Skeet Range Closure

ATTACHMENT 3
SITE MAPS -FIGURES 1 AND 2

Foster Wheeler Environmental Corporation



PROJECT LOCATION
US NAVY RAC
NAVAL WEAPONS STATION EARLE
COLTS NECK, NEW JERSEY

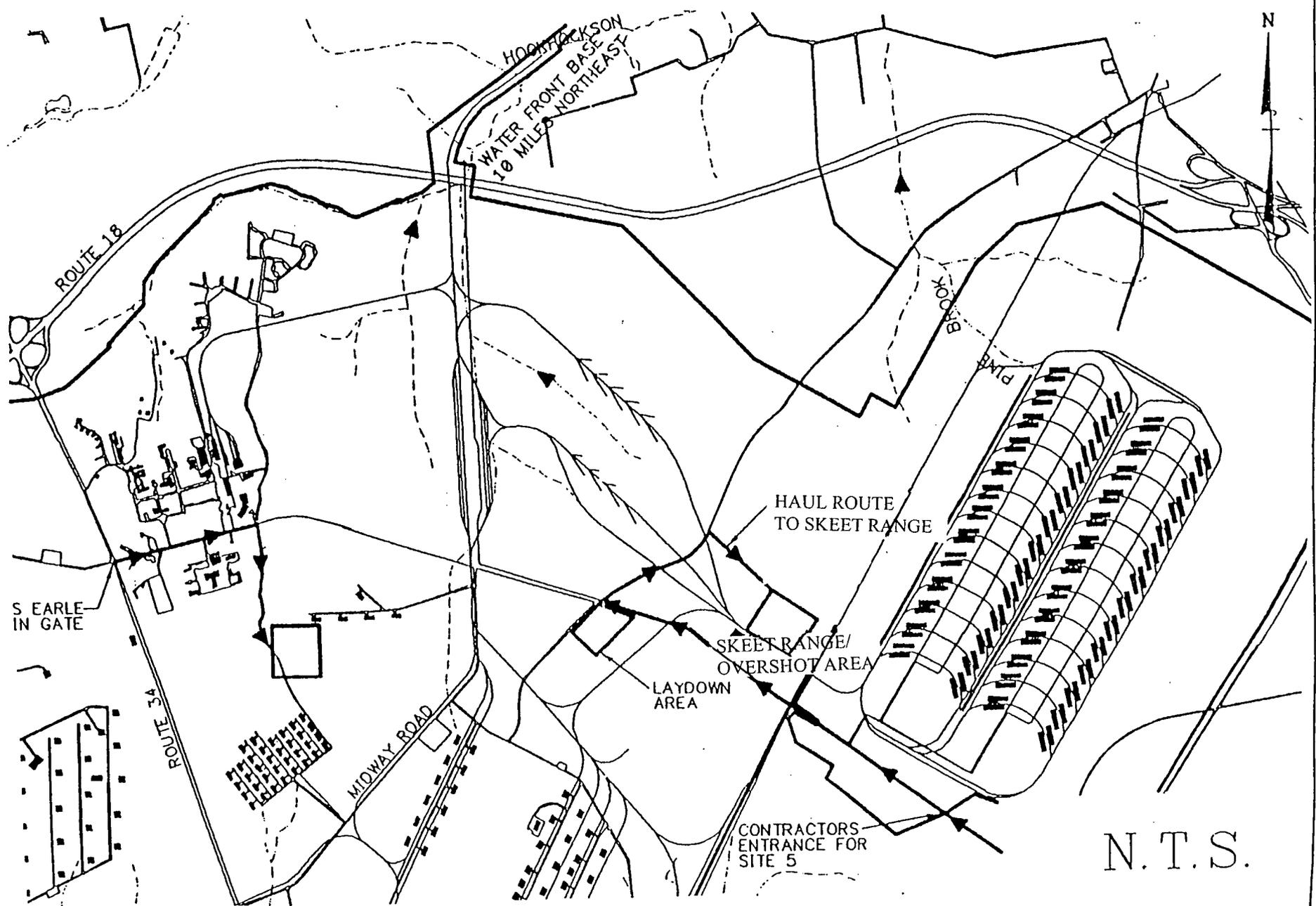


Figure
2

N.T.S.

ATTACHMENT 4
TABLES 1 AND 2

TABLE 1
FOSTER WHEELER ENVIRONMENTAL CORP.
NAVAL WEAPONS STATION EARLE
SKREET RANGE LEAD DELINEATION*

SAMPLE ID	Analysis	Results
S5-SS01-01	Total Pb	23.1 ppm
S5-SS02-01	Total Pb	180 ppm
S5-SS03-01	Total Pb	40.2 ppm
S5-SS05-01	Total Pb / TCLP Pb	729 ppm / 35.7 ppm
S5-SS06-01	Total Pb	343 ppm
S5-SS07-01	Total Pb / TCLP Pb	412 ppm / 99.5 ppm
S5-SS08-01	Total Pb	200 ppm
S5-SS09-01	Total Pb	240 ppm
S5-SS10-01	Total Pb	3.36 ppm
S5-SS12-01	Total Pb / TCLP Pb	412 ppm / 27.3 ppm
S5-SS13-01	Total Pb	272 ppm
S5-SS14-01	Total Pb / TCLP Pb	45,400 ppm / 169 ppm
S5-SS15-01	Total Pb / TCLP Pb	1,160 ppm / 7.37 ppm
S5-SS16-01	Total Pb / TCLP Pb	6,690 ppm / 139 ppm
S5-SS17-01	Total Pb	35.8 ppm
S5-SS21-01	Total Pb / TCLP Pb	1,660 ppm / 21.1 ppm
S5-SS22-01	Total Pb	322 ppm
S5-SS23-01	Total Pb / TCLP Pb	26,800 ppm / 37.3 ppm
S5-SS24-01	Total Pb	107 ppm
S5-SS26-01	Total Pb	164 ppm
S5-SS27-01	Total Pb / TCLP Pb	470 ppm / 104 ppm
S5-SS28-01	Total Pb / TCLP Pb	41,100 ppm / 229 ppm
S5-SS29-01	Total Pb / TCLP Pb	103,000 ppm / 777 ppm
S5-SS30-01	Total Pb / TCLP Pb	425 ppm / 88.7 ppm
S5-SS31-01	Total Pb	245 ppm
S5-SS32-01	Total Pb	117 ppm
S5-SS35-01	Total Pb	110 ppm
S5-SS36-01	Total Pb / TCLP Pb	1,960 ppm / 10.4 ppm
S5-SS37-01	Total Pb / TCLP Pb	38,500 ppm / 241 ppm
S5-SS38-01	Total Pb / TCLP Pb	1,380 ppm / 256 ppm
S5-SS39-01	Total Pb	181 ppm
S5-SS40-01	Total Pb	158 ppm
S5-SS41-01	Total Pb / TCLP Pb	1,100 ppm / 75.3 ppm
S5-SS42-01	Total Pb / TCLP Pb	93,800 ppm / 150 ppm
S5-SS43-01	Total Pb	115 ppm
S5-SS44-01	Total Pb / TCLP Pb	1,710 ppm / 10.2 ppm
S5-SS45-01	Total Pb	223 ppm
S5-SS46-01	Total Pb / TCLP Pb	3,450 ppm / 133 ppm
S5-SS47-01	Total Pb / TCLP Pb	2,120 ppm / 72.2 ppm
S5-SS48-01	Total Pb	63.6 ppm
S5-SS49-01	Total Pb / TCLP Pb	5,130 ppm / 4.72 ppm
S5-SS50-01	Total Pb / TCLP Pb	1,920 ppm / 8.31 ppm
S5-SS51-01	Total Pb	312 ppm
S5-SS52-01	Total Pb / TCLP Pb	904 ppm / 32.9 ppm

SAMPLE ID	Analysis	Results
S5-SS53-01	Total Pb / TCLP Pb	15,100 ppm / 64.7 ppm
S5-SS54-01	Total Pb / TCLP Pb	712 ppm / 28.5 ppm
S5-SS55-01	Total Pb	86.4 ppm
S5-SS56-01	Total Pb / TCLP Pb	80,500 ppm / 4.23 ppm
S5-SS57-01	Total Pb / TCLP Pb	48,400 ppm / 14.0 ppm
S5-SS58-01	Total Pb / TCLP Pb	655 ppm / 0.396 ppm
S5-SS59-01	Total Pb	88.2 ppm
S5-SS60-01	Total Pb	206 ppm
S5-SS61-01	Total Pb / TCLP Pb	707 ppm / 2.18 ppm
S5-SS62-01	Total Pb	165 ppm
S5-SS63-01	Total Pb / TCLP Pb	650 ppm / 0.423 ppm
S5-SS64-01	Total Pb	261 ppm
S5-SS65-01	Total Pb	80.1 ppm
S5-SS66-01	Total Pb	52.6 ppm
S5-SS67-01	Total Pb	54.7 ppm
S5-SS68-01	Total Pb	112 ppm
S5-SS69-01	Total Pb	96.6 ppm
S5-SS70-01	Total Pb	206 ppm
S5-SS71-01	Total Pb / TCLP Pb	1,200 ppm / 0.770 ppm
S5-SS64-B1	Total Pb / TCLP Pb	600 ppm / 2.70 ppm
S5-SS71-E1	Total Pb	71.8 ppm
S5-SS42-E1	Total Pb / TCLP Pb	36,800 ppm / 128 ppm
S5-SS77-H1	Total Pb	847 ppm / 0.394 ppm
S5-SS-71-E2	Total Pb	97.5 ppm
S5-SS-71-E3	Total Pb	97.2 ppm
S5-SS-64-B2	Total Pb	343 ppm
S5-SS-64-B3	Total Pb	377 ppm
S5-SS-42-E4	Total Pb	24.3 ppm
S5-SS-42-E3	Total Pb	187 ppm
S5-SS-42-E2	Total Pb	63.3 ppm
S5-PR-001	Total Pb	102 ppm
S5-PR-002	Total Pb	14.5 ppm
S5-PR-003	Total Pb	< 11 ppm
S5-PR-004	Total Pb / TCLP Pb	41,500 ppm** / 23.4 ppm
S5-PR-005	Total Pb	13.6 ppm
S5-PR-006	Total Pb / TCLP Pb	405 ppm / 112 ppm
S5-PR-007	Total Pb / TCLP Pb	495 ppm / 75.3 ppm
S5-PR-008	Total Pb / TCLP Pb	930 ppm / 4.4 ppm
S5-PR-009	Total Pb	396 ppm
S5-PR-010	Total Pb / TCLP Pb	72,900 ppm / 10.8 ppm
S5-PR-011	Total Pb	< 11 ppm
S5-PR-012	Total Pb / TCLP Pb	558 ppm / 4.2 ppm
S5-PR-013	Total Pb	147 ppm
S5-PR-014	Total Pb / TCLP Pb	1960 ppm / 4.4 ppm
S5-PR-015	Total Pb	136 ppm
S5-PR-016	Total Pb	210 ppm

*Sample locations are identified on Sketch 2, Attachment 5.

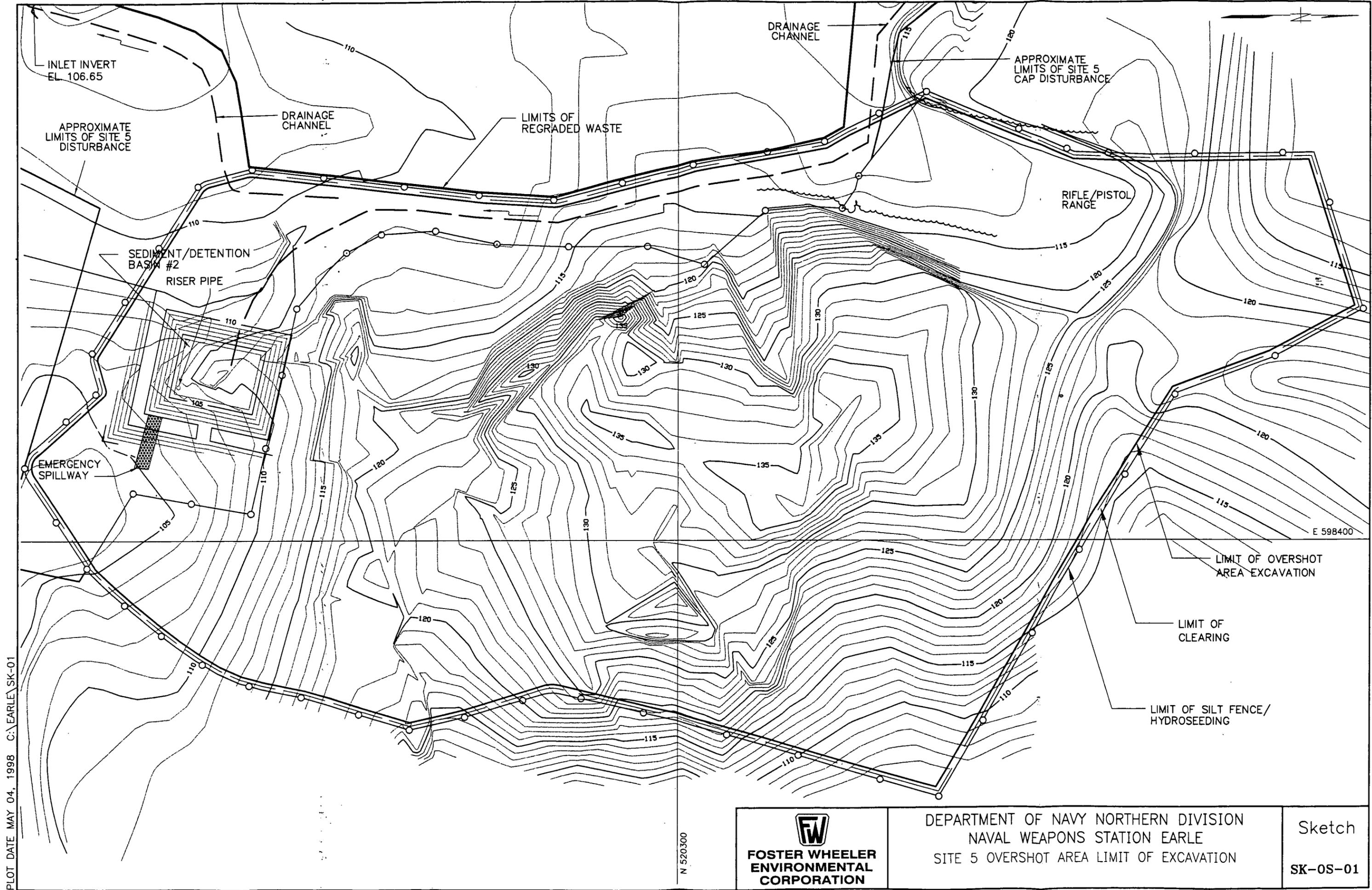
TABLE 2

FOSTER WHEELER ENVIRONMENTAL CORP.
 NAVAL WEAPONS STATION EARLE
 SKEET RANGE CLOSURE CLEANUP STANDARDS*

Contaminant	Cleanup level (ppm)
Acenaphthene	3,400
Anthracene	10,000
3,4-Benzofluoranthene	0.9
Benzo(a)anthracene	0.9
Benzo(a)pyrene	0.66
Benzo(k)fluoranthene	0.9
Chrysene	9
Dibenz(a,h)anthracene	0.66
Fluoranthene	2,300
Fluorene	2,300
Indeno(1,2,3-cd)pyrene	0.9
Naphthalene	230
Pyrene	1,700
Lead	400

*Standards taken from the New Jersey Department of Environmental Protection's proposed rule entitled *Cleanup Standards for Contaminated Sites*, N.J.A.C. 7:26D, last revised 7/11/96, Residential Direct Contact Soil Cleanup Criteria.

ATTACHMENT 5
SITE LAYOUT PLAN, SKETCHES 1 AND 2



PLOT DATE MAY 04, 1998 C:\EARLE\SK-01

N 520300

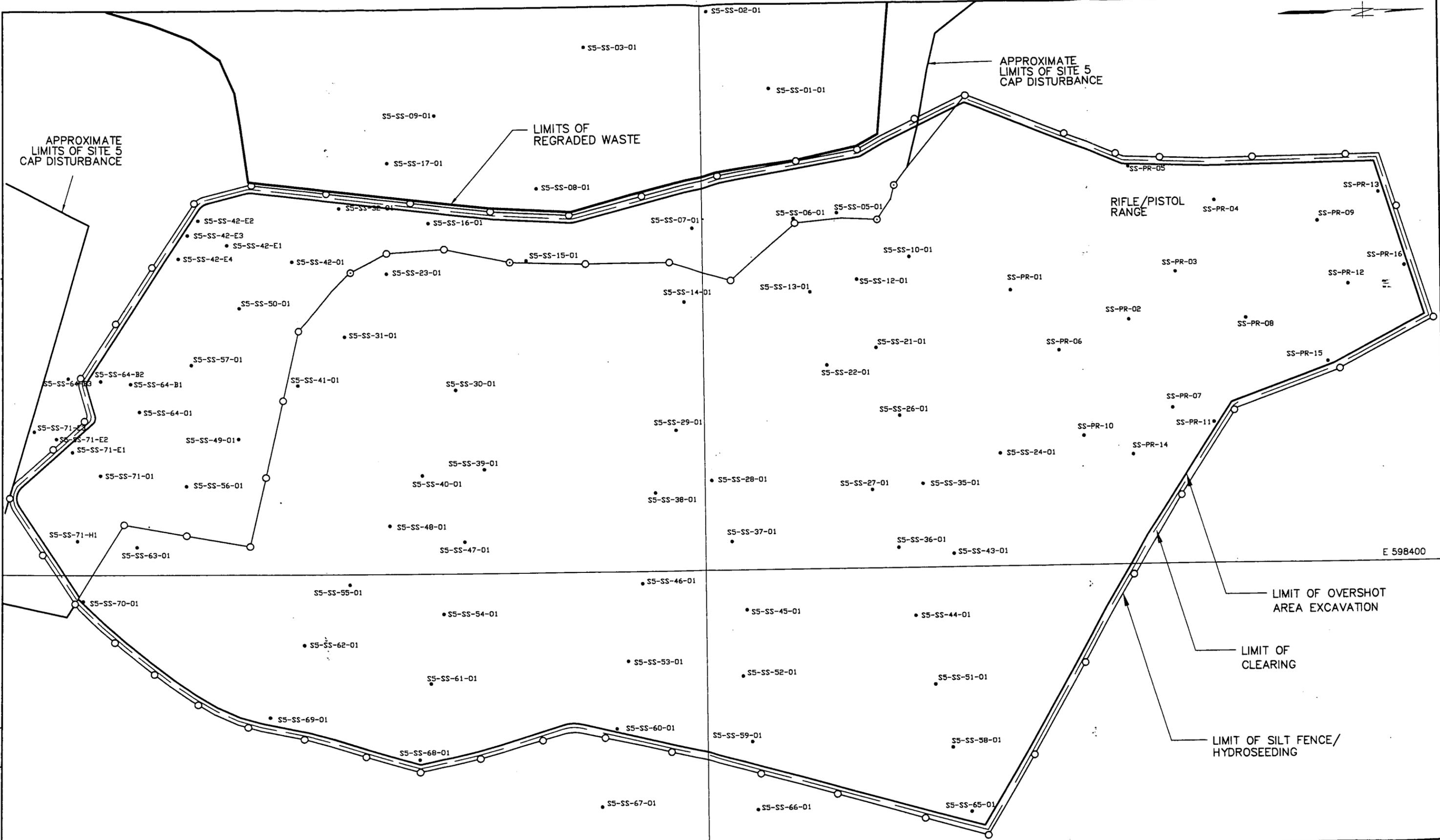
E 598400



DEPARTMENT OF NAVY NORTHERN DIVISION
NAVAL WEAPONS STATION EARLE
SITE 5 OVERSHOT AREA LIMIT OF EXCAVATION

Sketch
SK-05-01

PLOT DATE MAY 04, 1998 C:\EARLE\SK-02



DEPARTMENT OF NAVY NORTHERN DIVISION
NAVAL WEAPONS STATION EARLE
SITE 5 OVERSHOT AREA SAMPLING POINTS

Sketch
SK-0S-02

ATTACHMENT 6

3
SITE RESTORATION PLAN - DRAWING C-2 FROM THE SITE 4 AND 5 LANDFILL CAPS

EROSION AND SEDIMENT CONTROL REVEGETATION NOTES

SECTION I - VEGETATIVE STABILIZATION METHODS AND MATERIALS

A. SITE PREPARATION

- i. GRADE AS NEEDED AND FEASIBLE TO PERMIT THE USE OF CONVENTIONAL EQUIPMENT FOR SEEDBED PREPARATION, SEEDING, MULCH APPLICATION AND ANCHORING AND MAINTENANCE. ALL GRADING SHOULD BE DONE IN ACCORDANCE WITH STANDARDS FOR SOIL AND EROSION CONTROL IN NEW JERSEY; LAND GRADING, p.4.1.1.
- ii. INSTALL NEEDED EROSION CONTROL PRACTICES AND FACILITIES SUCH AS DIVERSIONS, GRADE STABILIZATION STRUCTURES, CHANNEL SEDIMENT BASINS, AND WATERWAYS STABILIZATION MEASURES.
- iii. SCHEDULE REQUIRED SOIL TESTS TO DETERMINE SOIL AMENDMENT COMPOSITION AND APPLICATION RATES.

B. SOIL AMENDMENTS (FERTILIZER AND LIME SPECIFICATIONS)

- i. APPLY LIMESTONE AND FERTILIZER ACCORDING TO SOIL TEST RECOMMENDATIONS SUCH AS THOSE OFFERED BY RUTGERS UNIVERSITY SOIL TESTING LABORATORY. SOIL SAMPLE MAILERS ARE AVAILABLE FROM THE LOCAL COOPERATIVE EXTENSION SERVICE OFFICE. IF SOIL TESTING IS NOT FEASIBLE ON SMALL OR VARIABLE SITES OR WHERE TIMING IS CRITICAL, FERTILIZER MAY BE APPLIED AT THE RATE SPECIFIED IN THE SECTION II TABLE. IF SEED IS DRILLED OVER BANDED FERTILIZER THE RATE OF FERTILIZER IS REDUCED 50 PERCENT. APPLY LIMESTONE (EQUIVALENT TO 50 PERCENT CALCIUM PLUS MAGNESIUM OXIDES) AS SPECIFIED IN THE TABLE OF SECTION II.
- ii. FERTILIZERS SHALL BE UNIFORM IN COMPOSITION, FREE FLOWING, AND SUITABLE FOR ACCURATE APPLICATION BY APPROVED EQUIPMENT. MANURE MAY BE SUBSTITUTED FOR FERTILIZER WITH PRIOR APPROVAL FROM THE APPROPRIATE APPROVAL AUTHORITY. FERTILIZERS SHALL BE DELIVERED TO THE SITE, FULLY LABELED ACCORDING TO APPLICABLE STATE FERTILIZER LAWS AND SHALL BEAR THE NAME, TRADE NAME OR TRADEMARK, AND WARRANTY OF THE PRODUCER.
- iii. LIME MATERIALS SHALL BE GROUND LIMESTONE (HYDRATED OR BURNT LIME MAY BE SUBSTITUTED) WHICH CONTAINS AT LEAST 50% TOTAL OXIDES (CALCIUM OXIDE PLUS MAGNESIUM OXIDE). LIMESTONE SHALL BE GROUND TO SUCH FINENESS THAT AT LEAST 50% WILL PASS THROUGH A #100 MESH SIEVE, AND 98 TO 100% WILL PASS THROUGH A #20 MESH SIEVE. PULVERIZED DOLOMITIC LIMESTONE IS PREFERRED FOR MOST SOILS SOUTH OF THE NEW BRUNSWICK-TRENTON LINE.
- iv. WORK LIME AND FERTILIZER INTO THE SOIL AS NEARLY AS PRACTICAL TO A DEPTH OF 4 INCHES WITH A DISC SPRINGTOOTH HARROW OR OTHER SUITABLE EQUIPMENT. THE FINAL HARROWING OR DISCING OPERATION SHOULD BE ON THE GENERAL CONTOUR.

C. SEEDBED PREPARATION

i. TEMPORARY SEEDING

- a. SEEDBED PREPARATION SHALL CONSIST OF LOOSENING SOIL TO A DEPTH OF 3 INCHES TO 5 INCHES BY MEANS OF SUITABLE AGRICULTURAL OR CONSTRUCTION EQUIPMENT, SUCH AS DISC HARROWS, CHISEL PLOWS, OR RIPPERS MOUNTED ON CONSTRUCTION EQUIPMENT. AFTER THE SOIL IS LOOSENED, IT SHOULD NOT BE ROLLED OR DRAGGED SMOOTH, BUT LEFT IN THE ROUGHENED CONDITION. SLOPED AREAS (GREATER THAN 3:1) SHOULD BE TRACKED BY A DOZER LEAVING THE SURFACE IN AN IRREGULAR CONDITION WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE.
- b. APPLY FERTILIZER AND LIME AS PRESCRIBED IN THESE PLANS.
- c. INCORPORATE LIME AND FERTILIZER INTO THE TOP 4 INCHES OF SOIL BY DISCING OR OTHER SUITABLE MEANS.
- d. INSPECT SEEDBED JUST BEFORE SEEDING. IF TRAFFIC HAS LEFT THE SOIL COMPACTED, THE AREA MUST BE RETILLED AS ABOVE.
- e. SOILS HIGH ON SULFIDES OR HAVING A pH OF 4 OR LESS SHOULD BE MULCHED ONLY.

ii. PERMANENT SEEDING

- a. MINIMUM SOIL CONDITIONS REQUIRED FOR PERMANENT VEGETATIVE ESTABLISHMENT:
 1. SOIL pH SHALL BE BETWEEN 5.0 AND 7.5.
 2. SOLUBLE SALTS SHOULD NOT BE EXCESSIVE (CONDUCTIVITY LESS THAN 0.5 MILLMHOS PER CENTIMETER).
 3. SOIL SHALL CONTAIN 2.75% MINIMUM ORGANIC MATTER BY WEIGHT. ORGANIC MATTER CONTENT CAN BE RAISED BY ADDITIVES.

4. SOIL MUST CONTAIN SUFFICIENT PORE SPACE TO PERMIT ADEQUATE ROOT PENETRATION.
 5. SOIL SHOULD BE FREE OF DEBRIS, OBJECTIONABLE WEEDS AND STONES, AND CONTAIN NO TOXIC SUBSTANCE THAT MAY BE HARMFUL TO PLANT GROWTH.
 6. IF THESE CONDITIONS CANNOT BE MET BY SOILS ON SITE, ADDING TOPSOIL IS REQUIRED IN ACCORDANCE WITH "STANDARD FOR TOPSOILING" p.3.5.1.
 7. SOILS HAVING A pH OF 4 OR LESS OR CONTAINING IRON SULFIDE SHALL BE COVERED WITH A MINIMUM OF 12 INCHES OF SOIL HAVING A pH OF 5 OR MORE BEFORE SEEDBED PREPARATION. THE ADDED SOIL SHALL BE LIMED AS ABOVE.
- b. AREAS PREVIOUSLY GRADED IN CONFORMANCE WITH THE DRAWINGS SHALL BE MAINTAINED IN A TRUE AND EVEN GRADE, THEN SCARIFIED OR OTHERWISE LOOSENED TO A DEPTH OF 3 TO 5 INCHES TO PERMIT BONDING OF THE TOPSOIL TO THE SURFACE AREA AND TO CREATE HORIZONTAL EROSION CHECK SLOTS TO PREVENT TOPSOIL FROM SLIDING DOWN A SLOPE.
 - c. APPLY SOIL AMENDMENTS AS PER SOIL TEST.
 - d. MIX SOIL AMENDMENTS INTO THE TOP 4 INCHES OF TOPSOIL BY DISCING OR OTHER SUITABLE MEANS. LAWN AREAS SHOULD BE RAKED TO SMOOTH THE SURFACE; REMOVE LARGE OBJECTS AND DEBRIS LIKE STONES AND BRANCHES, AND READY THE AREA FOR SEED APPLICATION. WHERE SITE CONDITIONS WILL NOT PERMIT NORMAL SEEDBED PREPARATION, LOOSEN SURFACE SOIL BY DRAGGING WITH A HEAVY CHAIN OR OTHER EQUIPMENT TO ROUGHEN THE SURFACE. STEEP SLOPES (STEEPER THAN 3:1) SHOULD BE TRACKED BY A DOZER LEAVING THE SOIL IN AN IRREGULAR CONDITION WITH RIDGES RUNNING PARALLEL TO THE CONTOUR OF THE SLOPE. THE TOP 1-3 INCHES OF SOIL SHOULD BE LOOSE AND FRIABLE. SEEDBED LOOSENING MAY NOT BE NECESSARY ON NEWLY DISTURBED AREAS.

D. SEED SPECIFICATIONS

- i. ALL SEED MUST MEET THE REQUIREMENTS OF THE BUREAU OF SEED CERTIFICATION, NEW JERSEY DEPARTMENT OF AGRICULTURE, TRENTON, NEW JERSEY. ALL SEED SHALL BE SUBJECT TO RE-TESTING BY A RECOGNIZED SEED LABORATORY. ALL SEED USED SHALL HAVE BEEN TESTED WITHIN 6 MONTHS IMMEDIATELY PRECEDING THE DATE OF SOWING SUCH MATERIAL ON THIS JOB. THE SEED MIXTURES, QUALITY, AND SPECIFICATIONS SHALL MEET THE MINIMUM REQUIREMENTS AS SPECIFIED IN APPENDIX B (JUNE, 1972) OF THE NEW JERSEY STANDARDS FOR SOIL AND EROSION CONTROL IN NEW JERSEY.

NOTE: SEED TAGS SHALL BE MADE AVAILABLE TO THE INSPECTOR TO VERIFY TYPE AND RATE OF SEED USED.

E. METHODS OF SEEDING

- i. HYDROSEEDING: APPLY SEED UNIFORMLY WITH HYDROSEEDER (SLURRY INCLUDES SEED AND FERTILIZER), BROADCAST OR DROP SEEDER, OR A CULTIPACKER SEEDER.
 - a. IF FERTILIZER IS BEING APPLIED AT THE TIME OF SEEDING, THE APPLICATION RATES AMOUNTS WILL NOT EXCEED THE FOLLOWING:
NITROGEN - MAXIMUM OF 300 POUNDS PER ACRE TOTAL OF SOLUBLE NITROGEN.
 - b. LIME - USE ONLY GROUND AGRICULTURAL LIMESTONE NORMALLY NOT MORE THAN 2 TONS ARE APPLIED BY HYDROSEEDING AT ANY ONE TIME. DO NOT USE BURNT OR HYDRATED LIME WHEN HYDROSEEDING.
 - c. SEED AND FERTILIZER SHALL BE MIXED ON SITE, AND SEEDING SHALL BE DONE IMMEDIATELY WITHOUT INTERRUPTION.
 - d. IF SOIL AMENDMENTS ARE BEING APPLIED DURING HYDROSEEDING, APPLICATION BY DIKING AS DISCUSSED IN I, b., IV, NEED NOT BE PERFORMED.
- ii. DRY SEEDING: THIS INCLUDES USE OF CONVENTIONAL DROP OR BROADCAST SPREADERS.
 - a. SEED SPREAD SHALL BE INCORPORATED INTO THE SUBSOIL AT THE RATES PRESCRIBED ON THE TEMPORARY OR PERMANENT SEEDING SUMMARIES. THE SEEDED AREA SHALL THEN BE ROLLED WITH A WEIGHTED CORRUGATED ROLLER TO PROVIDE GOOD SEED TO SOIL CONTACT.
 - b. WHERE PRACTICAL, SEED SHOULD BE APPLIED IN TWO DIRECTIONS PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION.

- iii. DRILL OR CULTIPACKER SEEDING: MECHANIZED SEEDERS THAT APPLY AND COVER SEED WITH SOIL.
 - a. CULTIPACKING SEEDERS ARE REQUIRED TO BURY THE SEED IN SUCH A FASHION AS TO PROVIDE AT LEAST 1/4 INCH OF SOIL COVERING. SEEDBED MUST BE FIRM AFTER PLANTING.
 - b. WHERE PRACTICAL, SEED SHOULD BE APPLIED IN TWO DIRECTIONS PERPENDICULAR TO EACH OTHER. APPLY HALF THE SEEDING RATE IN EACH DIRECTION.

F. MULCH SPECIFICATIONS

- i. STRAW SHALL CONSIST OF THOROUGHLY THRESHED SMALL GRAIN STRAW, HAY OR SALT HAY, OR SALT HAY, REASONABLY BRIGHT IN COLOR, AND SHALL NOT BE MUSTY, MOLDY, CAKED, DECAYED, OR EXCESSIVELY DUSTY, AND SHALL BE FREE OF NOXIOUS WEED SEEDS.
- ii. WOOD CELLULOSE FIBER MULCH (WCFM)
 - a. WCFM SHALL CONSIST OF SPECIALLY PREPARED WOOD CELLULOSE PROCESSED INTO A UNIFORM FIBROUS PHYSICAL STATE.
 - b. WCFM SHALL BE DYED GREEN OR CONTAIN A GREEN DYE IN THE PACKAGE THAT WILL PROVIDE AN APPROPRIATE COLOR TO FACILITATE VISUAL INSPECTION OF THE UNIFORMLY SPREAD SLURRY.
 - c. WCFM, INCLUDING DYE, SHALL CONTAIN NO GERMINATION OR GROWTH INHIBITING FACTORS.
 - d. WCFM SHALL BE MANUFACTURED AND PROCESSED IN SUCH A MANNER THAT THE WOOD CELLULOSE FIBER MULCH WILL REMAIN IN UNIFORM SUSPENSION IN WATER UNDER AGITATION AND WILL BLEND WITH SEED, FERTILIZER, AND OTHER ADDITIVES TO FORM A HOMOGENOUS SLURRY. THE MULCH MATERIAL SHALL FORM A BLOTTER-LIKE GROUND COVER, ON APPLICATION, HAVING MOISTURE ABSORPTION AND PERCOLATION PROPERTIES AND SHALL COVER AND HOLD GRASS SEED IN CONTACT WITH THE SOIL WITHOUT INHIBITING THE GROWTH OF THE GRASS SEEDINGS.
 - e. WCFM SHALL CONTAIN NO ELEMENTS OR COMPOUNDS AT CONCENTRATION LEVELS THAT WILL BE PHYTO-TOXIC.
 - f. WOOD CELLULOSE FIBER MUST CONFORM TO THE FOLLOWING PHYSICAL REQUIREMENTS: FIBER LENGTH TO APPROXIMATELY 10 MM., DIAMETER APPROXIMATELY 1 MM., pH RANGE OF 4.0 TO 8.5, ASH CONTENT OF 1.6% MAXIMUM, AND WATER HOLDING CAPACITY OF 90% MINIMUM.

NOTE: ONLY STERILE STRAW MULCH SHOULD BE USED IN AREAS WHERE A STAND OF ONE SPECIES OF GRASS IS DESIRED.

G. MULCHING SEEDED AREAS - MULCH SHALL BE APPLIED TO ALL SEEDED AREAS IMMEDIATELY AFTER SEEDING.

- i. IF GRADING IS COMPLETED OUTSIDE OF THE SEEDING SEASON, MULCH ALONE SHALL BE APPLIED AND PRESCRIBED IN THIS SECTION AND MAINTAINED UNTIL THE SEEDING SEASON RETURNS, AND SEEDING CAN BE PERFORMED IN ACCORDANCE WITH THESE SPECIFICATIONS.
- ii. WHEN STRAW MULCH IS USED, IT SHALL BE SPREAD OVER ALL SEEDED AREAS AT THE RATE OF 1 1/2 TO 2 TONS/ACRE (70 TO 90 POUNDS PER 1,000 SQUARE FEET). MULCH SHALL BE APPLIED TO A UNIFORM LOOSE DEPTH OF BETWEEN 1 AND 2 INCHES. MULCH APPLIED SHALL ACHIEVE A UNIFORM DISTRIBUTION EXPOSED, AND MUST BE ANCHORED.
- iii. WOOD CELLULOSE FIBER USED AS A MULCH SHALL BE APPLIED AT A NET DRY WEIGHT OF 1,500 LBS. PER ACRE. THE WOOD CELLULOSE FIBER SHALL BE MIXED WITH WATER, AND THE MIXTURE SHALL CONTAIN A MAXIMUM OF 50 LBS OF WOOD CELLULOSE FIBER PER 100 GALLONS OF WATER.

H. SECURING STRAW MULCH (MULCH ANCHORING): MULCH ANCHORING SHALL BE PERFORMED IMMEDIATELY FOLLOWING MULCH APPLICATION TO MINIMIZE LOSS BY WIND OR WATER. THIS MAY BE DONE BY ONE OF THE FOLLOWING METHODS DEPENDING UPON SIZE OF AREA, STEEPNESS OF SLOPES, AND COSTS.

- i. A MULCH ANCHORING TOOL (CRIMPER) IS A TRACTOR DRAWN IMPLEMENT DESIGNED TO PUNCH AND ANCHOR MULCH INTO THE SOIL SURFACE A MINIMUM OF 3 TO 4 INCHES. THIS IS THE MOST EFFECTIVE ON LARGE AREAS, BUT IS LIMITED TO FLATTER SLOPES WHERE EQUIPMENT CAN OPERATE SAFELY. IF USED ON SLOPING LAND, THIS PRACTICE SHOULD BE USED ON THE CONTOUR. STRAW MULCH RATE MUST BE 3 TONS PER ACRE.
- ii. WOOD CELLULOSE FIBER MAY BE USED FOR ANCHORING STRAW. THE FIBER BINDER SHALL BE APPLIED AT A NET DRY WEIGHT OF 1500 LBS./ACRE.

- iii. APPLICATIONS OF LIQUID BINDERS SHOULD BE APPLIED HEAVIER AT EDGES WHERE WIND CATCHES MULCH, IN VALLEYS AND ON CRESTS OF BANKS. THE REMAINDER OF AREA SHOULD BE UNIFORM AFTER BINDER APPLICATION. ONE OF THE FOLLOWING CAN BE USED: EMULSIFIED ASPHALT, CUTBACK ASPHALT, AND SYNTHETIC OR ORGANIC BINDERS. APPLICATION RATES FOR THESE BINDERS ARE PROVIDED IN THE REGULATIONS.
- iv. LIGHTWEIGHT: STAPLE PAPER, JUTE, COTTON, OR PLASTIC NETTING MAY BE STAPLED OVER THE MULCH ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. NETTING IS USUALLY AVAILABLE IN ROLLS OF 4 TO 15 FEET WIDE AND 300 TO 3,000 FEET LONG. USE A DEGRADABLE NETTING IN AREAS TO BE MOWED.
- v. PEG AND TWINE: SECURE MULCH BY STRETCHING TWINE BETWEEN 8 TO 10 INCH PEGS DRIVEN TO WITHIN 2 TO 3 INCHES OF THE SOIL SURFACE IN A CRISS-CROSS WITHIN A SQUARE PATTERN (EVERY 4 FEET IN ALL DIRECTIONS). SECURE TWINE AROUND EACH PEG WITH TWO OR MORE ROUND TURNS.

I. REPAIRS AND MAINTENANCE

INSPECT ALL SEEDED AREAS FOR FAILURES AND MAKE NECESSARY REPAIRS, REPLACEMENTS, AND RESEEDINGS WITHIN THE PLANTING SEASON.

- i. ONCE THE VEGETATION IS ESTABLISHED, THE SITE SHALL HAVE 94% GROUND COVER TO BE CONSIDERED ADEQUATELY STABILIZED, AS DETERMINED BY THE CONTRACTING OFFICER.
 - ii. IF THE STAND PROVIDES LESS THAN 40% GROUND COVERAGE, REESTABLISH FOLLOWING ORIGINAL LIME, FERTILIZER, SEEDBED PREPARATION, AND SEEDING RECOMMENDATIONS.
 - iii. IF THE STAND PROVIDES BETWEEN 40% AND 94% GROUND COVERAGE, OVERSEEDING AND FERTILIZING USING HALF OF THE RATES ORIGINALLY APPLIED MAY BE NECESSARY, AS DETERMINED AND DIRECTED BY THE CONTRACTING OFFICER.
- i. IF SOIL MOISTURE IS DEFICIENT, AND MULCH IS NOT USED, SUPPLY NEW SEEDINGS WITH ADEQUATE WATER (A MINIMUM OF 1/4 INCH TWICE A DAY UNTIL VEGETATION IS WELL ESTABLISHED). THIS IS ESPECIALLY TRUE WHEN SEEDINGS ARE MADE IN ABNORMALLY DRY OR HOT WEATHER OR ON DROUGHTY SITES.

SECTION II TEMPORARY SEEDING

ESTABLISHMENT OF TEMPORARY VEGETATIVE COVER ON SOILS EXPOSED FOR PERIODS OF TWO TO 12 MONTHS. FOR LONGER DURATION OF VEGETATIVE COVER, PERMANENT SEEDING IS REQUIRED.

TEMPORARY SEEDING SUMMARY

ZONE 7 SEED MIXTURE* (FROM TABLE 3.3-1 NEW JERSEY E & S STANDARDS)				FERTILIZER RATE (10-20-10)	LIME RATE
SPECIES	APPLICATION RATE (lb/ac)	SEEDING DATES	SEEDING** DEPTHS		
ANNUAL RYE GRASS	40	2/15-5/1 8/15- 10/15	1/2 INCHES	500 lb/ac (11 lb/1000 sf)	SEE TABLE SECTION II p.3.1.1
PEARL MILLET	20	5/1-8/1	1.0 INCHES		

*SEE TABLE 3.3-1 NEW JERSEY STANDARDS FOR EROSION AND SEDIMENT CONTROL FOR OTHER SPECIES SUITABLE FOR PLANTING OTHER THAN THOSE SPECIFIED IN THE TABLE ABOVE.

**TWICE THE DEPTH FOR SANDY SOIL.

SECTION III PERMANENT SEEDING

ESTABLISHMENT OF PERMANENT VEGETATIVE COVER ON EXPOSED SOILS WHERE PERENIAL VEGETATION IS NEEDED FOR LONG TERM PROTECTION.

PERMANENT SEEDING SUMMARY

SEED MIXTURE (FOR LANDFILLS, ZONE 7, WELL TO EXCESSIVELY WELL DRAINED SOIL) (FROM TABLE 3.2-1 NEW JERSEY E&S STANDARDS)				FERTILIZER RATE (10-20-10)	LIME RATE
SPECIES	APPLICATION RATE (lb/ac)	SEEDING DATES	SEEDING DEPTHS		
HARD OR SHEEP FESCUE	45	2/15-5/1	1/4-1/2 INCHES	500 lb/ac (11lb/1000sf)	SEE TABLE SECTION II p.3.2.1
PERENNIAL RYEGRASS	10	8/15-10/15	1/4-1/2 INCHES		