

**OPERATION AND MAINTENANCE USER MANUAL  
FOR OPERABLE UNIT 6 (SITES 3 AND 10)  
NAVAL WEAPONS STATION EARLE  
COLTS NECK, NEW JERSEY**

*Prepared for:*

**ENGINEERING FIELD ACTIVITY NORTHEAST  
10 INDUSTRIAL HIGHWAY  
LESTER, PENNSYLVANIA**

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## **DIVISION 1 - GENERAL INFORMATION**

### **1.1 INTRODUCTION**

Foster Wheeler Environmental Corporation (Foster Wheeler) has been contracted by the Engineering Field Activity Northeast (EFANE) to prepare an Operation and Maintenance (O&M) User Manual for Operable Unit 6 (Sites 3 and 10) at the Naval Weapons Station Earle (NWS Earle) in Colts Neck, New Jersey. The O&M user manual was prepared to guide site personnel in performing post-closure operation and maintenance of the two landfill sites. This O&M user manual has been prepared to satisfy the requirements of Remedial Action Contract Number N62472-99-D-0032, Contract Task Order 040, the Resource Conservation and Recovery Act (RCRA), and Section 7:26-2A.9 of the New Jersey Final Regulations. The O&M user manual will be used as a guidance document for various site maintenance activities. For detailed repair or maintenance activities, the applicable Project Specification Sections of the approved design and the approved design changes will be complied with. The O&M user manual will be revised, if necessary, to reflect any changes in the monitoring and inspection procedures and frequencies after two years of operations and then once every five years.

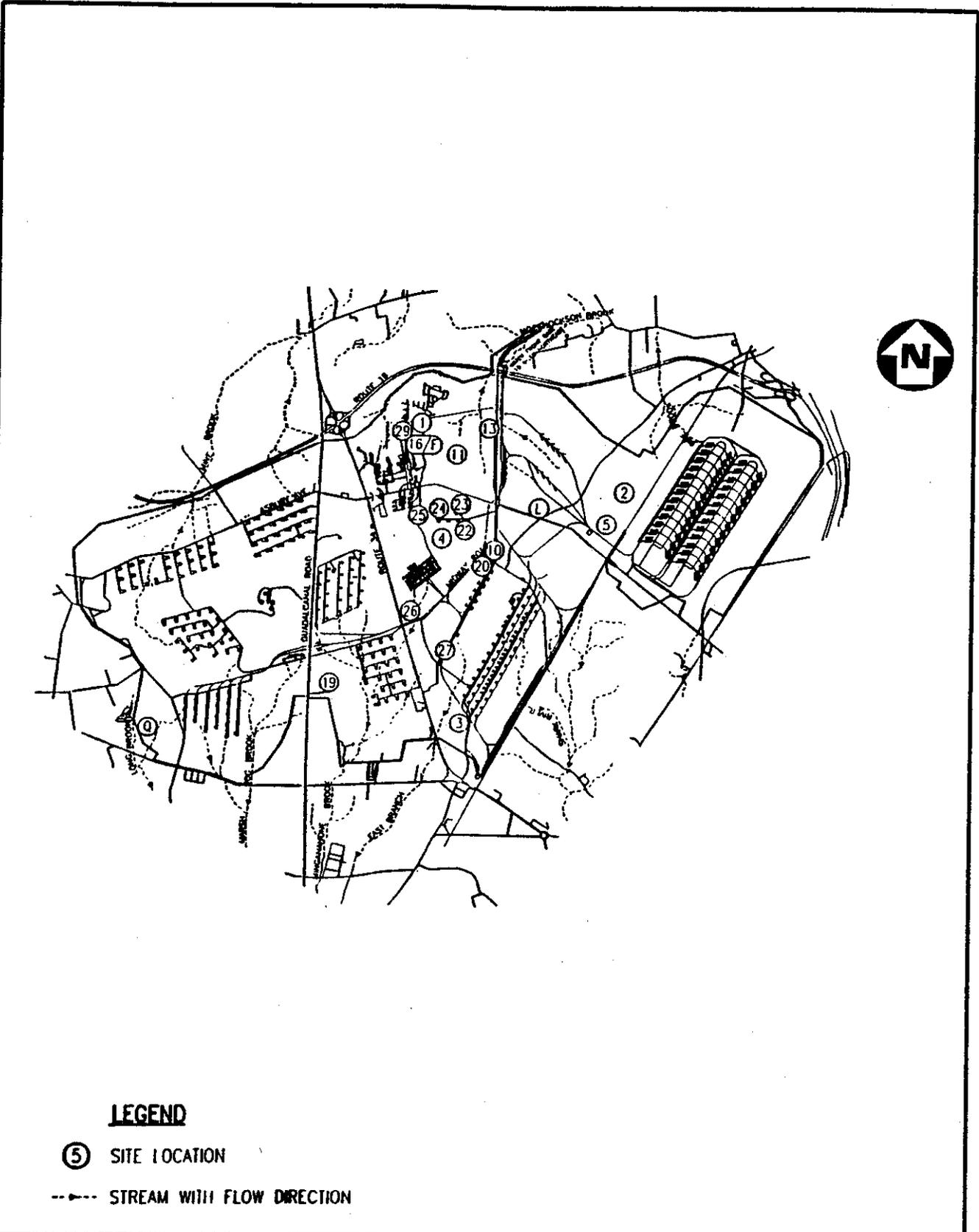
Subdivision 1.2 provides a brief site description. The list of as-built drawings and the Project Specification Sections are provided in Subdivision 1.3 and 1.4, respectively. The regulatory requirements are identified in Subdivision 1.5. The maintenance, monitoring and reporting activities to be performed by the facility to ensure compliance with the above-mentioned requirements are discussed in Divisions 2 through 10 of this manual. The support information for the manual is provided in Appendices A through C.

### **1.2 SITE DESCRIPTION**

NWS Earle is located in Monmouth County, New Jersey, approximately 47 miles south of New York City. NWS Earle consists of a 10,248-acre Main Base located in the Colts Neck Township approximately 10 miles inland from the Atlantic Ocean at Sandy Hook, and a 706-acre Waterfront Area. The two areas are connected via a Navy-controlled right-of-way. Sites 3 and 10 are both located on the Main Base area within Operable Unit 6 (OU-6). OU-6 consists of two former landfills located in the Mainside area; the landfill southwest of "F" group (Site 3) and the scrap metal landfill (Site 10). Site 3 is located in Howell Township and Site 10 is located in Colts Neck Township. The OU-6 sites were grouped together based on similarities of potential for contaminants to migrate to human and/or environmental receptors. Maps of the general area, the site vicinity and the project location are provided in Figures 1-1 and 1-2, respectively.

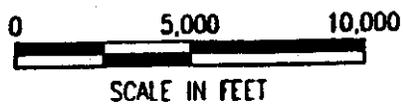
Site 3 is a 5-acre site located southwest of "F" group that was used from 1960 to 1968 for the disposal of domestic and industrial wastes. Industrial wastes reportedly disposed of at Site 3 consisted of paints and paint thinners, solvents, varnishes, shellac, acids, alcohols, caustics, pesticide containers and rinse water, wood, and small amounts of asbestos.

Site 10 is a scrap metal landfill that covers 2 acres and was used from 1953 to 1965 for the disposal of demilitarized munitions and spent munitions cases. There is no known evidence that



**LEGEND**

- ⑤ SITE LOCATION
- >-- STREAM WITH FLOW DIRECTION

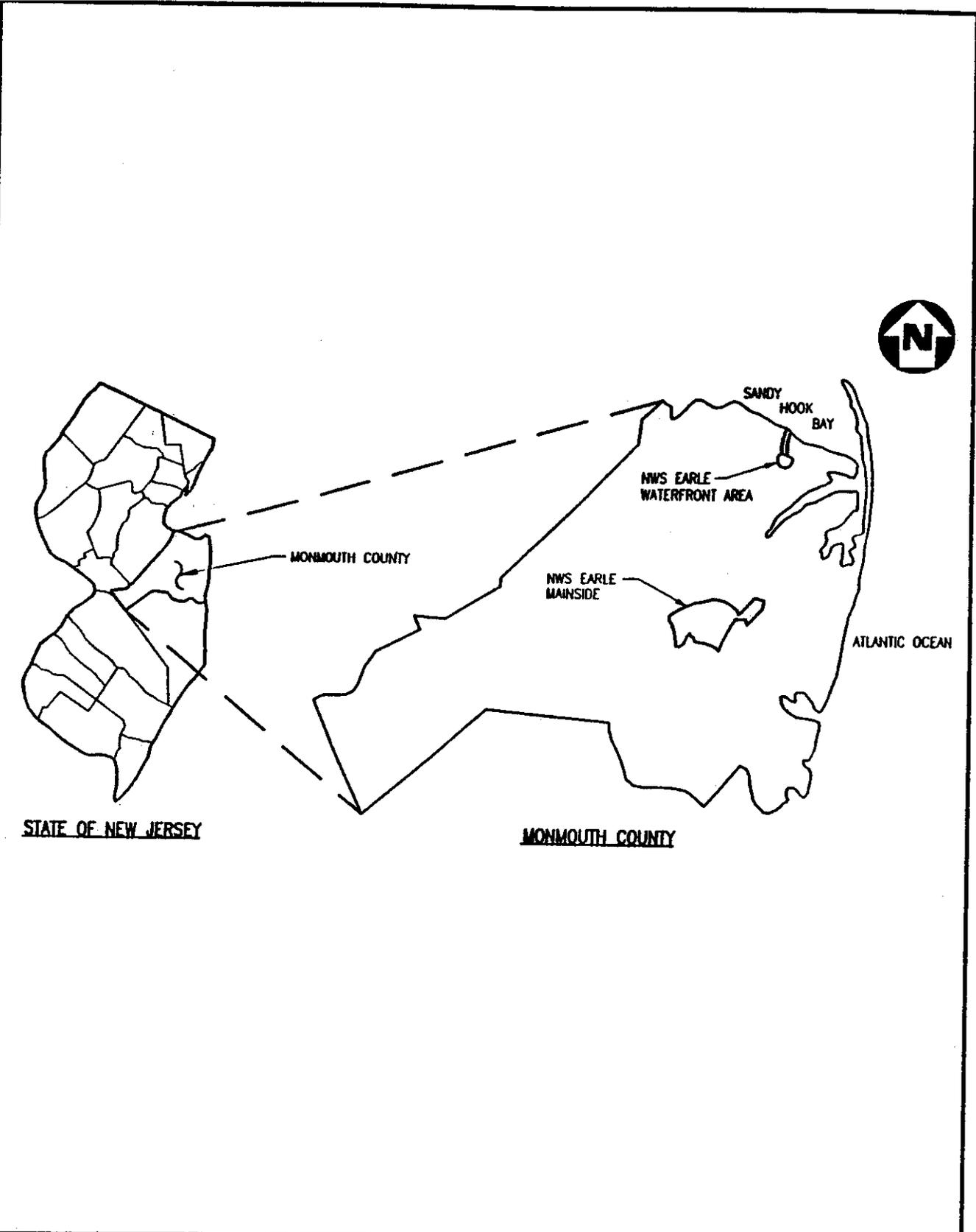


U.S. Navy RAC  
NWS- Earle, Colts Neck, NJ

Figure 1-1

Sites 3 & 10 Mainside Area Locations

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|  |  |
|--|--|
|  | U.S. Navy RAC<br>NWS- Earle, Colts Neck, NJ  |
|  | Figure 2-1<br>Site Location Map  |
|  |  FOSTER WHEELER ENVIRONMENTAL CORPORATION |

any live ammunition is buried at the site. Only certified-inert materials were reported to have been disposed there. An estimated 65,000 cubic yards, which includes cover material, were disposed at the site. The disposed material consisted primarily of aluminum and steel containers. Spent grit and paint chips from the ammunition rework operations were also buried.

In 1990, NWS Earle was placed on the National Priorities List (NPL). The nature and extent of the contamination at Sites 3 and 10 was addressed by the Phase II Remedial Investigation (RI) in 1995. The RI was completed in July 1996 and was used as the basis for performing a Feasibility Study (FS) of potential remedial alternatives. The Navy, USEPA and NJDEP developed the proposed remedial action plan from the findings of the FS and signed a Record of Decision (ROD) in July 2001. The major components of the proposed remedial action plan include:

1. Re-grading and addition of cover materials.
2. Passive gas venting system to manage landfill gas migration and build-up under cap (Site 10 only).
3. Surface controls to minimize erosion and manage runoff.
4. Upland revegetation.
5. Establish a Classification Exemption Area (CEA) adjacent to the landfills to bar the use of groundwater during the remediation period.
6. Provide long-term periodic groundwater monitoring.

### **1.3 LIST OF CONSTRUCTION DRAWINGS**

A list of construction drawings issued for the landfill closure at Sites 3 and 10 are provided in Table 1-1 and Table 1-2, respectively. The construction drawings are provided in Appendix A. The full size drawings are available from the NWS Earle Administrative Records office.

### **1.4 LIST OF SPECIFICATIONS**

A list of the Project Specifications issued for the landfill closure is provided in Table 1-3. The applicable portions of the specifications will be used for maintenance or construction activities at the site. These applicable portions of the specifications are provided in Appendix B.

**TABLE 1-1  
LIST OF DRAWINGS  
SITE 3**

| <u>SHEET</u> | <u>DRAWING</u> | <u>TITLE</u>   |
|--------------|----------------|--|
| 1 of 17      | T-1            | TITLE SHEET  |
| 2 of 17      | C-1            | GENERAL NOTES AND PROPOSED SEQUENCE OF CONSTRUCTION                  |
| 3 of 17      | C-2            | SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS                  |
| 4 of 17      | C-3            | EXISTING SITE CONDITIONS   |
| 5 of 17      | C-4            | CLEARING AND GRUBBING AND SOIL EROSION AND SEDIMENT CONTROL MEASURES |
| 6 of 17      | C-5            | FINAL GRADING PLAN   |
| 7 of 17      | C-6            | CAP SECTIONS AND DETAILS AND STORMWATER MANAGEMENT DETAILS           |
| 8 of 17      | C-7            | PROPOSED FEATURES  |
| 9 of 17      | C-8            | FEATURES DETAILS   |
| 10 of 17     | C-9            | PROPOSED SITE ACCESS ROAD SECTION                                    |
| 11 of 17     | C-10           | GRADING SECTIONS   |
| 12 of 17     | C-11           | GRADING SECTIONS   |
| 13 of 17     | C-12           | GRADING SECTIONS   |
| 14 of 17     | C-13           | GRADING SECTIONS   |
| 15 of 17     | C-14           | GRADING SECTIONS   |
| 16 of 17     | C-15           | GRADING SECTIONS   |
| 17 of 17     | C-16           | SWALE PROFILES   |

**TABLE 1-2  
LIST OF DRAWINGS  
SITE 10**

| <u>SHEET</u> | <u>DRAWING</u> | <u>TITLE</u>   |
|--------------|----------------|--|
| 1 of 12      | T-1            | TITLE SHEET  |
| 2 of 12      | C-1            | GENERAL NOTES AND PROPOSED SEQUENCE OF CONSTRUCTION                  |
| 3 of 12      | C-2            | SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS                  |
| 4 of 12      | C-3            | EXISTING SITE CONDITIONS   |
| 5 of 12      | C-4            | CLEARING AND GRUBBING AND SOIL EROSION AND SEDIMENT CONTROL MEASURES |
| 6 of 12      | C-5            | FINAL GRADING PLAN   |
| 7 of 12      | C-6            | CAP SECTIONS AND DETAILS AND STORMWATER MANAGEMENT DETAILS           |
| 8 of 12      | C-7            | PROPOSED FEATURES  |
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| 10 of 12     | C-9            | PROPOSED SITE ACCESS ROAD SECTION                                    |
| 11 of 12     | C-10           | GRADING SECTIONS   |
| 12 of 12     | C-11           | GRADING SECTIONS   |

**TABLE 1-3  
LIST OF SPECIFICATIONS**

**Division 1 - General Requirements**

|       |   |
|-------|---|
| 01010 | Summary of Work                                 |
| 01019 | Mobilization and Demobilization                 |
| 01052 | Field Surveys                                   |
| 01155 | Health and Safety Requirements                  |
| 01200 | Construction Meetings                           |
| 01300 | Submittals                                      |
| 01320 | Submittal Register                              |
| 01350 | Construction Photographs                        |
| 01400 | Construction Quality Control Plan               |
| 01430 | Field Sampling, Analysis, and Data Evaluation   |
| 01565 | Temporary Facilities and Environmental Controls |
| 01700 | Project Closeout and Record Documents           |

**Division 2 - Site Work**

|       |   |
|-------|---|
| 02050 | Demolition  |
| 02231 | Clearing and Grubbing                                   |
| 02240 | Erosion and Sediment Control                            |
| 02250 | Off-Site Transportation and Disposal                    |
| 02310 | Preparation of Subgrade                                 |
| 02320 | Granular Gas Management and Granular Drainage Materials |
| 02323 | Rip-rap   |
| 02324 | Site Access Road  |
| 02326 | Cover Soil  |
| 02327 | Drainage Ditches  |
| 02501 | Reinforced Concrete Pipe and Headwalls                  |
| 02600 | Monitoring Well Installation                            |
| 02714 | Geotextile Fabric                                       |
| 02771 | High Density Polyethylene (HDPE) Geomembrane Liner      |
| 02800 | Top Soil  |
| 02810 | Settlement Monuments                                    |
| 02830 | Cable Fence with Warning Signs and Vehicle Gate         |
| 02840 | Seeding   |

**Division 3 - Concrete**

|       |                        |
|-------|------------------------|
| 03200 | Concrete Reinforcement |
| 03300 | Cast-in-Place Concrete |

**Division 15 - Mechanical**

|       |   |
|-------|---|
| 15010 | Gas Management Piping                     |
| 15100 | Modification of Existing Monitoring Wells |
| 15483 | HDPE Liner Boots                          |

## 1.5 REGULATORY REQUIREMENTS

The post-closure care at Sites 3 and 10 must be performed for thirty (30) years after the closure in accordance with the RCRA requirements (40 CFR parts F, G and N) and Section 7:26-2A.9 of the New Jersey Final Regulations. The following maintenance, monitoring and reporting requirements must be complied with:

- Releases From Solid Waste Management Units, Subpart F
  1. Maintaining and monitoring a groundwater monitoring system;
  2. Groundwater sampling and analysis; and
  3. Recordkeeping and reporting.
- Closure and post-closure, subpart G.
  1. Post-closure care and use of property;
  2. Post-closure plan; amendment of plan;
  3. Post closure notices; and
  4. Certification of completion of post-closure care.
- Landfills, Subpart N
  1. Maintaining the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion and other events;
  2. Maintaining and monitoring the passive gas venting system;
  3. Preventing run-on and run-off from eroding or otherwise damaging the final cap;
  4. Protecting and maintaining surveyed benchmarks and settlement platforms;
  5. Maintaining the integrity of the landfill sideslopes;
  6. Controlling vegetative growth; and
  7. Maintaining the design grades of the vegetative layer.

The Navy ROICC (Resident Officer In Charge of Construction) must be contacted regarding any maintenance and monitoring activities that occur at Sites 3 and 10. The ROICC's name, address and telephone number is provided in Division 10 of this manual.

## **DIVISION 2 - LANDFILL CAP LAYERS**

### **2.1 SYSTEM COMPONENTS**

The landfill cap at Site 10 consists of the following layers from top to bottom as depicted in as-built drawing sheets C-6:

- The 18-inch vegetative layer consists of a 12-inch thick layer of select fill overlain by a 6-inch thick layer of topsoil. A non-woven geotextile was installed below the layer of select fill to prevent soil migration into the underlying granular drainage layer. The surface of the topsoil layer was mulched and seeded to establish a layer of uniform vegetation and protect the surface of the landfill cap against erosion.
- The granular drainage layer consists of a 12-inch thick layer of a poorly graded sand. The gradation of the sand is consistent with the requirements of the New Jersey sanitary landfill regulations.
- The low hydraulic conductivity layer consists of a 60-mil High-Density Polyethylene (HDPE) geomembrane. Smooth geomembrane was installed over the entire Site 10 area.
- The bedding/gas management layer consists of a 12-inch thick layer of coarse sand and several passive gas vents. The layer acts as bedding for the geomembrane to be installed over, and a means of collecting and venting landfill gases. The landfill gases are vented through passive gas vents that were installed at high points within Site 10.

The proposed cross section of the landfill cap at Site 10 is provided in Sheets 11 and 12.

The landfill at Site 3 consists of a properly graded 30-inch thick layer of cover soil overlain by a 6-inch thick layer of topsoil. The proposed cross section of the landfill cap at Site 3 is provided as Sheets 11 through 16.

### **2.2 MONITORING AND INSPECTION**

Monitoring and inspection of the landfill cap at Sites 3 and 10 will be performed quarterly for the first two years of the post-closure care period beginning in June 2003, and semi-annually for the remaining 28 years. The landfill cap will be inspected for erosion, differential settling, coverage of vegetation, and evidence of burrowing animals (such as holes in the ground). Settlement of Sites 3 and 10 will be monitored once per year during the 30-year post-closure period to assess potential settlement concerns. Settlement will be determined by surveying the elevation of the settlement monuments and re-surveying their elevations during each year's inspection. If little or no settlement is observed during the annual inspections, it will be proposed that the frequency of surveying being reduced.

### **2.3 MAINTENANCE**

The landfill cap at Sites 3 and 10 will require regular maintenance for soil erosion resulting from rain, snow, wind, and other natural factors. The erosion of landfill cap areas will be repaired by replacement of appropriate soil material. The holes created by burrowing animals will be

inspected for possible damage to the non-woven geotextile and geomembrane. Any damaged geotextile or geomembrane will be replaced in accordance with the Project Specifications, and the hole will be filled and compacted with the appropriate soil material. The other regular maintenance activities including cleaning of drainage areas and maintenance of vegetation are addressed in individual Divisions of this Manual.

If a differential settlement of over six inches over any 100 linear foot area of the landfill cap at Sites 3 and 10 is observed, the area of settlement will be removed to observe the integrity of the geomembrane, and an engineering evaluation will be conducted to determine the degree of damage to the cap system and the maintenance activities required. The specific maintenance activities will depend on the type and degree of damage to the cap. The construction details for each component are provided in the referenced specifications. A copy of the Project Specifications is attached in Appendix B. The following provides pertinent references to the specifications and the drawings:

The damaged portions of the cap system will be repaired or replaced in accordance with the specific requirements of the Project Specifications for each cap layer component.

The topsoil for the vegetative layer will be as per Section 02800 of the Project Specifications. Seeding will be performed in accordance with the requirements of Section 02840.

The cover soil is defined in Specification Section 02326. The non-woven geotextile will meet the material properties identified of Specification Section 02714.

The drainage layer is defined in Part 2 of Specification Section 02320. The drainage layer placement must be in accordance with the requirements of Part 3 of Section 02320. The non-woven cushion geotextile beneath the drainage layer will meet the material properties identified in Part 2 of Section 02714.

The specified properties of the textured and smooth HDPE geomembrane are defined in Part 2 of Specification Section 02771. Any necessary repairs to the HDPE geomembrane will be performed by a qualified geomembrane installer in accordance with Part 3 of Section 02771. The qualifications for the geomembrane installer are defined in Part 1 of Section 02771.

The bedding/gas management layer is defined in Part 2 of Specification Section 02320. All requirements of Part 3 of Section 02320 will be followed.

## **DIVISION 3 – STORM WATER DRAINAGE SYSTEM**

### **3.1 SYSTEM COMPONENTS**

The storm water drainage system consists of riprap and geotextile lined drainage swales along the perimeter of Sites 3 and 10. The typical cross sections of the drainage swale details are provided in drawing sheet C-6. The precise location of each type of drainage swale is located on drawing sheet C-7 of each section.

### **3.2 MONITORING AND INSPECTION**

All storm water controls will be inspected quarterly for the first two years of the post-closure care period, and semiannually for the remaining 28 years. Inspections will generally occur during non-winter months to provide a better evaluation of the storm water controls. The inspections will include checking for sediment accumulation, subsidence, ponding, obstructions to flow, erosion, and vegetative growth which could prevent free flow of storm water.

### **3.3 MAINTENANCE**

Accumulated sediment and vegetative growth that is obstructing the flow of storm water will be removed from the drainage swales and spread over the surrounding upland areas. Areas of the storm drainage system where water is ponding will be regraded to promote positive drainage. Any damage to the storm water control structures due to subsidence or erosion will be repaired as soon as possible in accordance with the requirements of Specification Section 02240 “Erosion and Sediment Control”. The degree of the maintenance activities will depend on the extent of damage to the storm water drainage system. The construction details for each component are provided in the referenced specifications and drawings.

## **DIVISION 4 - GAS MONITORING VENTS**

### **4.1 SYSTEM COMPONENTS**

To manage gases generated under the landfill cap of Site 10, a 12-inch bedding/gas management layer was placed below the low hydraulic conductivity layer (geomembrane) of the final cap. The 6-inch PVC gas vents were placed at high points of the final landfill cap. A total of 4 gas vents were installed at Site 10. The construction details of the gas vents are provided in Site 10 drawing sheet C-8. The locations of the gas monitoring vents are provided in Site 10 drawing C-7.

### **4.2 MONITORING AND INSPECTION**

The passive landfill gas control system will be inspected and maintained on a regular basis to ensure that the system continues to function properly over the post-closure care period. Visual inspection of the gas vents will be performed quarterly for the first two years during the post-closure care period and semiannually thereafter. The inspection will include checking for physical damage to the vents, vent screens, settlement in the area surrounding the gas vents, and obstructions within the gas vent piping. Monitoring of the gas emissions from the gas vents is discussed in Division 9 of this manual

### **4.3 MAINTENANCE**

Maintenance of the gas vents will be performed as determined during the site inspections. Physical damage to a gas vent or any of its components will be repaired or replaced in accordance with Specification Section 15010 – Gas Management Piping. If a differential settlement of over six inches is observed around a gas vent, the area of settlement will be removed to observe the integrity of the gas vent and its connection to the geomembrane. A broken or damaged gas vent will be repaired or replaced in accordance with Section 15010 of the Project Specifications. Damaged connections between a gas vent and the geomembrane will be repaired in accordance with Site 10 sheet C-8.

## **DIVISION 5 – SITE ACCESS ROADS**

### **5.1 SYSTEM COMPONENTS**

Access to the landfill caps at Sites 3 and 10 is provided by 15-foot wide gravel roads. The access roads at each site are constructed of a 12-inch thick layer of compacted crushed miscellaneous base underlain by a 12-ounce non-woven geotextile fabric. Installation of a 36-inch reinforced concrete pipe was required under the access road of Site 3 since it was constructed over the perimeter storm water drainage channel. A security gate was constructed at each of the access roads to control access to the landfill surface. Construction details for the access roads are shown on C-6 for Site 3 and C-6 for Site 10. The locations of the access roads and security gates are indicated on C-7 for Site 3 and C-7 for Site 10.

### **5.2 MONITORING AND INSPECTION**

The access roads and security gates will be inspected quarterly during the first two years of the post-closure care period, and semiannually for the remaining 28 years. Inspection of the access roads will include observation for potholes, ruts, settlement, soil erosion, vegetative growth coverage, and integrity of the security gates. Additionally, the headwalls at Site 3 will be inspected for structural integrity and erosion of the surrounding soils.

### **5.3 MAINTENANCE**

All of the required maintenance activities will be documented in the routine inspections and performed at the completion of the inspection. Any potholes or ruts that develop in the site access roads will be filled and compacted with the designated soil. Damage to the security gates will be repaired as necessary.

## **DIVISION 6 - VEGETATION**

### **6.1 SYSTEM COMPONENTS**

The revegetation at Sites 3 and 10 has been completed in accordance with Specification Section 02840 "Seeding". The revegetation was performed to control erosion of the landfill cap at Sites 3 and 10, and to return the area to its natural habitat. The revegetation on the landfill caps included installation of fertilizer, pH adjusters, soil conditioners, and seed in accordance with Section 02840.

### **6.2 MONITORING AND INSPECTION**

The coverage and maintenance of vegetation on the landfill caps will be inspected quarterly for the first two years of the post-closure care period, and semiannually thereafter (early spring and late fall). The turf will be inspected for bare spots larger than one square foot to evaluate if re-seeding will be required. The turf area will also be inspected for any damage caused by vehicles. All areas requiring maintenance activities such as mowing, watering, hydroseeding, mulching, and re-planting will be noted during the inspection, and the work will be performed shortly thereafter.

### **6.3 MAINTENANCE**

Both of the landfill caps will be mowed annually in the early fall (September - October) to prevent the overgrowth of the open areas by woody plants. The mower blades will be sharp to prevent tearing and set at a height where only 1/3 of the existing grass blade is cut. Mulch/grass clippings will remain. The need for additional mowing will be determined and implemented as noted during the routine inspections. Damaged turf areas and bare spots will be repaired by preparing the topsoil surface and applying additional soil conditioners and seed as outlined in Specification Section 02840. Seeding should occur between April 15 and May 15, or between September 15 and October 15.

## **DIVISION 7 - GROUNDWATER MONITORING SYSTEM**

### **7.1 SYSTEM COMPONENTS**

Eight groundwater monitoring wells were installed at Site 3 and four at Site 10 during previous investigations at the two sites. Four additional wells were installed at Site 3 during the capping activities. The locations of the existing wells are shown on sheets C-3 of each section of the Construction Drawings. The locations of the newly installed wells are shown on Sheet C-7 of the Site 3 drawings. These wells are scheduled to be used for long-term monitoring of the ground water at the two landfill sites during the post-closure care period. Some of the monitoring wells were modified during the construction activities as shown on the monitoring well modification detail on sheet C-8 of each set of the construction drawings. Details regarding the elevations and screen intervals for each monitoring well are provided in Table 7-1.

Four of the monitoring wells at Sites 3 were drilled using a mobile drill rig with a hollow stem auger. The actual wells were constructed of 4-inch diameter schedule 40 PVC pipe with 6-inch diameter steel casings placed over the top five feet of the well. No. 2 sand was used as the filtering media surrounding the PVC well screen. Overlaying the filtering media is a clay seal constructed of bentonite pellets followed by a grout seal constructed of a Portland cement/bentonite mixture. Each of the monitoring wells has a locking water-tight well cap with the well number etched or stamped on it.

### **7.2 MONITORING AND INSPECTION**

The groundwater monitoring wells will be inspected quarterly during the first two years of the post-closure care period and semiannually thereafter for any rusted locks, damage to the well caused by subsidence or vandalism, and blockage of the well caused by rocks or other means. Monitoring of the groundwater during the post-closure care period is discussed in Division 8 of this report.

### **7.3 MAINTENANCE**

Any of the monitoring wells that are noted during the inspections as being damaged will be repaired or replaced, as necessary in accordance with the requirements of USEPA publication 600/4-89/034 titled the *Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells* (1990). Repairs or replacement to any of the monitoring wells will remain consistent with the existing construction of the site monitoring wells. Components that will be used while repairing or replacing any of the monitoring wells will conform to Part 2 of Specification Section 02600. Any monitoring wells that require replacement will be developed according to Article 52 of USEPA Manual 570/9-75-001. Monitoring well construction logs and boring logs will be provided for any monitoring wells that are replaced.

**TABLE 7-1  
EXISTING GROUNDWATER MONITORING WELLS**

| WELL NUMBER | TOP OF PVC CASING (1)<br>ELEVATION (FT) | TOTAL WELL<br>DEPTH<br>(FT) | WELL SCREEN (2)<br>LENGTH<br>(FT) |
|-------------|---|-----------------------------|-----------------------------------|
| MW3-01      | 115.92                                  | 23                          | 15                                |
| MW3-02      | 124.87                                  | 25                          | 15                                |
| MW3-03      | 124.40                                  | 23                          | 15                                |
| MW3-04      | 122.16                                  | 14.60                       | 10                                |
| MW3-05      | 124.90                                  | 17.75                       | 12.75                             |
| MW3-06      | 125.65                                  | 19.00                       | 13.75                             |
| MW3-07      | 124.50                                  | 19.80                       | 15                                |
| MW3-08      | 118.22                                  | 20                          | 15                                |
| MW10-02     | 110.22                                  | 22                          | 15                                |
| MW10-04     | 113.00                                  | 22.5                        | 15                                |
| MW10-06     | 106.35                                  | 17                          | 15                                |
| MW10-07     | 107.97                                  | 19.5                        | 14.5                              |

(1) The elevation datum for the top of the PVC casings is Mean Sea Level (MSL).

(2) All of the well screen lengths are measured from the bottom of the monitoring well.

## **DIVISION 8 - GROUNDWATER QUALITY MONITORING**

### **8.1 GROUNDWATER MONITORING PROGRAM**

The purpose of the groundwater monitoring program is to monitor the effect that the landfill caps at Sites 3 and 10 have in improving groundwater quality around the two sites during the post-closure care period. Groundwater samples will be collected on an annual basis from twelve monitoring wells (eight existing and four new) at Site 3 and four monitoring wells from Site 10 during the entire post-closure care period. Samples from each of the monitoring wells will be analyzed for total metals. The specific parameters that the samples will be analyzed for are outlined in Table 8-1. If the analytical results from the groundwater sampling activities show that the groundwater beneath and downgradient of the landfill site has returned to background conditions, the Navy will submit a petition to the relevant regulatory agencies to discontinue or reduce the groundwater monitoring frequency.

As required by the Record of Decision for Sites 3 and 10, Classification Exemption Areas (CEA) will be established in accordance with Section 7:9-6 of the New Jersey Final Regulations. Establishment of a CEA is required by the State of New Jersey to provide official notice that the groundwater in certain portions of the site does not meet the State's groundwater quality standards. It is anticipated that Site 3 will have a CEA established southeast of the landfill near the newly installed monitoring wells. Site 10 is anticipated to have a CEA established adjacent to the landfill near monitoring wells MW10-06 and MW10-07. Both of the CEAs will be established for an initial period of thirty years, and will be monitored through the annual groundwater monitoring as outlined in this section. The precise configuration of each CEA will be established based on the results of the first round of post-closure care groundwater monitoring that will be conducted in June 2003. If the results from any future groundwater monitoring indicate that the groundwater in the CEA has returned to levels that comply with the groundwater quality criteria, the Navy will submit a petition to the state to remove the CEA from the two landfill sites. The groundwater classification for landfill at Sites 3 and 10 is Class II-A, which is the designation for groundwater that is an existing source of potable water with conventional water treatment, or is a potential source of potable water.

### **8.2 GROUNDWATER LEVEL MEASUREMENTS**

To gain an understanding of the direction of groundwater flow, groundwater level measurements will be obtained. Groundwater level measurements will be collected using an electrical water level indicator, prior to groundwater purging and sampling. Groundwater level measurements for all monitoring wells will be collected according to the following method:

- Follow the manufacturer's instructions to verify proper operation of the water level indicator equipment above ground. Prior to opening the well, don personal protective equipment as required by the Site-Specific Health and Safety Plan.

**Table 8-1**

**SAMPLE COLLECTION AND ANALYTICAL INFORMATION**

| <b>Laboratory Analyses</b>                                      | <b>Annual Monitoring No. of Samples</b> | <b>Sample Media</b> | <b>Sampling Method</b> | <b>Sample Containers</b>        | <b>Sample Preservation</b> | <b>Holding Time</b>               | <b>Method Detection Limits</b> | <b>Field Analyses</b>                                |
|---|---|---------------------|------------------------|---------------------------------|----------------------------|-----------------------------------|--------------------------------|--|
| Total Metals (TAL Metals)<br>Method 6010A,<br>Hg-7470A (SW-846) | 15<br>(2D)                              | Groundwater         | Low Flow               | One 1 liter polyethylene bottle | HNO <sub>3</sub> to pH <2  | 6 months analysis<br>(Hg 28 days) | Analyte Specific               | pH, conductivity, temperature, ORP, DO and turbidity |

Notes:

The number in parentheses in the “No. of Samples” column denotes the number of samples from the total that are duplicates (D) and Equipment Blanks.

Rinsate samples will not be required since dedicated sampling equipment is used for each well.

- Record the well number, time and date in a field logbook. Water levels will be measured relative to the surveyed reference mark on the top edge of the 4-inch diameter PVC pipe.
- Record the static water level and total depth of the well to the nearest 0.01-foot (0.3 cm).
- Decontaminate water level indicator and measuring tape prior to proceeding to the next well.

To ensure accurate readings, the downhole probe will be lowered slowly into the well. Upon reaching the water table, the depth-to-water (measured from the top of the 4-inch diameter PVC pipe) will be read directly from the water level indicator tape and recorded in the field logbook. All water level measurements will subsequently be tabulated, and corrected to feet of elevation above MSL.

### **8.3 SAMPLING EQUIPMENT AND PROCEDURES**

#### Sampling Equipment

The following equipment and supplies will be used for collecting groundwater samples from the monitoring wells at Sites 3 and 10:

- Adjustable rate peristaltic pump;
- Polyethylene tubing (dedicated to each well);
- In-line measurement flow cell;
- Interface probe, if needed;
- Methane monitoring equipment;
- Photo-ionization detector (PID);
- Graduated cylinder and stop watch;
- Power source;
- Indicator field parameter monitoring instrument;
- Decontamination supplies;
- Logbook and groundwater sampling forms
- Sample bottles;
- Sample preservation supplies, as required;
- Sample tags or labels;
- Well construction data and location map; and
- Well keys.

Groundwater will be purged using a portable, adjustable-flow rate peristaltic pump. Polyethylene tubing will be placed in each well and will remain in the well after the sampling event in order to minimize any cross-contamination in the wells. The tubing shall be used at each well to purge and sample the groundwater at the Sites.

### Decontamination of Sampling Equipment

For each monitoring well, sampling equipment coming in contact with groundwater in the well will be dedicated to that well. Therefore, decontamination of sampling equipment will not be required.

### Groundwater Sample Collection

The low flow purging and sampling procedure will be followed for collecting groundwater samples from monitoring wells. The groundwater samples from the monitoring wells will be collected as follows:

- Level D Personal Protective Equipment (PPE) will be donned for groundwater sampling. Open the well lock and cap and check methane concentration at the top of each well casing using a Combustible Gas Indicator (CGI) meter. Check the wellhead for volatile organics using a photoionization detector (PID). Record PID readings in the site logbook.
- Vent the monitoring well if explosive gas level exceeds 25 percent of Lower Explosive Limit (LEL). Check the wellhead again for volatile organics after venting the well for a minimum of five minutes.
- Measure the static water level of the well using the method specified in Subdivision 8.2 above, and record the readings in the field logbook. Also measure the total well depth prior to sampling. Calculate the number of linear feet of static water (total depth of well minus the depth to static water level). Calculate the volume of water in the 4-inch diameter PVC well pipe by multiplying the total linear feet times 0.653 gallons per foot of depth.
- Calculate depth from the top of casing to the midpoint of the screen, or well section open to the aquifer. Any dry wells encountered must be noted.
- During the first annual groundwater sampling, an oil-water interface probe will be employed to determine the presence of non-aqueous phase liquid (NAPL) in the groundwater. A sample of the NAPL will be collected if measurable quantities are present.
- Measure the water level before starting to purge the well. Start the pump at its lowest speed setting and slowly increase the speed until discharge occurs. Check water level. Adjust pump speed until there is little or no water level drawdown.
- Monitor and record water level. Measure pumping rate every three to five minutes using a graduated cylinder and stopwatch during purging. Record the pumping rate. The flow rate should be stabilized at approximately one liter/minute.

- The purged groundwater will be discharged onto the ground and allowed to percolate back into the soil in such a way as to avoid incidental discharge to surface water bodies.
- Water quality parameters (pH, conductivity, temperature, DO, turbidity and oxidation-reduction potential) will be measured every 3-5 minutes during well purging. Purging will proceed until all water quality parameters have stabilized. Stabilization is considered to be achieved when three consecutive readings are within the following limits: turbidity (10% for values greater than 1 NTU), DO (10%), conductivity (3%), temperature (3%), pH ( $\pm 0.1$  unit) and ORP ( $\pm 10$  millivolts). All measurements, except turbidity, will be obtained using a flow-through-cell and a water quality monitoring system. The final purge volume must be greater than the stabilized drawdown volume plus the extraction tubing volume.
- Water samples for laboratory analyses must be collected before the water has passed through the flow-through-cell (use a by-pass assembly, or disconnect tubing from the cell).
- In the event that recovery time of the well is very slow (e.g., 24 hours), sample collection can be delayed until the following day. If the well is incapable of producing a sufficient volume of sample at any time, obtain the largest sample quantity available and record in the logbook.
- Preservatives will be added to the sample bottles by the analytical laboratory, prior to delivering the bottleware to the site.
- After filling all laboratory bottleware, replace and lock the well cap. Label all sample bottles with the sample identification, date, time, analysis to be performed, and initials of the person collecting the samples. The sample label on the bottles will be taped over with clear packing tape to prevent smearing of the sample identification, if the bottles become wet during shipment. Sample shipping and Chain-of-Custody procedures are detailed below in Subdivision 8.5.

#### **8.4 SAMPLE DESIGNATION**

The objective of the sample identification system is to provide a framework for developing sample numbers that are unique to that sample, and convey information regarding sample type that will enable data users to easily identify sample locations. Each sample will be designated by an alpha-numeric code which will identify the site, sample location, matrix sampled, sample type, sample period, and contain a sequential sample number. For example:

**NWSE10-MW10-04-03-01**

Where:

**NWSE10** – Naval Weapons Station Earle, Site 10

**MW10-04** - Monitoring Well Number 04 From Site 10  
**03** - Sampled in 2003  
**01** - Sequential Number of the Sampling Round

Duplicate samples will be given a site identification label followed by a code to indicate which duplicate sample it represents. The location of each duplicate sample and time taken will be recorded in the field logbook by the sampling technician. Equipment blank (EB) samples may also be taken and will contain similar labels. The first duplicate sample taken from Site 10 in the third year of annual sampling will be labeled as follows: NWSE10-GW-DUP01-03

## **8.5 SAMPLE SHIPPING AND CHAIN OF CUSTODY CONTROL**

Samples will be packaged and shipped according to the Navy Installation Restoration Chemical Data Quality Manual (IR CDQM), September 1999. Chain-of-Custody forms, sample labels, custody seals, and other sample documents will be completed as specified in the above reference manual. All entries will be made in permanent ink. If errors are made when completing any of these forms, the error will be crossed out with a single line, initialed, and dated by the sampler.

Each sample will be labeled with the following minimum information:

- Site Name;
- Sample Identification number;
- Date and time of sample collection;
- Sample preservative, if used; and
- Type of analyses to be conducted.

The samples will be packed with sufficient ice (sealed in PE bags) to cool the samples to 4°C. Enough non-combustible adsorbent cushioning material will be used to minimize the possibility of container breakage. The large PE bag in the cooler will be sealed and the container closed. Custody seals and nylon strapping tape will be affixed to the cooler. All samples will be shipped within 24 hours of collection via a common carrier. All sample coolers and samples will be shipped in accordance with NJ DOT requirements and regulations.

A Chain-of-Custody (COC) record will be used to record the custody of the samples, and will accompany the samples at all times. The following information will be contained on the COC record:

- Site name;
- Signature of samplers;
- Sample identifier, date and time of collection, grab or composite;
- Sample matrix;
- Types of analysis to be conducted; and,
- Signatures of individuals involved in the sample transfer (i.e., relinquishing and accepting the samples).

## **8.6 SAMPLE ANALYSES**

The sample numbers, sampling matrix, sample containers/volume requirements, preservation techniques, holding time, laboratory analyses, method detection limit and field analyses requirements are presented in Table 8-1. The parameters to be analyzed for groundwater samples are listed in Tables 8-2 and 8-3.

## **8.7 EVALUATION OF ANALYTICAL DATA**

Following receipt of the groundwater analytical data, the results will be validated, reduced, and tabulated in a relational database format. Hard copies and an electric file of the data will be submitted to the regulatory agencies on an annual basis. The electronic copy of the data will conform to the NJDEP Electronic Data Deliverables (EDD) reporting format.

The analytical data at the completion of each round of groundwater sampling will be evaluated to ascertain which statistical method(s) would be most appropriate for analysis. Since most statistical methods require a minimum number of sampling points, normal distribution, and/or additional statistical assumptions, the Navy or its subcontractor will evaluate which method's assumptions are valid at the end of each sampling event, and select the most appropriate statistical method(s). The Navy will contact the regulatory agencies prior to using the selected statistical method for groundwater quality monitoring data evaluation.

**TABLE 8-2  
ANALYTICAL PARAMETERS**

**SITE 3**

|                               |
|-------------------------------|
| Aluminum, Total and Dissolved |
| Antimony, Total and Dissolved |
| Arsenic, Total and Dissolved  |
| Cadmium, Total and Dissolved  |
| Iron, Total and Dissolved     |

Note: Refer to Table 8-1 for the sample numbers, sampling matrix, sample containers/volume requirements, preservation techniques, holding time, laboratory analyses and method detection limit.

**TABLE 8-3  
ANALYTICAL PARAMETERS**

**SITE 10**

|                                |
|--------------------------------|
| Aluminum, Total and Dissolved  |
| Iron, Total and Dissolved      |
| Manganese, Total and Dissolved |

Note: Refer to Table 8-1 for the sample numbers, sampling matrix, sample containers/volume requirements, preservation techniques, holding time, laboratory analyses and method detection limit.

## **DIVISION 9 - LANDFILL GAS MONITORING**

### **9.1 LANDFILL GAS MONITORING PROGRAM**

The landfill gas monitoring program will consist of conducting field measurements of the landfill gas vents during the periodic monitoring of the site. These measurements will be taken quarterly for the first two years of the post-closure care period and annually for the remainder of the post-closure care period. The field measurements will be used to determine if a more extensive gas monitoring program or gas collection system will need to be established. Measurements of the Lower Explosive Limit (LEL) that exceed 5% in the air surrounding the gas vents will be used to evaluate if samples of the landfill gas need to be taken. If needed, the landfill gas monitoring program will be altered as noted in the Feasibility Study (FS) or the final Record of Decision (ROD) for the site.

### **9.2 SCREENING EQUIPMENT AND PROCEDURES**

A combustible gas indicator (CGI) will be used to field screen each of the landfill gas vents for total combustible gases. The instrument will be calibrated in the field at a location upwind of the respective landfill site at which the sampling is being performed prior to performing the field analysis. The results of the field analysis will be documented in a field logbook and reported as indicated on Table 10-1.

## **DIVISION 10 - RECORDKEEPING, REPORTING AND MONITORING**

### **10.1 RECORDKEEPING**

Site-specific maintenance and monitoring forms for recordkeeping are included in Appendix C of this manual. The repair, maintenance and monitoring records will be kept for at least a thirty-year period after the closure of the site. The records will be maintained in the Administrative Records at the Naval Weapons Station Earle. The records and reports to be kept are listed in Table 10-1.

### **10.2 REPORTING**

#### Reporting to the Regulatory Agencies

Table 10-1 identifies the selected monitoring reports, maintenance and repair records and survey reports for distribution to the NJDEP and the USEPA. These submittals will be made to NJDEP (2 copies) and the USEPA (3 copies) within 60 days from the date of the activity.

#### Internal Reporting

All of the reports and records identified in Table 10-1 will be distributed for internal use as follows:

- M. DiGeambeardino - 2 copies
- L. Burg - 1 copy
- D. Zari - 1 copy

The inspection reports will be distributed within one week from the date of inspection. The monitoring reports, maintenance and repair records and the survey reports will be distributed within 30 days from the date of completion of an activity.

#### Distribution Addresses

New Jersey Department of Environmental Protection (NJDEP)  
401 E. State Street  
CN 028  
Trenton, NJ 08625  
ATTN: R. Marcolina

United States Environmental Protection Agency Region II  
18<sup>th</sup> Floor East  
290 Broadway  
New York, NY 10007  
ATTN: Jessica Mollin

**TABLE 10-1  
MAINTENANCE AND MONITORING RECORDKEEPING**

| NO. | DESCRIPTION   | TO AGENCY                                 | NAVY  |
|-----|---|---|---|
| 1.  | <b>Facility Inspection Report</b><br>1. Landfill cap inspection<br>2. Storm drainage system inspection<br>3. Gas monitoring vents inspection<br>4. Access road inspection<br>5. Vegetation inspection<br>6. Groundwater monitoring system inspection<br>7. Perimeter fence, gate and sign inspection  | No<br>No<br>No<br>No<br>No<br>No<br>No    | Yes<br>Yes<br>Yes<br>Yes<br>Yes<br>Yes<br>Yes |
| 2.  | <b>Survey Reports</b><br>1. Surveyed elevation on the settling monuments  | Yes                                       | Yes   |
| 3.  | <b>Maintenance and Repair Records</b><br>1. Landfill cap maintenance and repair records<br>2. Storm drainage system maintenance and repair records<br>3. Gas monitoring vents maintenance and repair record<br>4. Access road maintenance/repair records<br>5. Perimeter fence, gate or sign maintenance and repair records<br>6. Vegetation replanting and maintenance records<br>7. Groundwater monitoring well maintenance records | Yes<br>No<br>Yes<br>No<br>No<br>No<br>Yes | Yes<br>Yes<br>Yes<br>Yes<br>Yes<br>Yes<br>Yes |
| 4.  | <b>Monitoring Reports</b><br>1. Gas monitoring reports<br>2. Groundwater monitoring well sampling/analysis and water level measurement reports  | Yes<br>Yes                                | Yes<br>Yes                                    |

Mr. Larry Burg  
Environmental Engineer  
Naval Weapons Station Earle  
201 Highway 34 South  
Building C-2  
Colts Neck, NJ 07722-5025

Commanding Officer  
Engineering Field Activity, Northeast  
Naval Facilities Engineering Command  
10 Industrial Highway, Mail Stop #82  
Lester, PA 19113  
ATTN: Code EV21 (Michele DiGeambeardino)

ROICC  
Naval Weapons Station Earle  
Building C-23  
201 Highway 34 South  
Colts Neck, NJ 07722-5025  
ATTN: Dan Zari  
(732) 866-2046

### **10.3 FREQUENCY OF MONITORING**

The site-specific monitoring frequencies for each activity are discussed in individual sections. The frequency of maintenance and monitoring are summarized in Table 10-2.

**TABLE 10-2  
MAINTENANCE AND MONITORING FREQUENCY**

| <b>Maintenance and Monitoring</b>                              | <b>Frequency</b>  |
|--|---|
| 1. Inspection of landfill cap                                  | Quarterly for the first two years and semiannually thereafter.    |
| 2. Settlement survey of gas vents                              | Once per year.  |
| 3. Inspection of storm water drainage system                   | Quarterly during the first two years and semiannually thereafter. |
| 4. Gas monitoring vents inspection                             | Quarterly during the first two years and semiannually thereafter. |
| 5. Gas monitoring vents monitoring                             | Quarterly during first two years and annually thereafter.         |
| 6. Access road inspection                                      | Quarterly during the first two years and semiannually thereafter. |
| 7. Perimeter cable fence/gate, and sign inspection             | Quarterly during the first two years and semiannually thereafter. |
| 8. Vegetation inspection                                       | Quarterly during the first two years and semiannually thereafter. |
| 9. Vegetation maintenance                                      | Mowing once in early fall.  |
| 10. Groundwater monitoring well inspection                     | Quarterly during the first two years and semiannually thereafter. |
| 11. Groundwater level measurements (for all monitoring wells). | Once per year during groundwater sampling.                        |
| 12. Groundwater sampling/analysis                              | Annually for the entire post-closure care period.                 |

**APPENDIX A**  
**CONSTRUCTION DRAWINGS**

**CONTRACT DRAWINGS**

**FINAL DESIGN CONSTRUCTION DRAWINGS**

**Landfill Cap – Site 3**

# FINAL DESIGN CONSTRUCTION DRAWINGS

## LANDFILL CAP - SITE 3

### NAVAL WEAPONS STATION EARLE

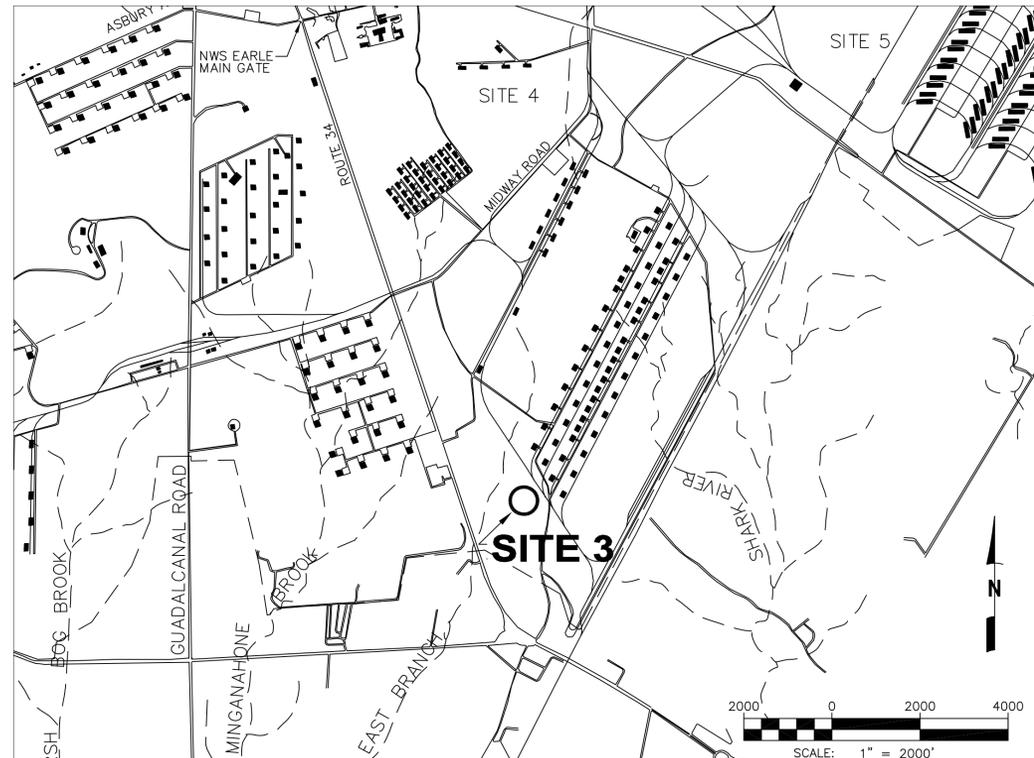
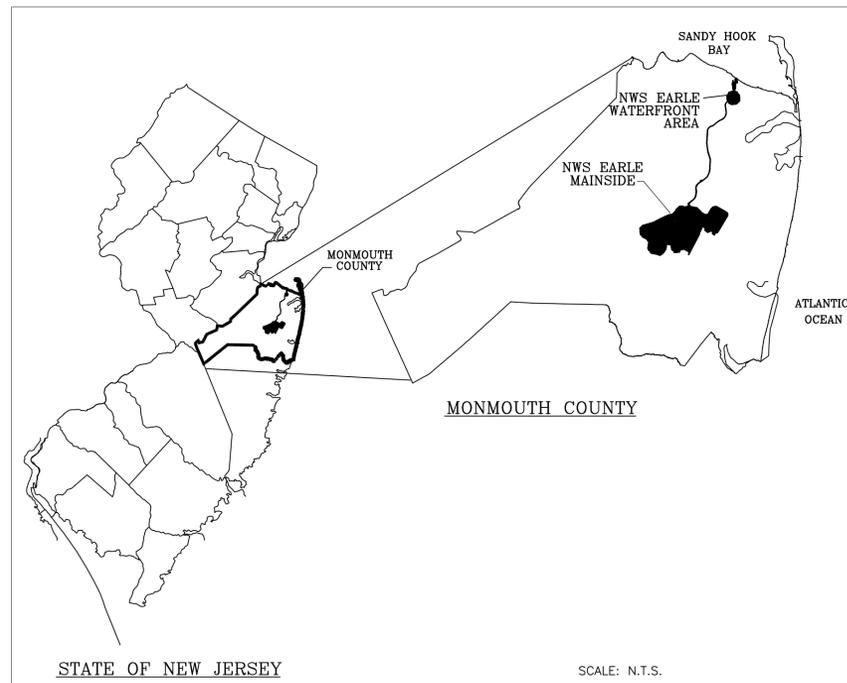
#### COLTS NECK, MONMOUTH COUNTY, NEW JERSEY

#### RAC CONTRACT NO. N62472-99-D-0032

DRAWING INDEX:

| <u>DRAWING NO.</u> | <u>DRAWING TITLE</u>  |
|--------------------|---|
| T-1                | TITLE SHEET   |
| C-1                | GENERAL NOTES AND PROPOSED SEQUENCE OF CONSTRUCTION                   |
| C-2                | SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS                   |
| C-3                | EXISTING SITE CONDITIONS  |
| C-4                | CLEARING AND GRUBBING, AND SOIL EROSION AND SEDIMENT CONTROL MEASURES |
| C-5                | FINAL GRADING PLAN  |
| C-6                | CAP SECTIONS AND DETAILS AND STORMWATER MANAGEMENT DETAILS            |
| C-7                | PROPOSED FEATURES   |
| C-8                | FEATURES DETAILS  |
| C-9                | PROPOSED SITE ACCESS ROAD SECTION                                     |

| <u>DRAWING NO.</u> | <u>DRAWING TITLE</u> |
|--------------------|----------------------|
| C-10               | GRADING SECTIONS     |
| C-11               | GRADING SECTIONS     |
| C-12               | GRADING SECTIONS     |
| C-13               | GRADING SECTIONS     |
| C-14               | GRADING SECTIONS     |
| C-15               | GRADING SECTIONS     |
| C-16               | SWALE PROFILES       |

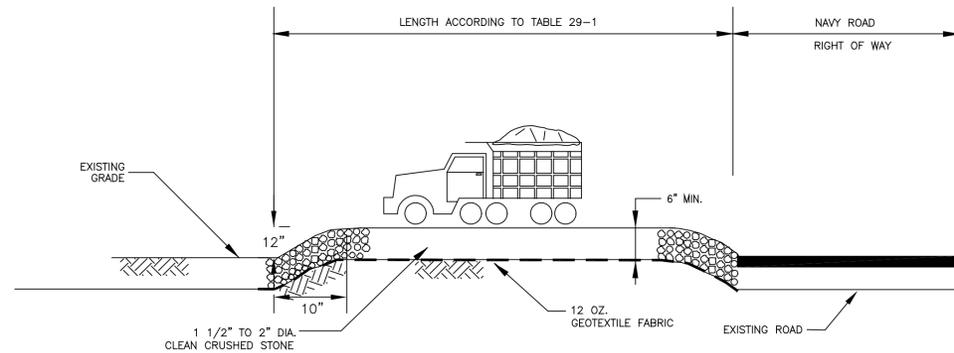
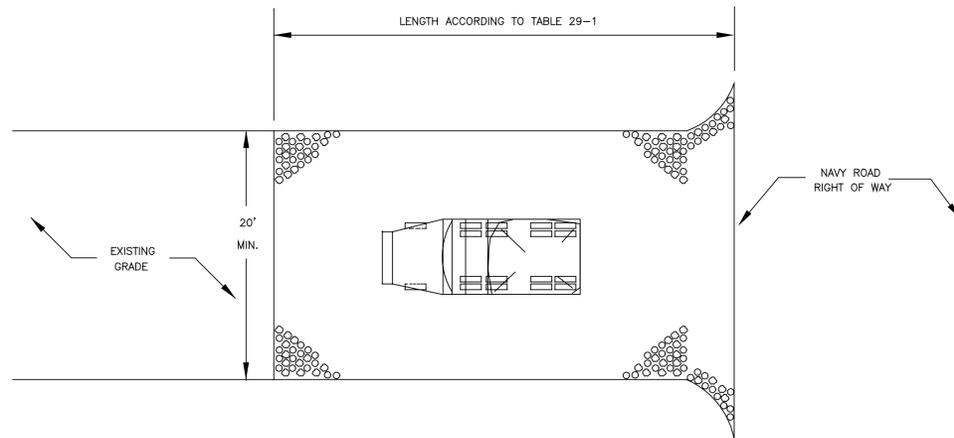


|  |  |      |             |             |      |             |      |
|--|--|------|-------------|-------------|------|-------------|------|
| <br><small>                 SUBMITTED BY: (FIRM NUMBER)<br/>                 APPROVED BY: (DATE)<br/>                 DATE:             </small>   | FOSTER WHEELER ENVIRONMENTAL<br><small>                 CHK: JAA<br/>                 DATE:             </small> | REV. | DESCRIPTION | PREPARED BY | DATE | REVIEWED BY | DATE |
| DEPARTMENT OF THE NAVY<br>NAVAL FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY<br>NAVAL WEAPONS STATION EARLE<br>COLTS NECK<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 3<br>TITLE SHEET |  |      |             |             |      |             |      |
| APPROVED<br>KEVIN FITZGERALD, P.E.<br>N.J.P.E. NO. GE31825<br>SAT TO: 7/26/02<br>DATE:   |  |      |             |             |      |             |      |
| CODE ID. NO.<br>SCALE: AS NOTED<br>SPEC. NO.<br>CONSTR. CONTR. NO.<br>N62472-99-D-0032<br>NAVFAC DRAWING NO.   |  |      |             |             |      |             |      |
| SHEET 1 OF 17<br>SIZE: D DIS. SH. NO. T-1  |  |      |             |             |      |             |      |



**SOIL EROSION AND SEDIMENT CONTROL NOTES**

- ALL SOIL EROSION AND SEDIMENT CONTROL PRACTICES ARE TO BE INSTALLED PRIOR TO ANY MAJOR SOIL DISTURBANCE AND MAINTAINED UNTIL PERMANENT PROTECTION IS ESTABLISHED.
- ANY DISTURBED AREAS THAT SHALL BE LEFT EXPOSED MORE THAN THIRTY (30) DAYS, AND NOT SUBJECT TO CONSTRUCTION TRAFFIC, SHALL IMMEDIATELY RECEIVE A TEMPORARY SEEDING. IF THE SEASON PREVENTS THE ESTABLISHMENT OF A TEMPORARY COVER, THE DISTURBED AREAS SHALL BE MULCHED WITH STRAW, OR EQUIVALENT MATERIAL, AT A RATE OF TWO (2) TONS PER ACRE, ACCORDING TO STATE STANDARDS.
- PERMANENT VEGETATION TO BE SEEDING OR SODDED ON ALL EXPOSED AREAS WITHIN TEN (10) DAYS AFTER FINAL GRADING. MULCHING IS REQUIRED ON ALL SEEDING. WHEN HYDROSEEDING, MULCH SHALL NOT BE INCLUDED IN THE TANK WITH THE SEED.
- ALL WORK TO BE DONE IN ACCORDANCE WITH THE STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL OF NEW JERSEY.
- A SUBBASE COURSE WILL BE APPLIED IMMEDIATELY FOLLOWING ROUGH GRADING AND INSTALLATION OF IMPROVEMENTS TO STABILIZE STREETS, ROADS, DRIVEWAYS AND PARKING AREAS. IN AREAS WHERE NO UTILITIES ARE PRESENT, THE SUBBASE SHALL BE INSTALLED WITHIN FIFTEEN (15) DAYS OF THE PRELIMINARY GRADING.
- IMMEDIATELY FOLLOWING INITIAL DISTURBANCE OR ROUGH GRADING, ALL CRITICAL AREAS SUBJECT TO EROSION (I.E. STEEP SLOPES AND ROADWAY EMBANKMENTS) SHALL RECEIVE A TEMPORARY SEEDING IN COMBINATION WITH STRAW MULCH OR A SUITABLE EQUIVALENT, AT A RATE OF TWO (2) TONS PER ACRE, ACCORDING TO STATE STANDARDS.
- ANY SLOPES GREATER THAN 3H:1V RECEIVING PIPELINE INSTALLATION SHALL BE BACKFILLED AND STABILIZED DAILY, AS THE INSTALLATION CONTINUES.
- THE STANDARD FOR STABILIZED CONSTRUCTION ACCESS REQUIRES THE INSTALLATION OF A STONE PAD OF 1 1/2" TO 2" STONE, AT ALL CONSTRUCTION DRIVEWAYS, IMMEDIATELY AFTER INITIAL SITE DISTURBANCE.
- IN ACCORDANCE WITH THE STANDARD FOR MANAGEMENT OF HIGH ACID PRODUCING SOILS, ANY SOIL HAVING A pH OF 4 OR LESS OR CONTAINING IRON SULFIDES SHALL BE COVERED WITH A MINIMUM OF TWELVE (12) INCHES OF SOIL HAVING A pH OF 5 OR MORE PRIOR TO SEED BED PREPARATION. AREAS WHERE TREES OR SHRUBS ARE TO BE PLANTED SHALL BE COVERED WITH A MINIMUM OF TWENTY-FOUR (24) INCHES OF SOIL HAVING A pH OF 5 OR MORE.
- THE FREEHOLD SOIL CONSERVATION DISTRICT SHALL BE NOTIFIED SEVENTY-TWO (72) HOURS IN ADVANCE OF ANY LAND DISTURBING ACTIVITY.
- AT THE TIME THE SITE PREPARATION FOR PERMANENT VEGETATIVE STABILIZATION IS GOING TO BE ACCOMPLISHED, ANY SOIL THAT WILL NOT PROVIDE A SUITABLE ENVIRONMENT TO SUPPORT ADEQUATE VEGETATIVE GROUND COVER, SHALL BE REMOVED OR TREATED IN SUCH A WAY THAT IT WILL PERMANENTLY ADJUST THE SOIL CONDITIONS AND RENDER IT SUITABLE FOR VEGETATIVE GROUND COVER. IF THE REMOVAL OR TREATMENT OF THE SOIL WILL NOT PROVIDE SUITABLE CONDITIONS, NONVEGETATIVE MEANS OF PERMANENT GROUND STABILIZATION SHALL BE EMPLOYED.
- IN THAT N.J.S.A. 4:24-39 ET. SEQ. REQUIRES THAT NO CERTIFICATES OF OCCUPANCY BE ISSUED BEFORE THE PROVISIONS OF THE CERTIFIED PLAN FOR EROSION CONTROL HAVE BEEN COMPLIED WITH FOR PERMANENT MEASURES, ALL SITE WORK FOR SITE PLANS AND ALL WORK AROUND INDIVIDUAL LOTS IN SUBDIVISIONS, SHALL BE COMPLETED PRIOR TO THE DISTRICT ISSUING A REPORT OF COMPLIANCE FOR THE ISSUANCE OF A CERTIFICATE OF OCCUPANCY BY THE MUNICIPALITY.
- CONDUIT OUTLET PROTECTION MUST BE INSTALLED AT ALL REQUIRED OUTFALLS PRIOR TO THE DRAINAGE SYSTEM BECOMING OPERATIONAL.
- ANY CHANGES TO THE CERTIFIED SOIL EROSION AND SEDIMENT CONTROL PLANS SHALL REQUIRE THE SUBMISSION OF REVISED SOIL EROSION AND SEDIMENT CONTROL PLANS TO THE DISTRICT FOR RECERTIFICATION. THE REVISED PLANS MUST MEET ALL CURRENT STATE SOIL EROSION AND SEDIMENT CONTROL STANDARDS.
- UNFILTERED DEWATERING IS NOT PERMITTED. TAKE ALL NECESSARY PRECAUTIONS DURING ALL DEWATERING OPERATIONS TO MINIMIZE SEDIMENT TRANSFER. ANY DEWATERING METHODS USED MUST BE IN ACCORDANCE WITH STATE STANDARDS.
- SHOULD THE CONTROL OF DUST AT THE SITE BE NECESSARY, THE SITE SHALL BE SPRINKLED UNTIL THE SURFACE IS WET. TEMPORARY VEGETATIVE COVER SHALL BE ESTABLISHED OR MULCH SHALL BE APPLIED IN ACCORDANCE WITH STATE STANDARDS FOR EROSION CONTROL.
- ALL SOIL WASHED, DROPPED, SPILLED, OR TRACKED OUTSIDE THE LIMIT OF DISTURBANCE OR ONTO PUBLIC RIGHTS-OF-WAY SHALL BE REMOVED IMMEDIATELY.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY EROSION OR SEDIMENTATION THAT MAY OCCUR BELOW STORMWATER OUTFALLS OR OFFSITE AS A RESULT OF CONSTRUCTION OF THE PROJECT.
- STOCKPILE AND STAGING LOCATIONS DETERMINED IN THE FIELD SHALL BE PLACED WITHIN THE LIMIT OF DISTURBANCE ACCORDING TO THE CERTIFIED PLAN. STAGING AND STOCKPILES NOT LOCATED WITHIN THE LIMIT OF DISTURBANCE SHALL REQUIRE CERTIFICATION OF A REVISED SOIL EROSION AND SEDIMENT CONTROL PLAN. THE DISTRICT RESERVES THE RIGHT TO DETERMINE WHEN CERTIFICATION OF A NEW AND SEPARATE SOIL EROSION AND SEDIMENT CONTROL PLAN IS REQUIRED FOR THESE ACTIVITIES.
- ALL SOIL STOCKPILES ARE TO BE TEMPORARILY STABILIZED IN ACCORDANCE WITH SOIL EROSION AND SEDIMENT CONTROL NOTE #2.
- ALL SILT FENCE WILL BE CHECKED REGULARLY FOR UNDERMINING OR DETERIORATION OF THE FABRIC. SEDIMENT WILL BE REMOVED WHEN THE LEVEL OF SEDIMENT DEPOSITION REACHES HALF OF THE HEIGHT OF THE FABRIC.

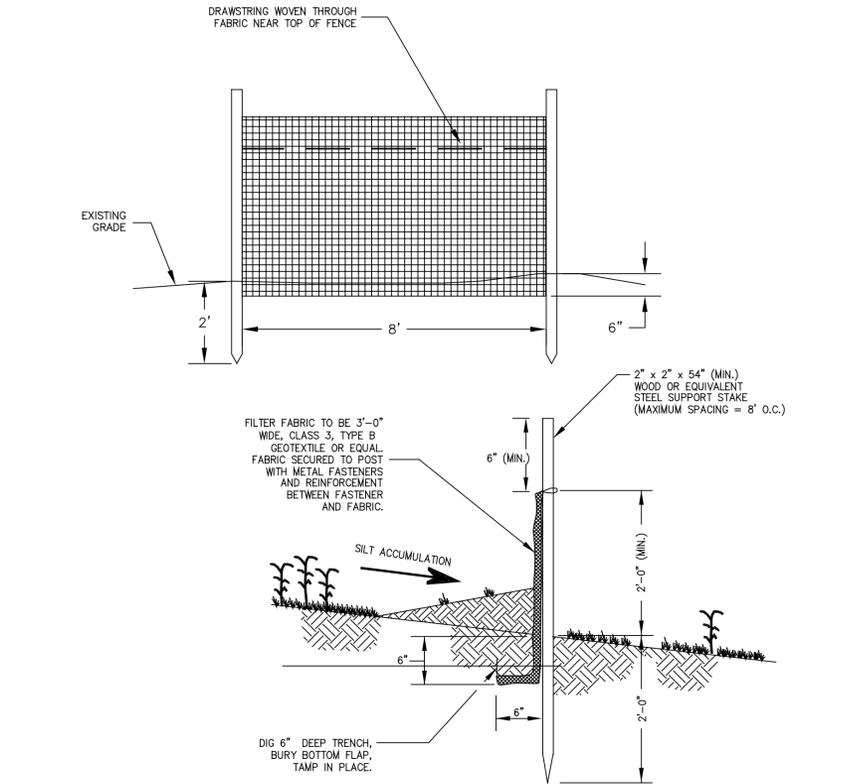


**TABLE 29-1: LENGTHS OF CONSTRUCTION EXITS ON SLOPING ROADBEDS**

| PERCENT SLOPE OF ROADWAY | LENGTH OF STONE REQUIRED                                     |                    |
|--------------------------|--|--------------------|
|                          | COARSE GRAINED SOILS   | FINE GRAINED SOILS |
| 0 TO 2%                  | 50 FT.   | 100 FT.            |
| 2 TO 5%                  | 100 FT.  | 200 FT.            |
| >5%                      | ENTIRE SURFACE STABILIZED WITH FABC BASE COURSE <sup>1</sup> |                    |

1. AS PRESCRIBED BY LOCAL ORDINANCE OR GOVERNING AUTHORITY.

DETAIL 1 STABILIZED CONSTRUCTION ACCESS/EGRESS PLAN VIEW AND SECTION



DETAIL 2 SILT FENCE CONSTRUCTION AND INSTALLATION (TYP)

DETAIL 3 DECONTAMINATION PAD DETAIL

**TEMPORARY SEEDING SPECIFICATIONS**

| ZONE 7 a, b SEED MIXTURE* (FROM TABLE 7-2 NEW JERSEY SESC STANDARDS) |                          |                            |                 |                                |                 |
|--|--------------------------|----------------------------|-----------------|--------------------------------|-----------------|
| SPECIES  | APPLICATION RATE (LB/AC) | SEEDING DATES              | SEEDING DEPTH** | FERTILIZER RATE (10-20-10)     | LIME RATE       |
| PERENNIAL RYE GRASS  | 100 LB/AC                | 2/15 - 5/1<br>8/15 - 10/15 | 1/2 INCH        | 500 LB/AC<br>(11 LB/1000 S.F.) | 90 LB/1000 S.F. |
| PEARL MILLET   | 20 LB/AC                 | 5/1 - 9/1                  | 1.0 INCH        |                                |                 |

\* SEE TABLE 7-2 NEW JERSEY STANDARDS FOR SOIL EROSION AND SEDIMENT CONTROL FOR SPECIES SUITABLE FOR PLANTING OTHER THAN THOSE SPECIFIED IN THE TABLE ABOVE.

\*\* TWICE THE DEPTH FOR SANDY SOIL.

- APPLY GROUND LIMESTONE AT A RATE OF 90 LB PER 1000 S.F.
- APPLY FERTILIZER (10-20-10) AT A RATE OF 11 LB PER 1000 S.F.
- APPLY PERENNIAL RYEGRASS SEED AT 100 LB PER ACRE AND PEARL MILLET AT 20 LB PER ACRE.
- APPLY HAY OR STRAW MULCH AT A RATE OF 90 LB PER 1000 S.F.
- APPLY A LIQUID MULCH BINDER OR TACK TO STRAW OR HAY MULCH.

**PERMANENT SEEDING SPECIFICATIONS**

| UNITED STATES DEPARTMENT OF THE NAVY SEED MIXTURE |                          |                            |                |                                |                                  |
|---|--------------------------|----------------------------|----------------|--------------------------------|----------------------------------|
| SPECIES   | APPLICATION RATE (LB/AC) | SEEDING DATES              | SEEDING DEPTH  | FERTILIZER RATE (10-20-10)     | LIME RATE                        |
| TALL FESCUE                                       | 75 LB/AC                 | 3/15 - 4/30<br>8/15 - 9/30 | 1/4 - 1/2 INCH | 870 LB/AC<br>(20 LB/1000 S.F.) | 2,178 LB/AC<br>(50 LB/1000 S.F.) |
| SERICEA LESPEDEZA                                 | 60 LB/AC                 | 3/15 - 4/30<br>8/15 - 9/30 | 1/4 - 1/2 INCH |                                |                                  |

- APPLY TOPSOIL TO A DEPTH OF 6 INCHES (UNCOMPACTED).
- APPLY GROUND LIMESTONE AT A RATE OF 50 LB PER 1000 S.F. AND WORK FOUR INCHES INTO SOIL.
- APPLY FERTILIZER (10-20-10) AT A RATE OF 20 LB PER 1000 S.F.
- APPLY TALL FESCUE SEED AT 75 LB PER ACRE AND SERICEA LESPEDEZA AT 60 LB PER ACRE.
- APPLY HAY OR STRAW MULCH AT A RATE OF 90 LB PER 1000 S.F.
- APPLY A LIQUID MULCH BINDER OR TACK TO STRAW OR HAY MULCH.

**DUST CONTROL NOTES**

| MATERIAL   | WATER DILUTION  | TYPE OF NOZZLE | APPLY GALLON/ACRE |
|--|---|----------------|-------------------|
| LATEX EMULSION   | 12.5:1  | FINE SPRAY     | 235               |
| RESIN IN WATER   | WATER DILUTION  | TYPE OF NOZZLE | APPLY GALLON/ACRE |
| POLYACRYLAMIDE (PAM)-SPRY ON<br>POLYACRYLAMIDE (PAM)-DRY SPRAY | APPLY ACCORDING TO MANUFACTURER'S INSTRUCTIONS MAY ALSO BE USED AS AN ADDITIVE TO SEDIMENT BASINS TO FLOCCULATE AND PRECIPITATE SUSPENDED COLLOIDS. SEE SEDIMENT BASIN STANDARD |                |                   |
| ACIDULATED SOY BEAN SOAP STICK                                 | NONE  | COARSE SPRAY   | 1200              |

**DUST CONTROL NOTES**

- MULCHES - SEE STANDARD FOR STABILIZATION WITH MULCHES
- VEGETATIVE COVER - SEE STANDARD FOR TEMPORARY VEGETATIVE COVER, PERMANENT VEGETATIVE COVER FOR SOIL STABILIZATION, AND PERMANENT STABILIZATION WITH SOD.
- SPRAY-ON ADHESIVES - ON MINERAL SOILS (NOT EFFECTIVE ON MUCK SOILS). KEEP TRAFFIC OFF THESE AREAS.
- TILLAGE - TO ROUGHEN SURFACE AND BRING CLODS TO THE SURFACE. THIS IS A TEMPORARY EMERGENCY MEASURE WHICH SHOULD BE USED BEFORE SOIL BLOWING STARTS. BEGIN PLOWING ON WINDWARD SIDE OF SITE. CHISEL-TYPE PLOWS SPACED ABOUT 12 INCHES APART, AND SPRING-TOOTHED HARROWS ARE EXAMPLES OF EQUIPMENT WHICH MAY PRODUCE THE DESIRED EFFECT.
- SPRINKLING - SITE IS SPRINKLED UNTIL THE SURFACE IS WET.
- BARRIERS - SOLID BOARD FENCES, SNOW FENCES, BURLAP FENCES, CRATE WALLS, BALES OF HAY, AND SIMILAR MATERIAL CAN BE USED TO CONTROL AIR CURRENTS AND SOIL ACCUMULATION AROUND PLANTS.
- CALCIUM CHLORIDE - SHALL BE IN THE FORM OF LOOSE, DRY GRANULATES OF FLAKES FINE ENOUGH TO FEED THROUGH COMMONLY USED SPREADERS AT A RATE THAT WILL KEEP SURFACE MOIST BUT NOT CAUSE POLLUTION OR PLANT DAMAGE. IF USED ON STEEPER SLOPES, THEN USE OTHER PRACTICES TO PREVENT WASHING INTO STREAMS, OR ACCUMULATION AROUND PLANTS.
- STONE - COVER SURFACE WITH CRUSHED STONE OR COARSE GRAVEL.

FOSTER WHEELER ENVIRONMENTAL

DATE: 7/26/02

PREP BY: [Name]

DESCRIPTION: NAVAL WEAPONS STATION EARLE - LANDFILL CAP - SITE 3

REV. 1: [Description]

SCALE: N.T.S.

CONSTR. CONTR. NO. N62472-99-D-0032

SHEET 3 OF 17

SIZE: D C-2



**LEGEND:**

- SOIL BORING LOCATION
- EXISTING MONITORING WELL
- EXISTING SPOT ELEVATION
- APPROXIMATE LANDFILL BOUNDARY
- TREELINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING REINFORCED CONCRETE PIPE
- EXISTING ROAD

Scale: 1"=40'

0 40 80 120

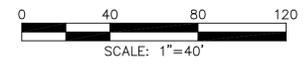
**SOURCE:**  
 TOPOGRAPHIC PLAN - SITE NO. 3, BOUCHER AND JAMES, INC.,  
 DOYLESTOWN, PA, DRAWN: JPD, CHECKED: CJB, SHEET: 1 OF 1,  
 DATE: JUNE 22, 2001.

|  |  |  |             |   |      |
|--|--|--|-------------|---|------|
| DEPARTMENT OF THE NAVY<br>LESTER<br>COIT'S NECK  |  | NAVAL FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY |             | FOSTER WHEELER ENVIRONMENTAL<br>CHIEF ENGINEER<br>DATE: 7/26/02 |      |
| EFA NORTHEAST<br>NAVAL WEAPONS STATION EARLE<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 3<br>EXISTING SITE CONDITIONS |  | REV.   | DESCRIPTION | PREP BY   | DATE |
| APPROVED<br>KEVIN FITZGERALD, P.E.<br>N.A.F.E. NO. 6E31825   |  | APPROVED FOR COMMANDER, NAVFAC                                     |             | OFFICER IN CHARGE   |      |
| SAT TO   |  | DATE   |             | DATE  |      |
| CODE LD. NO.<br>SCALE: 1"=40'  |  | CONSTRN. CONTR. NO.<br>N62472-99-D-0032                            |             | SHEET 4 OF 17   |      |
| SPEC. NO.  |  | NAVFAC DRAWING NO.   |             | DIS. SH. NO.  |      |
| SIZE:  |  | DIS. SH. NO.   |             | DATE  |      |
| D  |  | C-3  |             | DATE  |      |



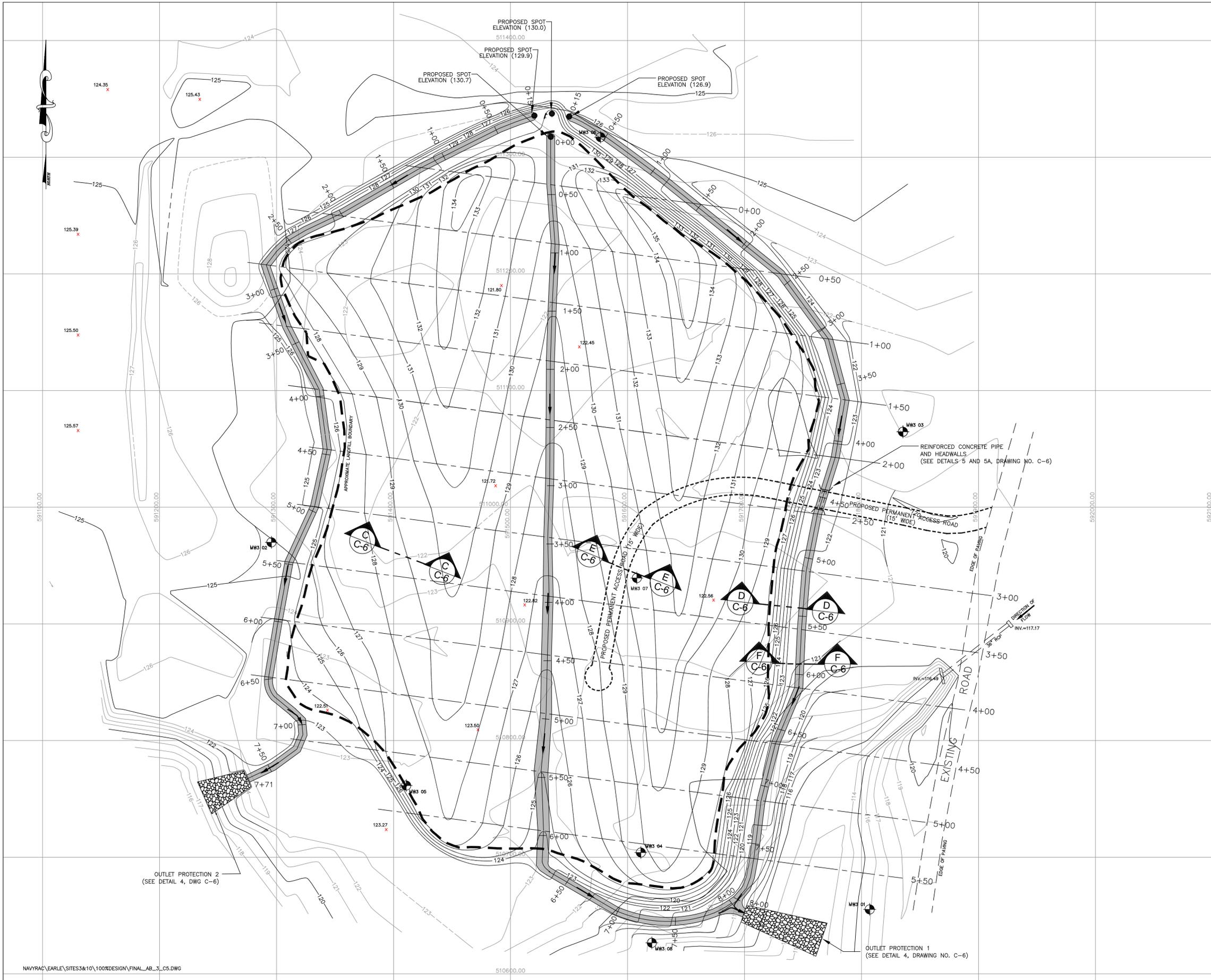
**NOTES:**  
 1. SILT FENCE IS LOCATED 1' WITHIN CLEARING AND GRUBBING BOUNDARY LINE.  
 2. CONTRACTOR SHALL DEMOLISH EXISTING SHEDS AND DISPOSE OFF-SITE ALL DEMOLITION DEBRIS OFF-SITE.

- LEGEND:**
- △ or ⊕ SOIL BORING LOCATION
  - ⊕ EXISTING MONITORING WELL
  - x113.33 EXISTING SPOT ELEVATION
  - - - - - APPROXIMATE LANDFILL BOUNDARY
  - ~ TREELINE
  - SILT FENCE
  - LIMITS OF DISTURBANCE
  - ▨ AREA TO BE CLEARED AND GRUBBED
  - - - - - EXISTING MAJOR CONTOUR
  - - - - - EXISTING MINOR CONTOUR
  - || RCP EXISTING REINFORCED CONCRETE PIPE
  - - - - - EXISTING ROAD



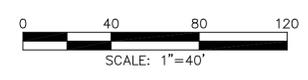
**SOURCE:**  
 TOPOGRAPHIC PLAN - SITE NO. 3, BOUCHER AND JAMES, INC., DOYLESTOWN, PA, DRAWN: JPD, CHECKED: CJB, SHEET: 1 OF 1, DATE: JUNE 22, 2001.

|  |  |   |  |   |  |
|--|--|---|--|---|--|
| DEPARTMENT OF THE ARMY<br>LESTER<br>COLTS NECK   |  | NVAE FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY |  | FOSTER WHEELER ENVIRONMENTAL<br>DATE: 7/26/02<br>CH. ENG. NO.:<br>CHIEF ENGINEER:<br>(TITLE)<br>(NAME)<br>(PHONE NUMBER)<br>(FAX)<br>(E-MAIL)<br>(CELL)<br>(HOME)<br>(OFFICE)<br>(FACILITY) |  |
| EFA NORTH/EAST<br>NAVAL WEAPONS STATION EARLE<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 3<br>CLEARING AND GRUBBING, AND SOIL EROSION AND SEDIMENT CONTROL MEASURES |  | REV. DESCRIPTION<br>PREP BY DATE APPROVD                          |  | DATE  |  |
| KEVIN FITZGERALD, P.E.<br>NJPE NO. GE31825   |  | DATE<br>7/26/02   |  | CODE ID. NO.<br>SCALE: 1"=40'<br>SPEC. NO.<br>CONSTR. CONTR. NO.<br>N62472-99-D-0032<br>NAVFAC DRAWING NO.  |  |
| SHEET 5 OF 17<br>DIS. SH. NO.  |  | DATE  |  | APPROVED  |  |
| D  |  | C-4   |  | DATE  |  |



- NOTES:**
1. THE PROPOSED DRAINAGE SWALES SHALL HAVE MINIMUM SLOPE ALONG THEIR CENTERLINES AS SHOWN ON SHEET C-7.
  2. THE CONTRACTOR SHALL MAINTAIN A MINIMUM DEPTH OF 1.5 FEET IN THE PROPOSED DRAINAGE SWALE.
  3. SECTION DETAILS A AND B ARE NOT USED.
  4. A 30 FOOT DIAMETER TURN AROUND WILL BE INSTALLED AT THE END OF THE ACCESS ROAD.

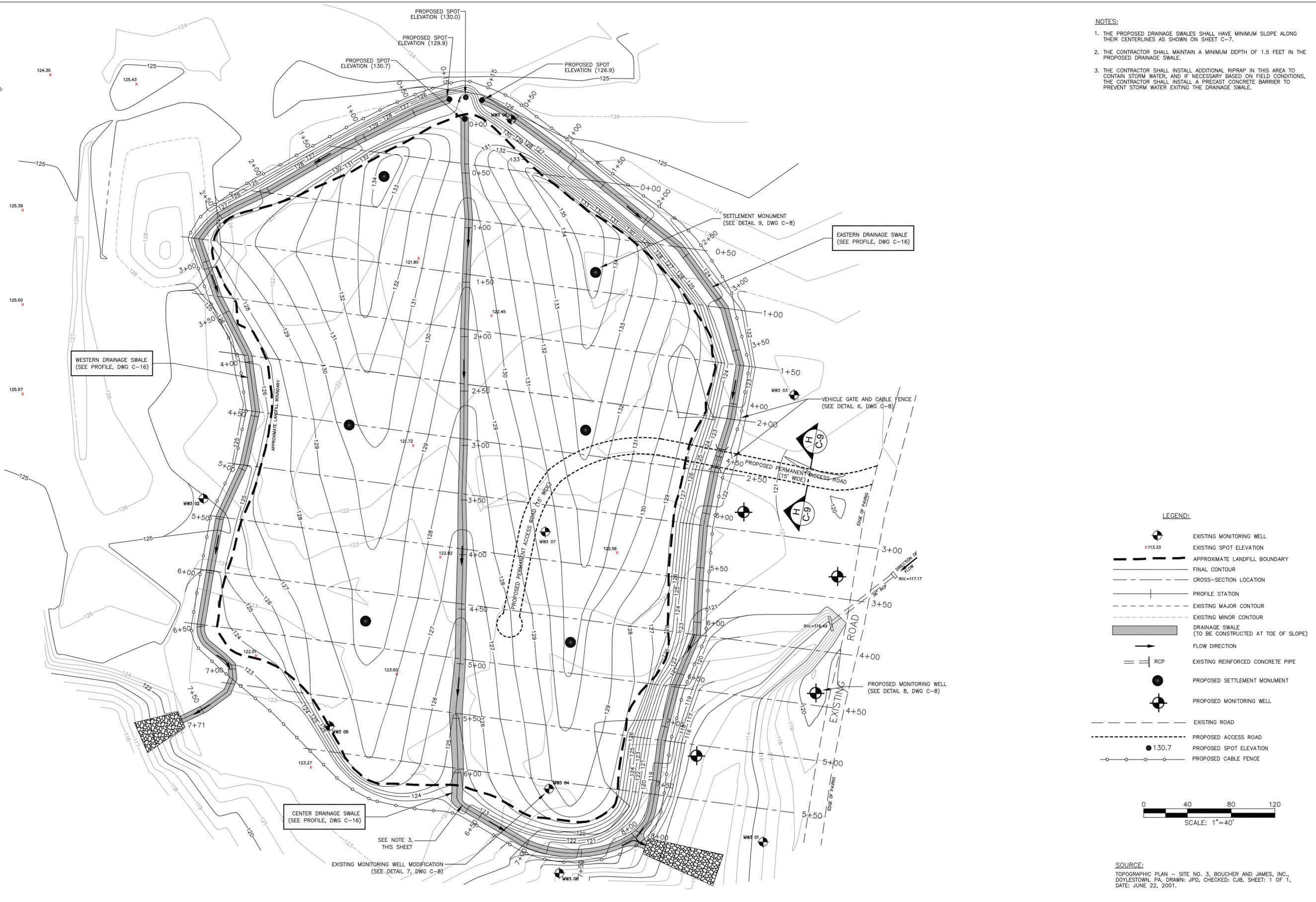
- LEGEND:**
- EXISTING MONITORING WELL
  - EXISTING SPOT ELEVATION
  - APPROXIMATE LANDFILL BOUNDARY
  - FINAL CONTOUR
  - CROSS-SECTION LOCATION
  - PROFILE STATION
  - EXISTING MAJOR CONTOUR
  - EXISTING MINOR CONTOUR
  - DRAINAGE SWALE (TO BE CONSTRUCTED AT TOE OF SLOPE)
  - FLOW DIRECTION
  - EXISTING REINFORCED CONCRETE PIPE
  - EXISTING ROAD
  - PROPOSED ACCESS ROAD
  - PROPOSED SPOT ELEVATION



**SOURCE:**  
 TOPOGRAPHIC PLAN - SITE NO. 3, BOUCHER AND JAMES, INC., DOYLESTOWN, PA. DRAWN: JPD, CHECKED: CJB, SHEET: 1 OF 1, DATE: JUNE 22, 2001.

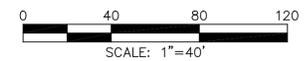
|  |  |  |  |  |  |
|--|--|--|--|--|--|
| DEPARTMENT OF THE ARMY<br>LEISTER<br>COLTS NECK  |  | MWA FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY   |  | FOSTER WHEELER ENVIRONMENTAL<br>DR. D.<br>CR. JMA<br>CH. ENG.  |  |
| NAVY<br>591100.00<br>591200.00<br>591300.00<br>591400.00<br>591500.00<br>591600.00<br>591700.00<br>591800.00<br>591900.00<br>592000.00 |  | NAVY WEAPONS STATION EARLE<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 3<br>FINAL GRADING PLAN |  | REV. DESCRIPTION PREP BY DATE 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- NOTES:**
1. THE PROPOSED DRAINAGE SWALES SHALL HAVE MINIMUM SLOPE ALONG THEIR CENTERLINES AS SHOWN ON SHEET C-7.
  2. THE CONTRACTOR SHALL MAINTAIN A MINIMUM DEPTH OF 1.5 FEET IN THE PROPOSED DRAINAGE SWALE.
  3. THE CONTRACTOR SHALL INSTALL ADDITIONAL RIPRAP IN THIS AREA TO CONTAIN STORM WATER, AND IF NECESSARY BASED ON FIELD CONDITIONS, THE CONTRACTOR SHALL INSTALL A PRECAST CONCRETE BARRIER TO PREVENT STORM WATER EXITING THE DRAINAGE SWALE.

- LEGEND:**
- EXISTING MONITORING WELL
  - EXISTING SPOT ELEVATION
  - APPROXIMATE LANDFILL BOUNDARY
  - FINAL CONTOUR
  - CROSS-SECTION LOCATION
  - PROFILE STATION
  - EXISTING MAJOR CONTOUR
  - EXISTING MINOR CONTOUR
  - DRAINAGE SWALE (TO BE CONSTRUCTED AT TOE OF SLOPE)
  - FLOW DIRECTION
  - EXISTING REINFORCED CONCRETE PIPE
  - PROPOSED SETTLEMENT MONUMENT
  - PROPOSED MONITORING WELL
  - EXISTING ROAD
  - PROPOSED ACCESS ROAD
  - PROPOSED SPOT ELEVATION
  - PROPOSED CABLE FENCE

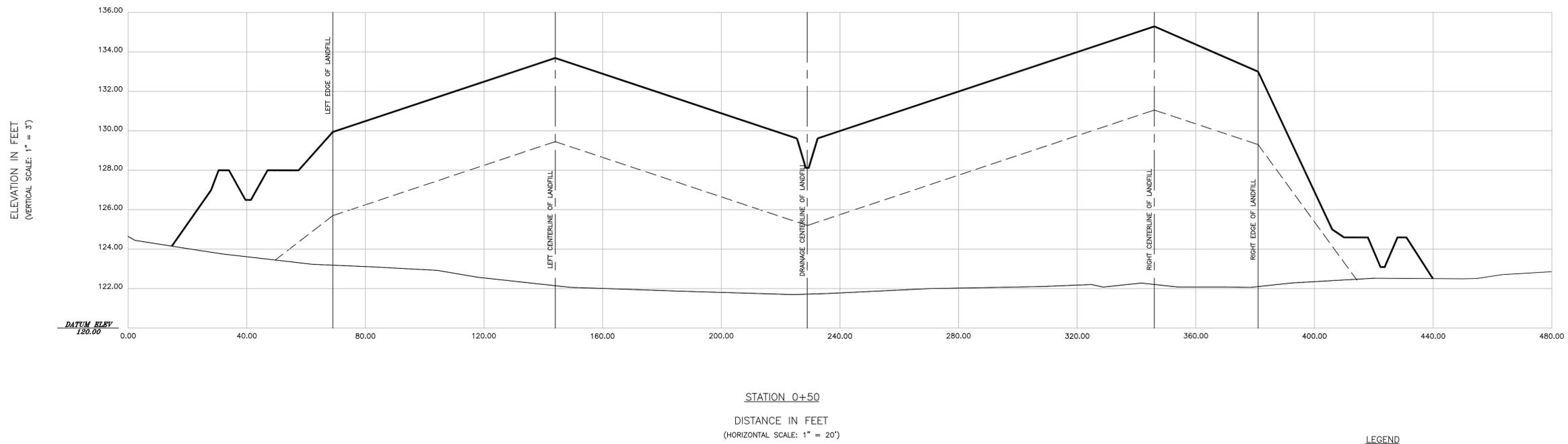
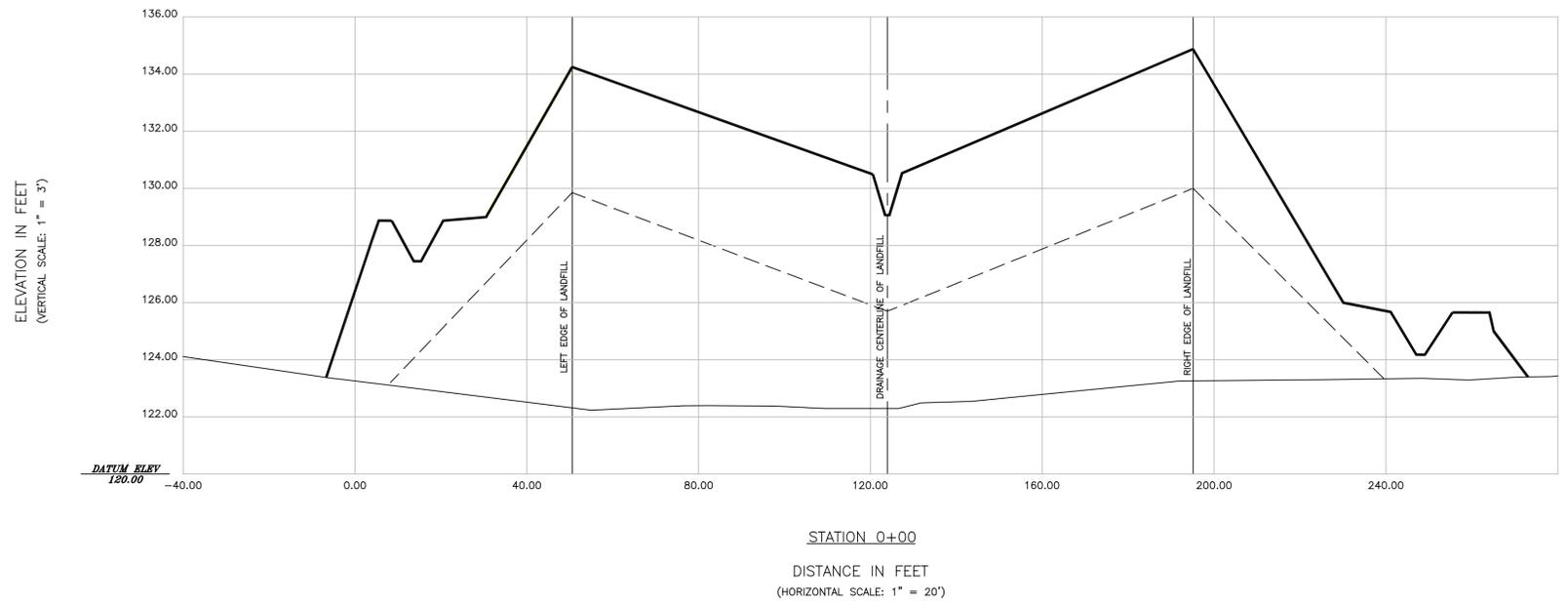


**SOURCE:**  
 TOPOGRAPHIC PLAN - SITE NO. 3, BOUCHER AND JAMES, INC., DOYLESTOWN, PA, DRAWN: JPD, CHECKED: CJB, SHEET: 1 OF 1, DATE: JUNE 22, 2001.

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| DATE                         | DATE | 251  |             |      |         |
| DATE                         | DATE | 252  |             |      |         |





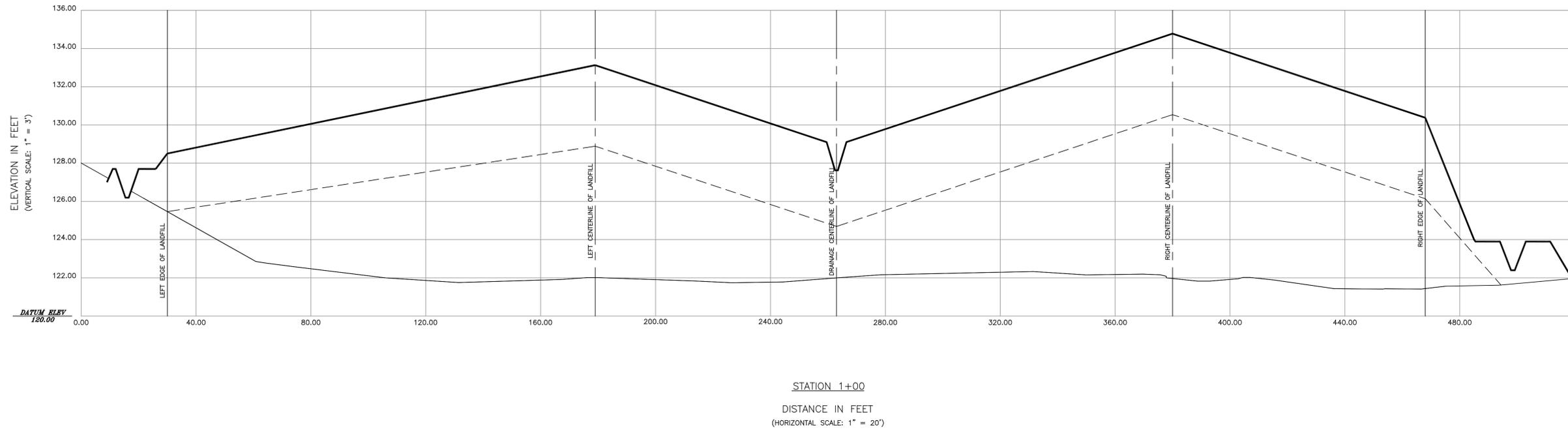


**LEGEND**

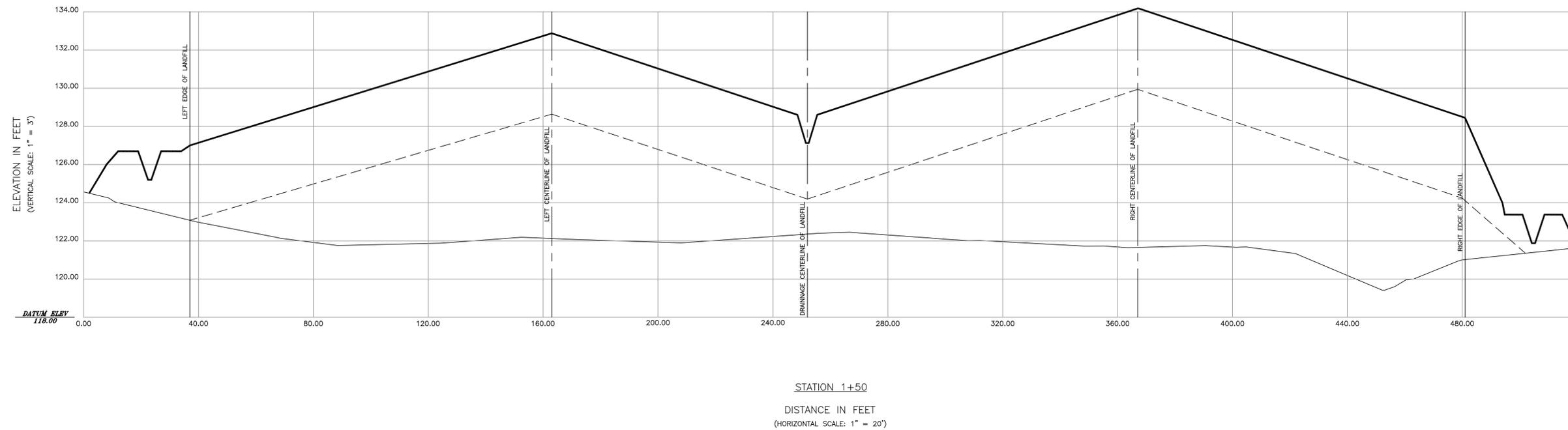
|           |                         |
|-----------|-------------------------|
| —————     | EXISTING GRADE          |
| - - - - - | PROPOSED FINAL SUBGRADE |
| —————     | PROPOSED FINAL GRADE    |

**NOTE:**  
1. THE HORIZONTAL DISTANCE BEYOND THE EDGE OF LANDFILL IS TAKEN AS A HORIZONTAL PROJECTION.

|   |  |   |  |  |  |
|---|--|---|--|--|--|
| DEPARTMENT OF THE NAVY<br>LESTER<br>COLTS NECK  |  | NAVY FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY |  | FOSTER WHEELER ENVIRONMENTAL<br>CH. ENG.<br>CHIEF ENGINEER |  |
| EPA NORTHEAST<br>NAVAL WEAPONS STATION EARLE<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 3<br>GRADING SECTIONS            |  | NAVY FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY |  | FOSTER WHEELER ENVIRONMENTAL<br>CH. ENG.<br>CHIEF ENGINEER |  |
| DATE: 7/26/02<br>CODE I.D. NO.: 80091<br>SCALE: AS NOTED<br>SPEC. NO.: 04-<br>CONSTR. CONTR. NO.: N62472-99-D-0032<br>NAVFAC DRAWING NO.: |  | DATE: 7/26/02<br>CHIEF ENGINEER<br>(TITLE)                        |  | DATE: 7/26/02<br>CHIEF ENGINEER<br>(TITLE)                 |  |
| SHEET 11 OF 17<br>SIZE: D C-10  |  | APPROVED<br>OFFICER IN CHARGE                                     |  | APPROVED<br>OFFICER IN CHARGE                              |  |



STATION 1+00  
DISTANCE IN FEET  
(HORIZONTAL SCALE: 1" = 20')



STATION 1+50  
DISTANCE IN FEET  
(HORIZONTAL SCALE: 1" = 20')

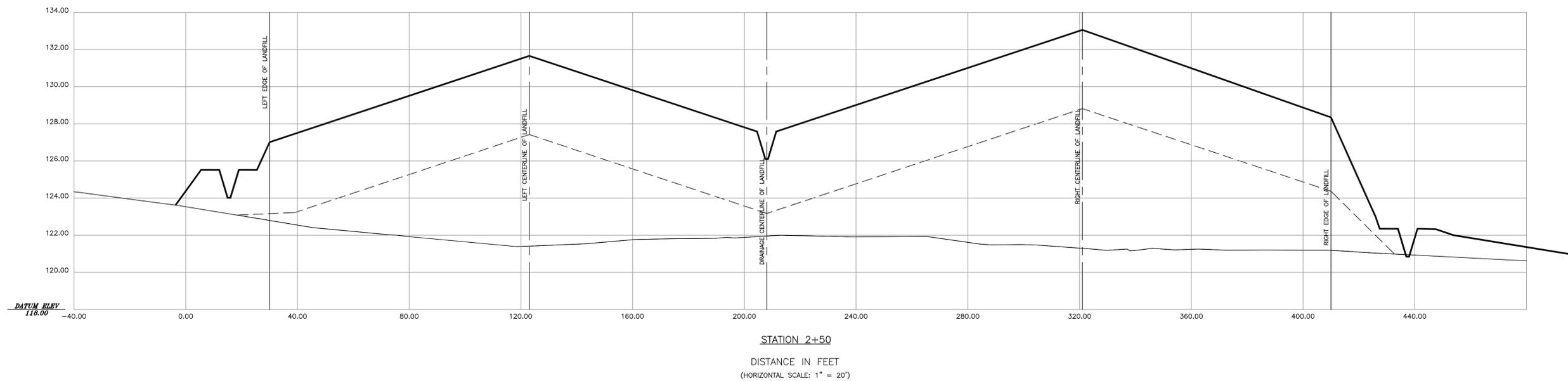
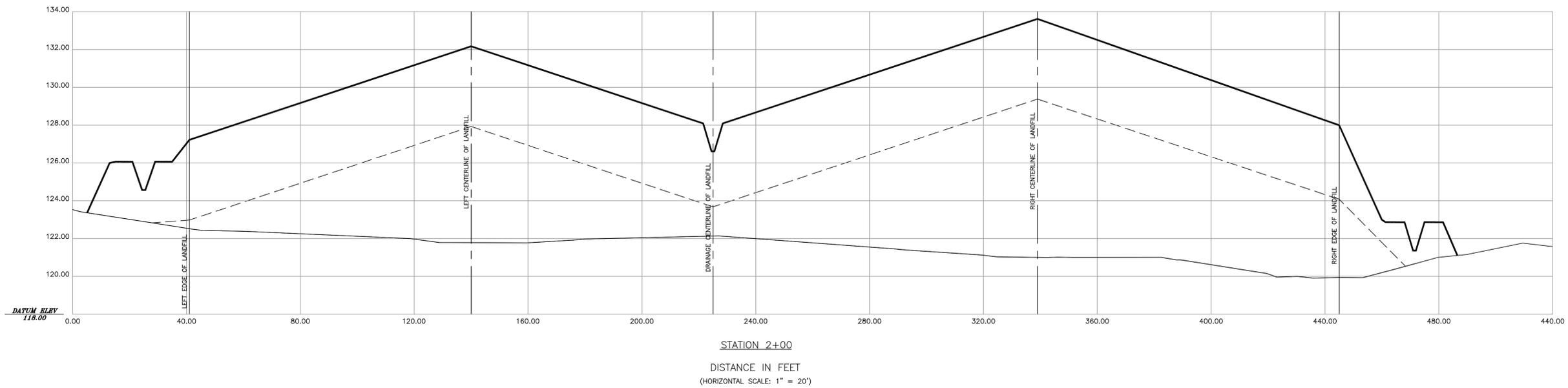
LEGEND:

- EXISTING GRADE
- - - - - PROPOSED FINAL SUBGRADE
- PROPOSED FINAL GRADE

NOTE:

1. THE HORIZONTAL DISTANCE BEYOND THE EDGE OF LANDFILL IS TAKEN AS A HORIZONTAL PROJECTION.

|  |  |   |  |   |  |
|--|--|---|--|---|--|
| DEPARTMENT OF THE NAVY<br>LESTER<br>COLTS NECK   |  | NAVY FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY |  | FOSTER WHEELER ENVIRONMENTAL<br>DATE: 7/26/02<br>PREP BY: KEVIN FITZGERALD<br>CHECKED BY: KEVIN FITZGERALD<br>DATE: 7/26/02 |  |
| EFA NORTHEAST<br>NAVAL WEAPONS STATION EARLE<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 3<br>GRADING SECTIONS |  | REV. DESCRIPTION<br>DATE<br>PREP BY<br>DATE<br>APPROVD            |  | DATE<br>APPROVED<br>OFFICER IN CHARGE<br>DATE   |  |
| KEVIN FITZGERALD, P.E.<br>NJPE NO. GE31825   |  | DATE: 7/26/02<br>CODE I.D. NO.: 80091                             |  | SCALE: AS NOTED<br>SPEC. NO.: 04-   |  |
| SHEET 12 OF 17<br>SIZE: D C-11   |  | CONSTR. CONTR. NO.: N62472-99-D-0032<br>NAVFAC DRAWING NO.        |  | DATE  |  |



**LEGEND:**

————— EXISTING GRADE

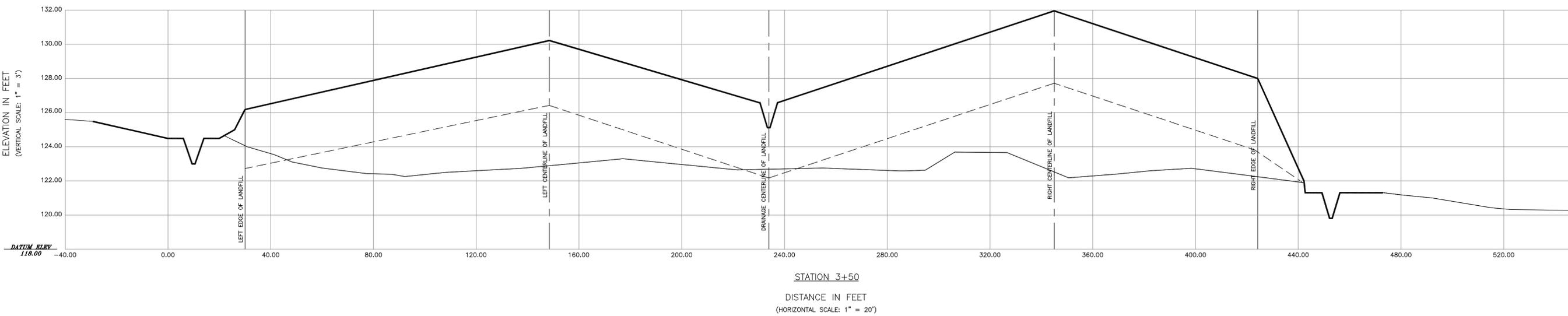
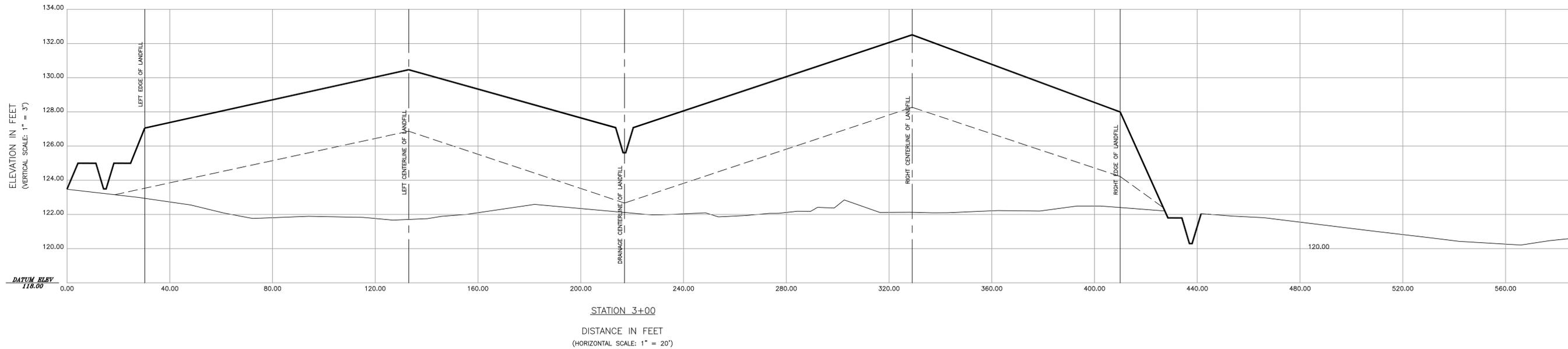
- - - - - PROPOSED FINAL SUBGRADE

————— PROPOSED FINAL GRADE

**NOTE:**

1. THE HORIZONTAL DISTANCE BEYOND THE EDGE OF LANDFILL IS TAKEN AS A HORIZONTAL PROJECTION.

|  |  |   |  |  |  |
|--|--|---|--|--|--|
| DEPARTMENT OF THE NAVY<br>LESTER<br>COLTS NECK   |  | NAVY FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY |  | FOSTER WHEELER ENVIRONMENTAL<br>DR. D.<br>CH. ENG. |  |
| EFA NORTHEAST<br>NAVAL WEAPONS STATION EARLE<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 3<br>GRADING SECTIONS |  | NAVY FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY |  | FOSTER WHEELER ENVIRONMENTAL<br>DR. D.<br>CH. ENG. |  |
| KEVIN FITZGERALD, P.E.<br>NJPE NO. GE31825   |  | KEVIN FITZGERALD<br>(PRINT NUMBER)<br>NJPE NO. GE31825            |  | KEVIN FITZGERALD<br>(TITLE)<br>CHIEF ENGINEER      |  |
| SAT TO<br>DATE<br>7/26/02  |  | CODE I.D. NO.<br>80091  |  | SCALE : AS NOTED                                   |  |
| SPEC. NO. 04-  |  | CONSTR. CONTR. NO.<br>N62472-99-D-0032                            |  | NAVFAC DRAWING NO.                                 |  |
| SHEET 13 OF 17   |  | DIS. SH. NO.  |  | DATE   |  |
| SIZE: D  |  | C-12  |  | APPROVED   |  |



**LEGEND:**

————— EXISTING GRADE

- - - - - PROPOSED FINAL SUBGRADE

————— PROPOSED FINAL GRADE

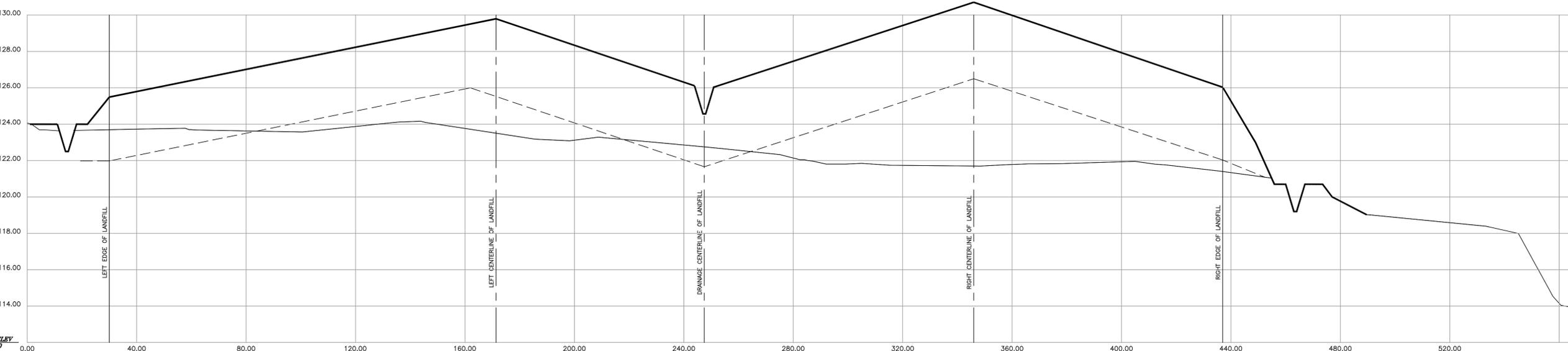
**NOTE:**

1. THE HORIZONTAL DISTANCE BEYOND THE EDGE OF LANDFILL IS TAKEN AS A HORIZONTAL PROJECTION.

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| DEPARTMENT OF THE NAVY<br>LESTER<br>COLTS NECK   |  | NAVY FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY |  | FOSTER WHEELER ENVIRONMENTAL<br>CH. ENG. / C.E.C. / P.E.<br>KEVIN FITZGERALD<br>7/26/02 |  |
| EFA NORTHEAST<br>NAVAL WEAPONS STATION EARLE<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 3<br>GRADING SECTIONS |  | REV. DESCRIPTION<br>DATE<br>PREP BY                               |  | APPROVED<br>DATE  |  |
| APPROVED<br>DATE   |  | APPROVED<br>DATE  |  | APPROVED<br>DATE  |  |
| KEVIN FITZGERALD, P.E.<br>NYPE NO. GE31825   |  | SAT TO<br>DATE<br>80091<br>7/26/02                                |  | CODE I.D. NO.<br>SCALE : AS NOTED<br>SPEC. NO. 04-                                      |  |
| SHEET 14 OF 17<br>SIZE: D C-13   |  | CONSTR. CONTR. NO.<br>N62472-99-D-0032<br>NAVFAC DRAWING NO.      |  | OFFICER IN CHARGE<br>APPROVED<br>DATE   |  |

ELEVATION IN FEET  
(VERTICAL SCALE: 1" = 3')

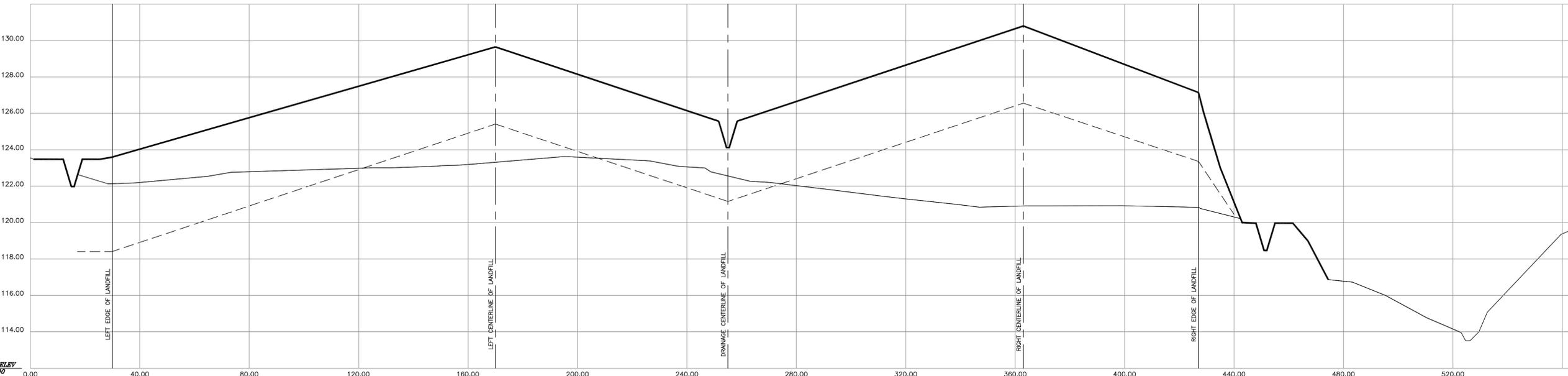
DATUM ELEV  
112.00



STATION 4+00  
DISTANCE IN FEET  
(HORIZONTAL SCALE: 1" = 20')

ELEVATION IN FEET  
(VERTICAL SCALE: 1" = 3')

DATUM ELEV  
112.00



STATION 4+50  
DISTANCE IN FEET  
(HORIZONTAL SCALE: 1" = 20')

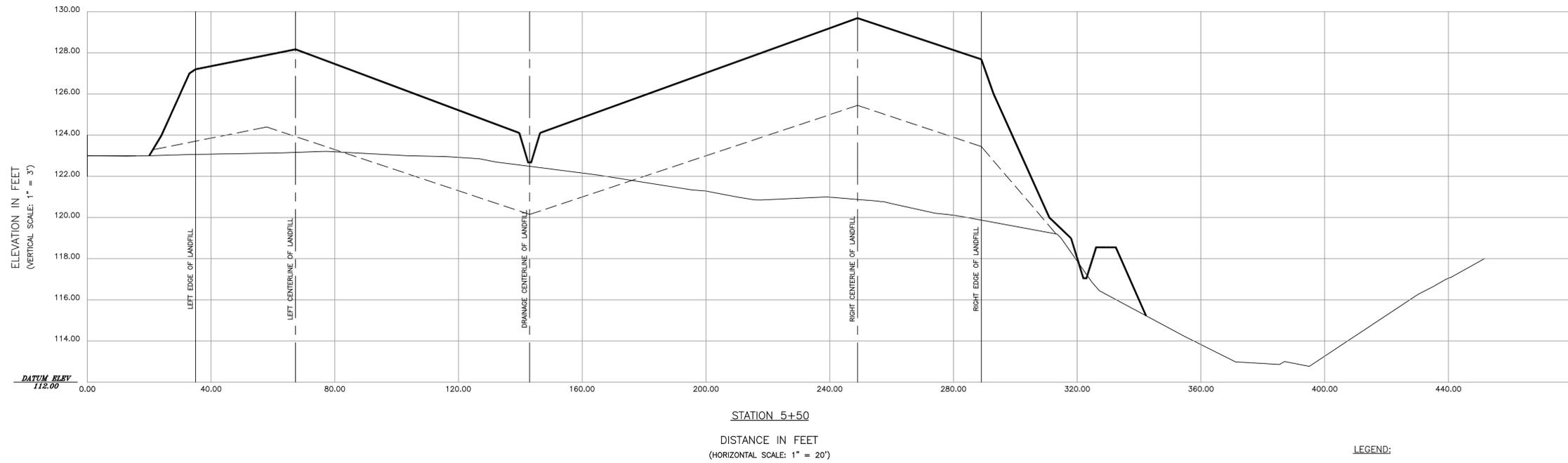
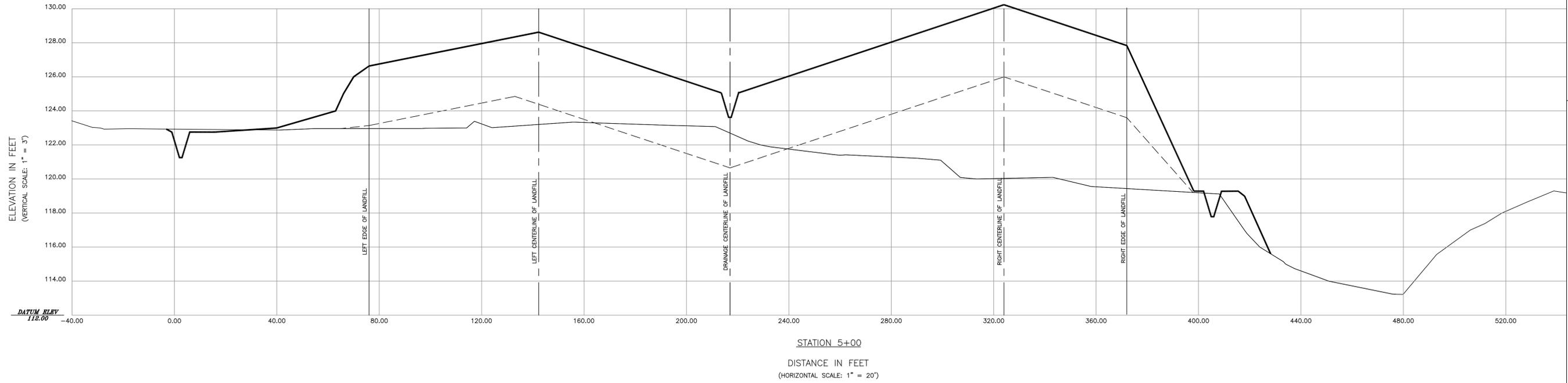
LEGEND:

- EXISTING GRADE
- - - PROPOSED FINAL SUBGRADE
- PROPOSED FINAL GRADE

NOTE:

1. THE HORIZONTAL DISTANCE BEYOND THE EDGE OF LANDFILL IS TAKEN AS A HORIZONTAL PROJECTION.

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| DEPARTMENT OF THE NAVY<br>LESTER<br>COLTS NECK | NAVA FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY | EFA NORTHBAST<br>NAVAL WEAPONS STATION EARLE<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 3<br>GRADING SECTIONS | REV. DESCRIPTION<br>DATE<br>PREP BY<br>APPROVD | FOSTER WHEELER ENVIRONMENTAL<br>DATE<br>PREP BY<br>APPROVD |
| KEVIN FITZGERALD, P.E.<br>NJPE NO. GE31825     | SAT TO<br>DATE<br>7/26/02   | CODE ID. NO.<br>80091  | SCALE : AS NOTED                               | SPEC. NO. 04-  |
| CONSTR. CONTR. NO.<br>N62472-99-D-0032         | NAVFAC DRAWING NO.  | SHEET 15 OF 17   | SIZE: D  | DIS. SH. NO.<br>C-14                                       |



**LEGEND:**

————— EXISTING GRADE  
 - - - - - PROPOSED FINAL SUBGRADE  
 ————— PROPOSED FINAL GRADE

**NOTE:**  
 1. THE HORIZONTAL DISTANCE BEYOND THE EDGE OF LANDFILL IS TAKEN AS A HORIZONTAL PROJECTION.

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| DEPARTMENT OF THE NAVY<br>LESTER<br>COLTS NECK   |  | NAVY FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY |  | FOSTER WHEELER ENVIRONMENTAL<br>DATE: 7/26/02<br>PREP BY: |  |
| EFA NORTHEAST<br>NAVAL WEAPONS STATION EARLE<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 3<br>GRADING SECTIONS |  | REV. DESCRIPTION<br>DATE<br>PREP BY:                              |  | APPROVD<br>DATE<br>APPROVD                                |  |
| KEVIN FITZGERALD, P.E.<br>NJPE NO. GE31825   |  | KEVIN FITZGERALD<br>(PRINT NUMBER)<br>CHIEF ENGINEER<br>(TITLE)   |  | DATE: 7/26/02<br>APPROVD                                  |  |
| SAT TO: 7/26/02<br>CODE I.D. NO.: 80091<br>SCALE: AS NOTED<br>SPEC. NO.: 04-   |  | CONSTR. CONTR. NO.: N62472-99-D-0032<br>NAVFAC DRAWING NO.:       |  | SHEET 16 OF 17<br>DIS. SH. NO.:<br>SIZE: D C-15           |  |



**FINAL DESIGN CONSTRUCTION DRAWINGS**

**Landfill Cap – Site 10**

# FINAL DESIGN CONSTRUCTION DRAWINGS

## LANDFILL CAP - SITE 10

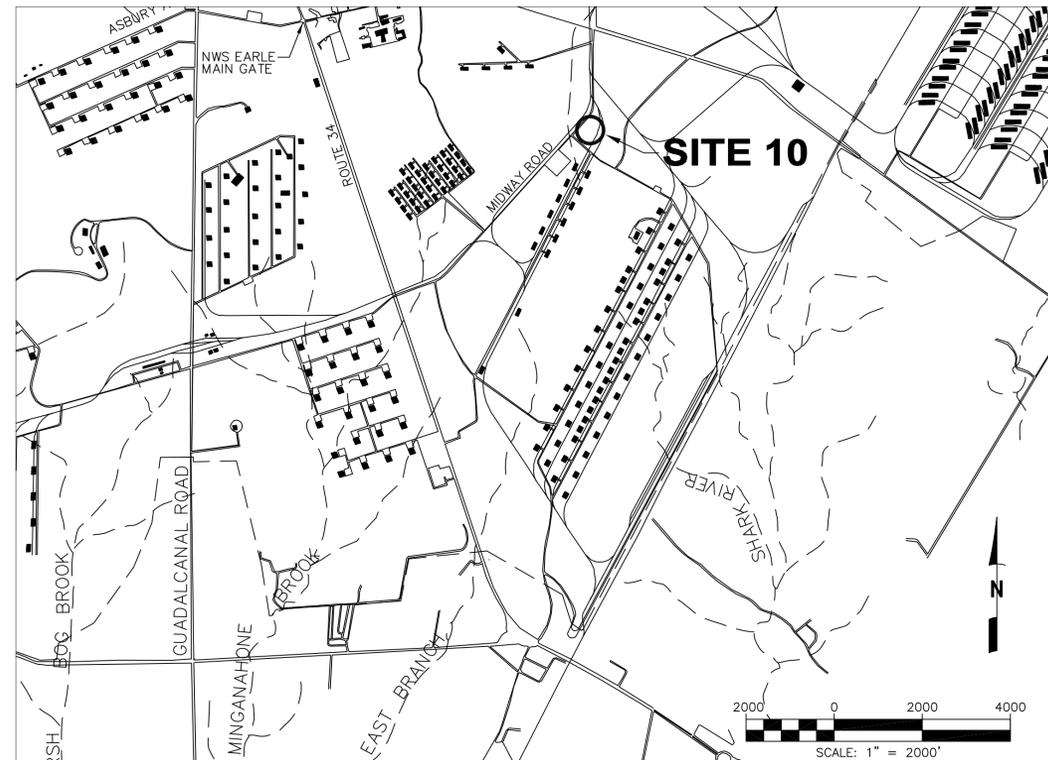
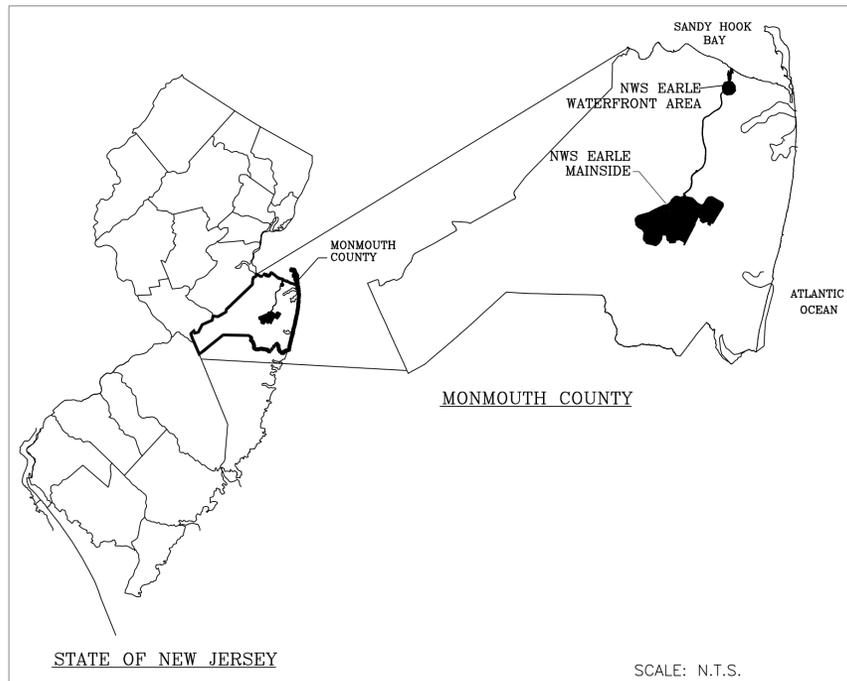
### NAVAL WEAPONS STATION EARLE

#### COLTS NECK, MONMOUTH COUNTY, NEW JERSEY

#### RAC CONTRACT NO. N62472-99-D-0032

DRAWING INDEX:

| DRAWING NO. | DRAWING TITLE   |
|-------------|---|
| T-1         | TITLE SHEET   |
| C-1         | GENERAL NOTES AND PROPOSED SEQUENCE OF CONSTRUCTION                   |
| C-2         | SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS                   |
| C-3         | EXISTING SITE CONDITIONS  |
| C-4         | CLEARING AND GRUBBING, AND SOIL EROSION AND SEDIMENT CONTROL MEASURES |
| C-5         | FINAL GRADING PLAN  |
| C-6         | CAP SECTIONS AND DETAILS AND STORMWATER MANAGEMENT DETAILS            |
| C-7         | PROPOSED FEATURES   |
| C-8         | FEATURES DETAILS  |
| C-9         | PROPOSED SITE ACCESS ROAD SECTION                                     |
| C-10        | GRADING SECTIONS  |
| C-11        | GRADING SECTIONS  |



|   |   |  |  |  |   |  |
|---|---|--|--|--|---|--|
| <small>DESIGN: SP</small><br><small>SUPV: RW</small><br><small>DATE: 7/26/02</small>  | <small>CHK: JAK</small><br><small>DATE: 7/26/02</small> | <small>APPV: [Signature]</small><br><small>DATE: 7/26/02</small> | <small>PREP: [Signature]</small><br><small>DATE: 7/26/02</small> | <small>DESC: [Signature]</small><br><small>DATE: 7/26/02</small> | <small>REV: [Signature]</small><br><small>DATE: 7/26/02</small> | <small>APPV: [Signature]</small><br><small>DATE: 7/26/02</small> |
| <small>NAVAL FACILITIES ENGINEERING COMMAND</small><br><small>PENNYWALK</small><br><small>NEW JERSEY</small>  |   |  |  |  |   |  |
| <small>DEPARTMENT OF THE ARMY</small><br><small>LESTER</small><br><small>COLTS NECK</small>   |   |  |  |  |   |  |
| <small>EFA NORTHEAST</small><br><small>NAVAL WEAPONS STATION EARLE</small><br><small>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 10</small><br><small>TITLE SHEET</small>                  |   |  |  |  |   |  |
| <small>NAVFAC DRAWING NO.</small><br><small>N62472-99-D-0032</small>  |   |  |  |  |   |  |
| <small>KEY: KEVIN FITZGERALD, P.E.</small><br><small>NJPE NO. GE31825</small><br><small>SAT TO DATE</small><br><small>7/26/02</small>   |   |  |  |  |   |  |
| <small>CODE I.D. NO.</small><br><small>SCALE: AS NOTED</small><br><small>SPEC. NO.</small><br><small>CONSTR. CONTR. NO.</small><br><small>N62472-99-D-0032</small><br><small>NAVFAC DRAWING NO.</small> |   |  |  |  |   |  |
| <small>SHEET 1 OF 12</small><br><small>SIZE: D DIS. SH. NO.</small><br><small>T-1</small>   |   |  |  |  |   |  |

# GENERAL NOTES

- EXISTING TOPOGRAPHIC DATA IS BASED ON FIELD SURVEYS PERFORMED BY BOUCHER & JAMES, INC., DOYLESTOWN, PA IN JUNE 2001. SEE SHEET C-3 FOR EXISTING SITE CONDITIONS.
- HORIZONTAL DATUM BASED UPON NEW JERSEY STATE PLANE COORDINATES NAD83 AND VERTICAL DATUM BASED UPON NAVD88 AS FURNISHED BY RESIDENT OFFICER IN CHARGE OF CONSTRUCTION OFFICE AT THE NAVAL WEAPONS STATION - EARLE FOR THE FOLLOWING MONITORING WELLS:

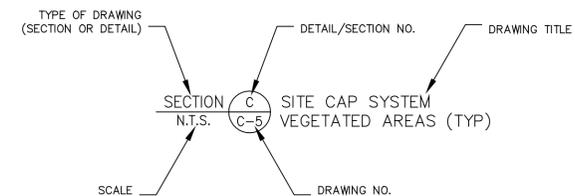
| WELL ID | NORTH     | EAST      | TOP OF OUTER CASING |
|---------|-----------|-----------|---------------------|
| MW10-06 | 519268.74 | 592712.39 | 106.50              |
| MW10-07 | 519230.86 | 592807.94 | 108.20              |

- ELEVATIONS ARE BASED ON MEAN SEA LEVEL DATUM NAVD88.
- THE CONTOURS SHOWN HEREIN ARE AT 1 FOOT INTERVALS. SEE SHEETS C-3, C-4 AND C-5.
- THE REMEDIAL ACTION CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING HORIZONTAL AND VERTICAL CONTROLS FOR THE LANDFILL CAP CONSTRUCTION THROUGHOUT THE DURATION OF THE PROJECT.
- ALL WORK FOR THIS PROJECT SHALL BE IN ACCORDANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS; APPLICABLE SECTIONS OF THE NEW JERSEY DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, DATED 1996; AND THE STANDARDS FOR SOIL EROSION AND SEDIMENT IN NEW JERSEY, ADOPTED JULY 1999. ALL METHODS OF WORK FOR THIS PROJECT SHALL ALSO COMPLY WITH FEDERAL, STATE OF NEW JERSEY, AND LOCAL ORDINANCES, UNLESS OTHERWISE NOTED IN THE CONTRACT DRAWINGS AND SPECIFICATIONS.
- THE CONTRACTOR SHALL NOTIFY THE CONTRACTING OFFICER A MINIMUM OF THREE WORKING DAYS PRIOR TO INTRUSIVE ACTIVITIES AT SITE 10 TO ALLOW TIME FOR COORDINATION WITH APPROPRIATE BASE PERSONNEL AND TO ENSURE THAT ALL PROCEDURES ARE IN COMPLIANCE.
- THE CONTRACTOR SHALL CONTACT THE "NJ ONE CALL SYSTEM" A MINIMUM OF FIVE AND MAXIMUM OF TEN WORKING DAYS PRIOR TO ANY INTRUSIVE ACTIVITIES. THE PHONE NUMBER IS 1-800-272-1000. UTILITIES SHOWN ON THE DRAWINGS ARE BASED UPON THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY AND ALLOW FOR THEIR LOCATIONS. IF A UTILITY IS IN CONFLICT, THE CONTRACTOR SHALL COORDINATE WITH THE CONTRACTING OFFICER AND APPROPRIATE UTILITY TO RESOLVE THE CONFLICT.
- THE APPROXIMATE LIMITS OF THE LANDFILL BOUNDARY WERE DETERMINED BY FOSTER WHEELER ENVIRONMENTAL CORPORATION DURING A JUNE 2001 SITE INVESTIGATION SOIL BORING PROGRAM.
- THE CONTRACTOR SHALL CLEAR TREES AND SHRUBS WITHIN THE LIMITS OF DISTURBANCE. NO TREES AND SHRUBS OUTSIDE THESE LIMITS ARE TO BE DISTURBED WITHOUT AUTHORIZATION BY THE CONTRACTING OFFICER.
- ADEQUATE SOIL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED BY THE CONTRACTOR, AS PER THE ATTACHED DRAWINGS, PRIOR TO LANDFILL CAP CONSTRUCTION ACTIVITIES. ALL DISTURBED AREAS SHALL BE STABILIZED (HYDROSEEDING, RIPRAPPED, OR COVERED WITH STONE) IMMEDIATELY UPON ESTABLISHING FINAL GRADE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR LIMITING ALL WORK TO THE IMMEDIATE PROJECT AREA. ALL AREAS DISTURBED BY THE CONTRACTOR THAT ARE OUTSIDE THE LIMITS OF DISTURBANCE SHALL BE RESTORED TO THE ORIGINAL CONDITIONS BY THE CONTRACTOR AND APPROVED BY THE CONTRACTING OFFICER.
- FIGURE DIMENSIONS TAKE PRECEDENCE OVER SCALED DIMENSIONS. CHECK GRAPHIC SCALE BEFORE SCALING DRAWINGS.
- THE CONTRACTOR SHALL THOROUGHLY INSPECT SITE 10 PRIOR TO CONSTRUCTION TO VERIFY EXISTING SITE CONDITIONS. VERIFICATION OF EXISTING SITE CONDITIONS WILL INCLUDE, BUT NOT BE LIMITED TO, STAKING THE LOCATION OF ALL AREAS TO BE WITHIN THE LIMITS OF DISTURBANCE PRIOR TO ACTUAL WORK. THE FIELD LOCATION STAKES MUST BE REVIEWED AND APPROVED BY THE CONTRACTING OFFICER PRIOR TO DISTURBANCE ACTIVITIES.
- THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING GRADES THAT SUSTAIN POSITIVE DRAINAGE THROUGHOUT LANDFILL CAP CONSTRUCTION ACTIVITIES.
- THE STABILIZED CONSTRUCTION ENTRANCE FOR SITE 10 SHALL BE THE SOLE POINT FOR SITE INGRESS AND EGRESS. THE CONTRACTOR SHALL CONSTRUCT THE STABILIZED CONSTRUCTION ENTRANCE AT THE LOCATION SHOWN ON SHEET C-4 AND AS PER THE DETAIL ON SHEET C-2.
- THE LOCATION OF THE CONTRACTOR STAGING AREAS MUST BE APPROVED BY THE CONTRACTING OFFICER AND SHALL NOT CONFLICT WITH TRAFFIC OR PEDESTRIAN FLOW. ALL STAGING AREAS SHALL BE LOCATED WITHIN THE LIMITS OF DISTURBANCE AS DEPICTED ON SHEET C-4.
- THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CONTRACTING OFFICER IN THE EVENT THE PROPOSED LIMITS OF THE CAP REQUIRE DESIGN REVISION OR MODIFICATION.
- ALL WORK AREAS SHALL BE MAINTAINED FREE FROM DUST AND ODORS.
- EVIDENCE OF WETLANDS WAS NOT OBSERVED AT OR SURROUNDING SITE 10 DURING DELINEATION INVESTIGATION ACTIVITIES. IN THE EVENT WETLANDS ARE ENCOUNTERED DURING CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL CEASE WORK IN THESE AREAS AND NOTIFY THE CONTRACTING OFFICER.
- DRAWINGS DO NOT INCLUDE THE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. ALL CONSTRUCTION SHALL BE PERFORMED IN COMPLIANCE WITH THE APPROVED HEALTH AND SAFETY PLAN, IN ACCORDANCE WITH THE OCCUPATIONAL SAFETY AND HEALTH ACT, AND ALL RULES AND REGULATIONS THERETO APPURTENANT.
- CONTRACTOR SHALL FURNISH SIGNALMENT AND SUCH WARNING SIGNS AS ARE NECESSARY TO PROVIDE ADEQUATE WARNING TO THE PUBLIC OF HIS OPERATIONS.
- ALL ASPHALT ROADWAYS ARE TO BE SWEEPED FREE OF SOIL, SEDIMENT, AND DEBRIS ON A DAILY BASIS AND ADDITIONALLY AS DIRECTED BY THE CONTRACTING OFFICER.
- THE SITE'S APPROVAL LETTER, APPROVED SOIL EROSION AND SEDIMENT CONTROL PLAN, DAILY LOG BOOKS AND TEST REPORTS SHALL BE AVAILABLE AT THE SITE AT ALL TIMES.
- TEMPORARY SEDIMENT CONTROL DEVICES MAY BE REMOVED, WITH PERMISSION OF THE CONTRACTING OFFICER, WITHIN THIRTY (30) DAYS FOLLOWING THE ESTABLISHMENT OF PERMANENT STABILIZATION IN ALL CONTRIBUTORY DRAINAGE AREAS.
- FOR FINISHED GRADING, THE CONTRACTOR SHALL PROVIDE ADEQUATE GRADIENTS SO AS TO PREVENT WATER FROM STANDING ON THE SURFACE FOR MORE THAN TWENTY FOUR (24) HOURS AFTER THE END OF A RAINFALL EVENT EXCEPT IN DESIGNATED DRAINAGE COURSES AND SWALE FLOW AREAS, WHICH MAY DRAIN AS LONG AS FORTY-EIGHT (48) HOURS AFTER THE END OF A RAINFALL. AREAS DESIGNED TO HAVE STANDING WATER SHALL NOT BE REQUIRED TO MEET THIS REQUIREMENT.
- THE CONTRACTING OFFICER HAS THE OPTION OF REQUIRING ADDITIONAL SAFETY OR SEDIMENT CONTROL MEASURES, IF DEEMED NECESSARY.
- THE QUARTERS D ENTRANCE WILL BE USED AS A CONSTRUCTION ENTRANCE AND A SPECIFIC CONTRACTOR'S ROUTE WILL BE ESTABLISHED PRIOR TO THE START OF CONSTRUCTION.

# PROPOSED SEQUENCE OF CONSTRUCTION AT SITE 10

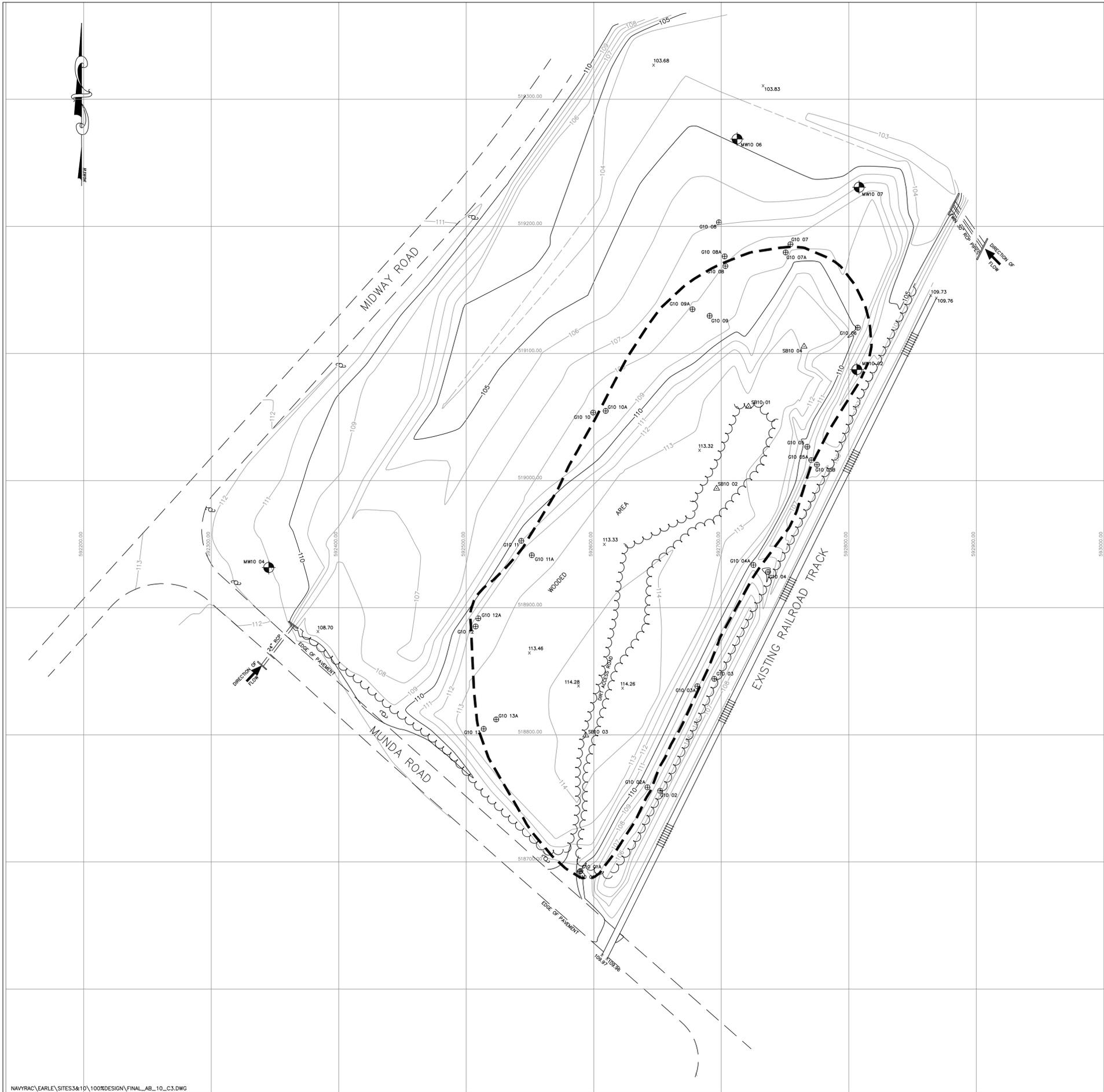
| TASK  | DURATION (WORKING DAYS) |
|---|-------------------------|
| 1. MOBILIZE SITE  | 2                       |
| 2. SWEEP THE WORK AREA FOR UNEXPLODED ORDNANCE                            | 2                       |
| 3. INSTALL SOIL EROSION AND SEDIMENT CONTROL MEASURES                     | 5                       |
| 4. CLEARING AND GRUBBING OF SITE WITHIN LIMITS OF DISTURBANCE             | 2                       |
| 5. PERFORM TEST PIT OPERATIONS AND CONDUCT SITE SURVEY                    | 4                       |
| 6. CONSTRUCT AND STABILIZE TEMPORARY SITE ACCESS ROADS                    | 5                       |
| 7. PLACE AND GRADE SUBGRADE   | 5                       |
| 8. CONSTRUCT LANDFILL CAP   | 10                      |
| 9. CONSTRUCT PERMANENT SECURITY FENCING                                   | 2                       |
| 10. SEED SITE AND CONDUCT FINAL SITE SURVEY                               | 5                       |
| 11. DEMOBILIZE SITE AND REMOVE SOIL EROSION AND SEDIMENT CONTROL MEASURES | 3                       |

# KEY

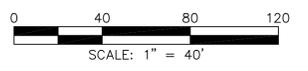


|  |                           |  |                                      |   |                           |
|--|---------------------------|--|--------------------------------------|---|---------------------------|
| DEPARTMENT OF THE NAVY<br>LESTER<br>COLTS NECK |                           | NAVAL FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY<br>NAVAL WEAPONS STATION EARLE<br>CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 10<br>GENERAL NOTES AND PROPOSED SEQUENCE OF CONSTRUCTION |                                      | FOSTER WHEELER ENVIRONMENTAL<br>CH. ENG.<br>CHIEF ENGINEER<br>7/26/02<br>(DATE) |                           |
| KEVIN FITZGERALD, P.E.<br>NJPE NO. GE31825     | SAT TO<br>DATE<br>7/26/02 | CODE I.D. NO.<br>SCALE : NONE<br>SPEC. NO.<br>CONSTR. CONTR. NO.<br>N62472-99-D-0032<br>NAVFAC DRAWING NO.   | SHEET 2 OF 12<br>DIS. SH. NO.<br>C-1 | APPROVED<br>DATE  | OFFICER IN CHARGE<br>DATE |



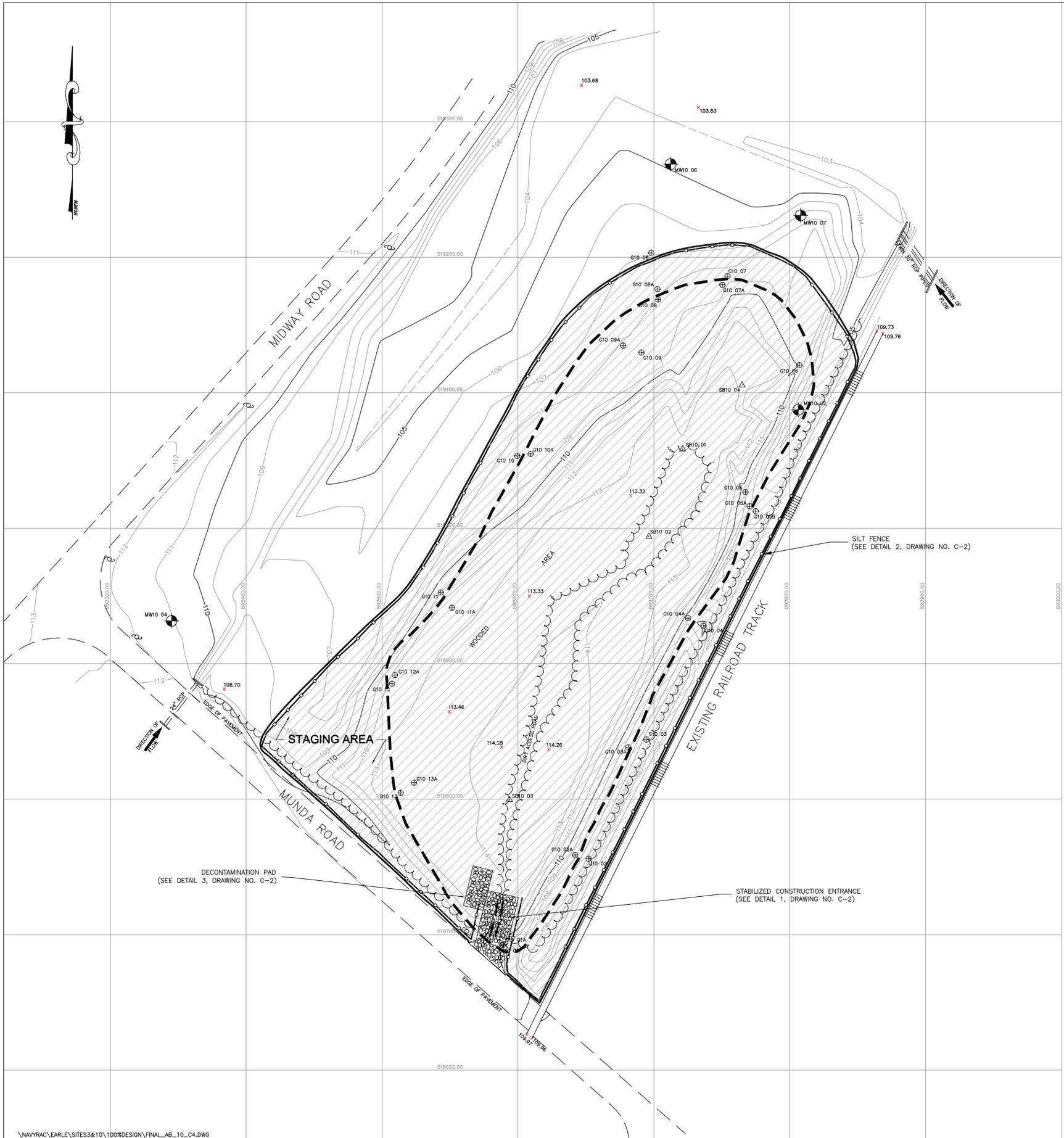


- LEGEND:**
- $\Delta$  OR  $\oplus$  SOIL BORING LOCATION
  - $\bullet$  EXISTING MONITORING WELL
  - X 113.33 EXISTING SPOT ELEVATION
  - APPROXIMATE LANDFILL BOUNDARY
  - ~ TREELINE
  - ⊕ EXISTING UTILITY POLE
  - - - EXISTING MAJOR CONTOUR
  - - - EXISTING MINOR CONTOUR
  - == RCP EXISTING REINFORCED CONCRETE PIPE
  - ||| EXISTING RAILROAD TRACKS
  - EXISTING ROAD

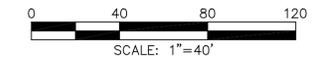
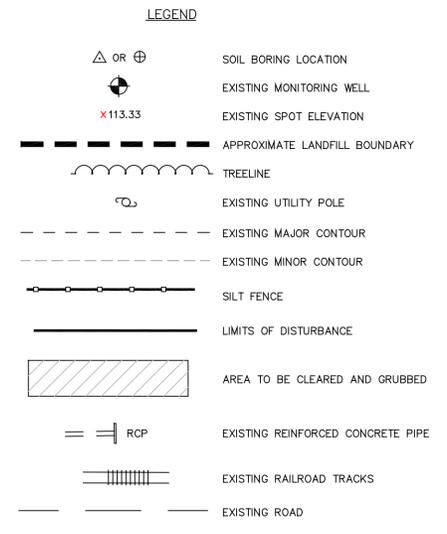


**SOURCE:**  
 TOPOGRAPHIC PLAN - SITE NO. 10, BOUCHER AND JAMES, INC.,  
 DOYLESTOWN, PA, DRAWN: JPD, CHECKED: CJB, SHEET: 1 OF 1,  
 DATE: JUNE 22, 2001.

|  |                 |  |   |   |   |
|--|-----------------|--|---|---|---|
| DEPARTMENT OF THE NAVY<br>NAVAL FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY |                 | <b>EPA NORTHEAST</b><br>NAVAL WEAPONS STATION EARLE<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 10<br>EXISTING SITE CONDITIONS |   | REV. DESCRIPTION<br>PREP BY DATE APPROVD    | FOSTER WHEELER ENVIRONMENTAL<br>DATE: EL<br>DRAWN BY: KEVIN FITZGERALD<br>CHECKED BY: (TITLE)<br>NORTHWEST<br>DATE: 7/26/02<br>PROJECT NO.:<br>OFFICE IN CHARGE:<br>APPROVED: |
| KEVIN FITZGERALD, P.E.<br>NJPE NO. GE31825   | DATE<br>7/26/02 | CODE I.D. NO.<br>SCALE: 1"=40'   | SPEC. NO.<br>CONSTR. CONTR. NO.<br>N62472-99-D-0032<br>NAVFAC DRAWING NO. | SHEET 4 OF 12<br>SIZE: D DS. SH. NO.<br>C-3 | DATE  |

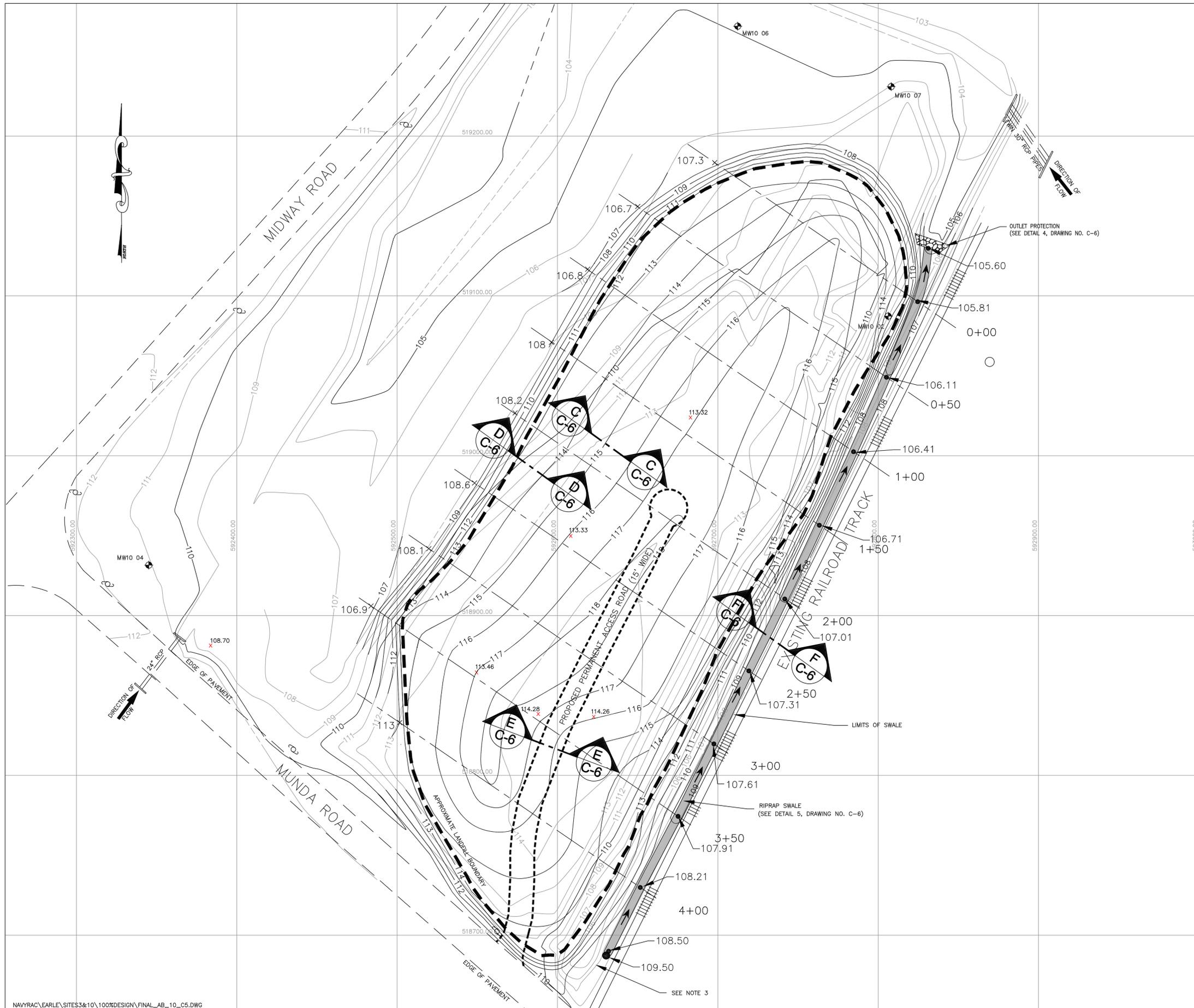


**NOTES:**  
 1. SILT FENCE IS LOCATED APPROXIMATELY 1' WITHIN LIMIT OF DISTURBANCE LINE.  
 2. THE LIMITS OF DISTURBANCE WILL INCLUDE AREAS WITHIN THE APPROXIMATE LANDFILL BOUNDARY AND ALL AREAS WITHIN A 30' OFFSET OF THE APPROXIMATE LANDFILL BOUNDARY.



**SOURCE:**  
 TOPOGRAPHIC PLAN - SITE NO. 10, BOUCHER AND JAMES, INC., DOYLESTOWN, PA, DRAWN: JPD, CHECKED: CJB, SHEET: 1 OF 1, DATE: JUNE 22, 2001.

|   |  |   |  |
|---|--|---|--|
| DEPARTMENT OF THE HWY<br>LESTER<br>COLTS NECK   | NAWAC FACILITIES ENGINEERING COMPANY<br>PENNSYLVANIA<br>NEW JERSEY | REV. DESCRIPTION<br>DATE<br>PREP BY<br>APPROVD              | FOSTER WHEELER ENVIRONMENTAL<br>DATE: 7/26/02<br>CH. ENG. ENGINEER<br>KEVIN FITZGERALD<br>(THRU NUMBER)<br>NORTHERN DISTRICT<br>OFFICE # CHANGE<br>APPROVED<br>DWE |
| EFA NORTHEAST<br>NAVAL WEAPONS STATION EARLE<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 10<br>CLEARING & GRUBBING, AND EROSION & SEDIMENT CONTROL MEASURES |  | DATE  | DATE   |
| KEVIN FITZGERALD, P.E.<br>N.J.P.E. NO. GE31825  |  | SAT TO<br>DATE<br>7/26/02                                   | DATE   |
| CODE I.D. NO.<br>SCALE: 1"=40'<br>SPEC. NO.   |  | CONSTR. CONTR. NO.<br>N62472-99-D-0032<br>NAWAC DRAWING NO. |  |
| SHEET 5 OF 12<br>DIS. SH. NO.   |  | APPROVED<br>D C-4   |  |



- NOTES:**
1. THE PROPOSED DRAINAGE SWALE SHALL HAVE A MINIMUM OF 0.6% SLOPE ALONG THE CENTERLINE.
  2. THE CONTRACTOR SHALL MAINTAIN A MINIMUM DEPTH OF 1.0 FEET IN THE PROPOSED DRAINAGE SWALE.
  3. THE CONTRACTOR SHALL USE COVER SOIL TO FILL THE TOPOGRAPHICALLY DEPRESSED AREA LOCATED IN THE SOUTHEASTERN CORNER OF THE LANDFILL.
  4. A 30 FOOT DIAMETER TURN AROUND WILL BE INSTALLED AT THE END OF THE ACCESS ROAD.

**LEGEND:**

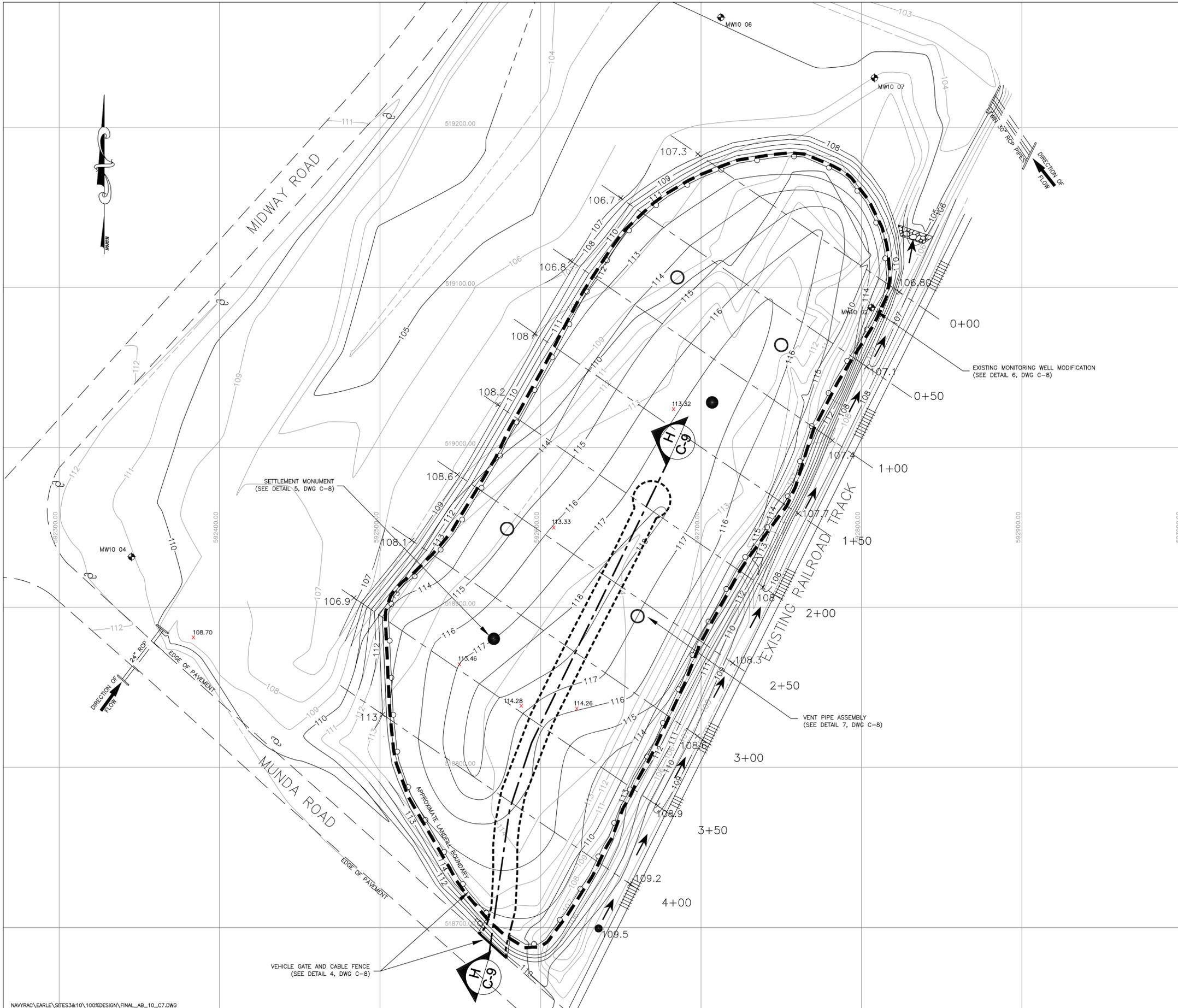
- EXISTING MONITORING WELL
- EXISTING UTILITY POLE
- SPOT ELEVATION
- SECTION LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- FINAL CONTOUR
- APPROXIMATE LANDFILL BOUNDARY
- TOE OF SLOPE SPOT ELEVATION
- PROPOSED SPOT ELEVATION
- DRAINAGE SWALE INVERT ELEVATION
- FLOW DIRECTION
- EXISTING RAILROAD TRACKS
- EXISTING ROAD
- PROPOSED PERMANENT ACCESS ROAD
- EXISTING REINFORCED CONCRETE PIPE
- RIPRAP LINED DRAINAGE SWALE (TO BE CONSTRUCTED AT TOE OF SLOPE)

0 30 60 90  
SCALE: 1"=30'

**SOURCE:**  
 TOPOGRAPHIC PLAN - SITE NO. 10, BOUCHER AND JAMES, INC., DOYLESTOWN, PA, DRAWN: JPD, CHECKED: CJB, SHEET: 1 OF 1, DATE: JUNE 22, 2001.

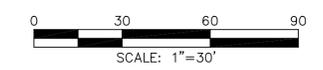
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|--|-------------|--|------|---|------|
| DEPARTMENT OF THE NAVY<br>LESTER<br>COLTS MEKX   |             | NAVAL FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY |      | FOSTER WHEELER ENVIRONMENTAL<br>DRG. NO. 10<br>DRG. DATE 7/26/02<br>SUBMITTED BY: KEVIN FITZGERALD (FORM NUMBER)<br>CHECKED BY: CJB (TITLE)<br>INCHARGE: NA<br>DATE: NA<br>OFFICE IN CHARGE: NA<br>APPROVED: NA |      |
| REV.   | DESCRIPTION | PREP BY  | DATE | APPRVD  | DATE |
|  |             |  |      |   |      |
| EFA NORTHEAST<br>NAVAL WEAPONS STATION EARLE<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 10<br>FINAL GRADING PLAN<br>DATE:   |             |  |      |   |      |
| KEVIN FITZGERALD, P.E.<br>NJPE NO. GE31825<br>SAT TO: 7/26/02<br>CODE I.D. NO.: 800911<br>SCALE: 1"=30'<br>SPEC. NO.: 04-<br>CONSTR. CONTR. NO.: N62472-99-D-0032<br>NAVFAC DRAWING NO.:<br>SHEET 6 OF 12<br>SIZE: D C-5 |             |  |      |   |      |





- NOTES:**
- THE CONTRACTOR SHALL MAINTAIN A MINIMUM DEPTH OF 1.0 FEET IN THE DRAINAGE SWALE.
  - THE EXACT LOCATION OF THE CABLE FENCE WILL BE DETERMINED BY THE NAVY.
  - EACH VENT PIPE SHALL BE PROTECTED BY 3 BOLLARDS.

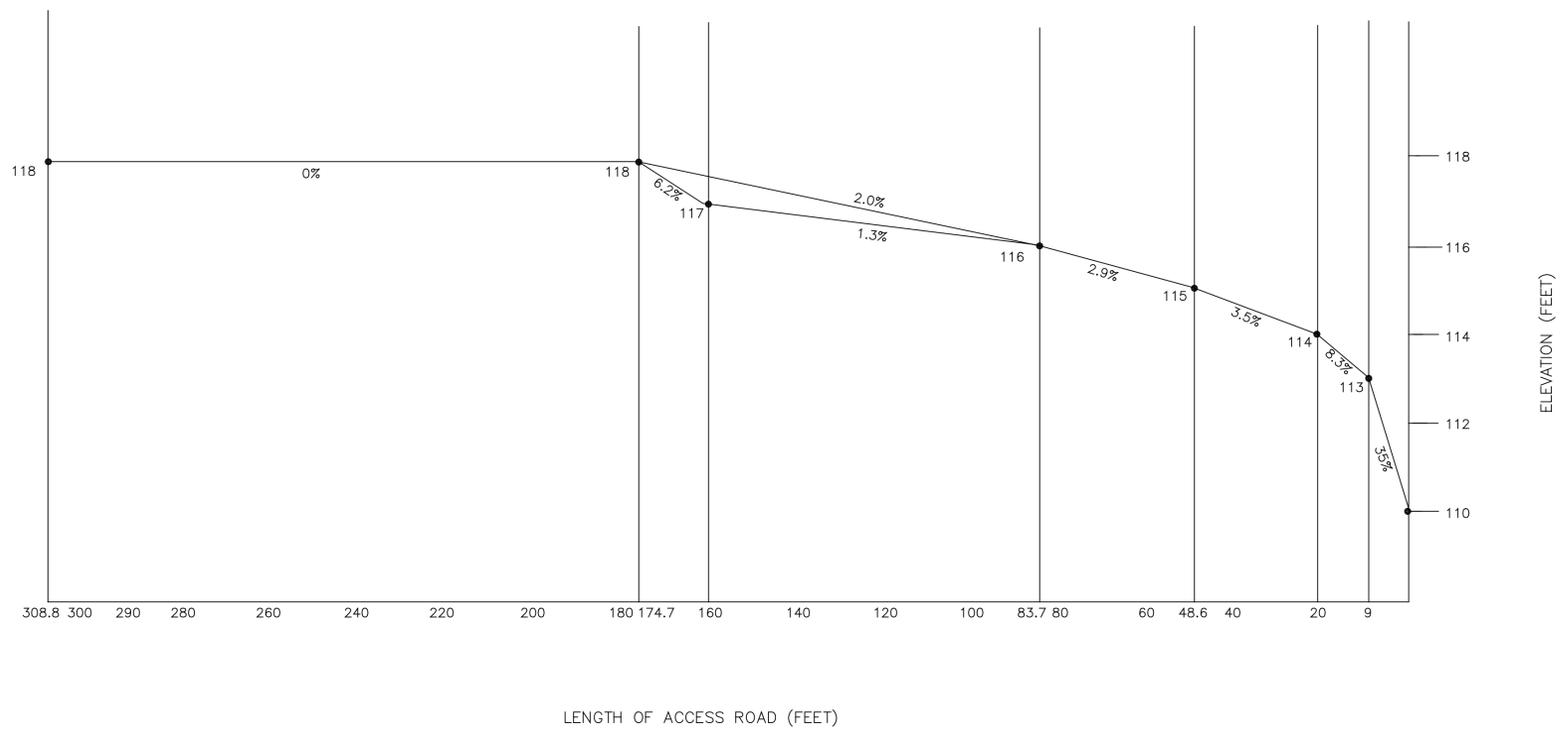
- LEGEND**
- EXISTING MONITORING WELL
  - EXISTING UTILITY POLE
  - SPOT ELEVATION
  - SECTION LINE
  - EXISTING MAJOR CONTOUR
  - EXISTING MINOR CONTOUR
  - PROPOSED CONTOUR
  - APPROXIMATE LANDFILL BOUNDARY
  - TOE OF SLOPE SPOT ELEVATION
  - PROPOSED SPOT ELEVATION
  - DIRECTION OF FLOW IN SWALE
  - PROPOSED SETTLEMENT MONUMENT
  - PROPOSED VENT PIPE
  - PROPOSED CABLE FENCE
  - EXISTING RAILROAD TRACKS
  - EXISTING ROAD
  - PROPOSED ACCESS ROAD



**SOURCE:**  
 TOPOGRAPHIC PLAN - SITE NO. 10, BOUCHER AND JAMES, INC., DOYLESTOWN, PA. DRAWN: JPD, CHECKED: CJB, SHEET: 1 OF 1, DATE: JUNE 22, 2001.

|  |             |   |      |   |  |
|--|-------------|---|------|---|--|
| DEPARTMENT OF THE NAVY<br>LESTER<br>COLTS NECK   |             | NAVY FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY |      | FOSTER WHEELER ENVIRONMENTAL<br>DATE: 7/26/02<br>CH. ENG. KEVIN FITZGERALD<br>SUBMITTED BY: KEVIN FITZGERALD (TEAM NUMBER)<br>NORTOWN: DM<br>PER: JPD<br>OFFICER IN CHARGE: APPROVED<br>DATE: |  |
| REV.   | DESCRIPTION | PREP BY   | DATE | APPROVD   |  |
|  |             |   |      |   |  |
| NAVAL WEAPONS STATION EARLE<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 10<br>PROPOSED FEATURES<br>DATE:   |             |   |      |   |  |
| SEAL AREA  |             |   |      |   |  |
| KEVIN FITZGERALD, P.E.<br>N.I.P.E. NO. GE31825<br>SAT TO: 80091<br>DATE: 7/26/02<br>CODE I.D. NO.: 80091<br>SCALE: 1"=30'<br>SPEC. NO.: 04-<br>CONSTR. CONTR. NO.: N62472-99-D-0032<br>NAVFAC DRAWING NO.: |             |   |      |   |  |
| SHEET 8 OF 12<br>DIS. SH. NO.:<br>SIZE: D C-7  |             |   |      |   |  |

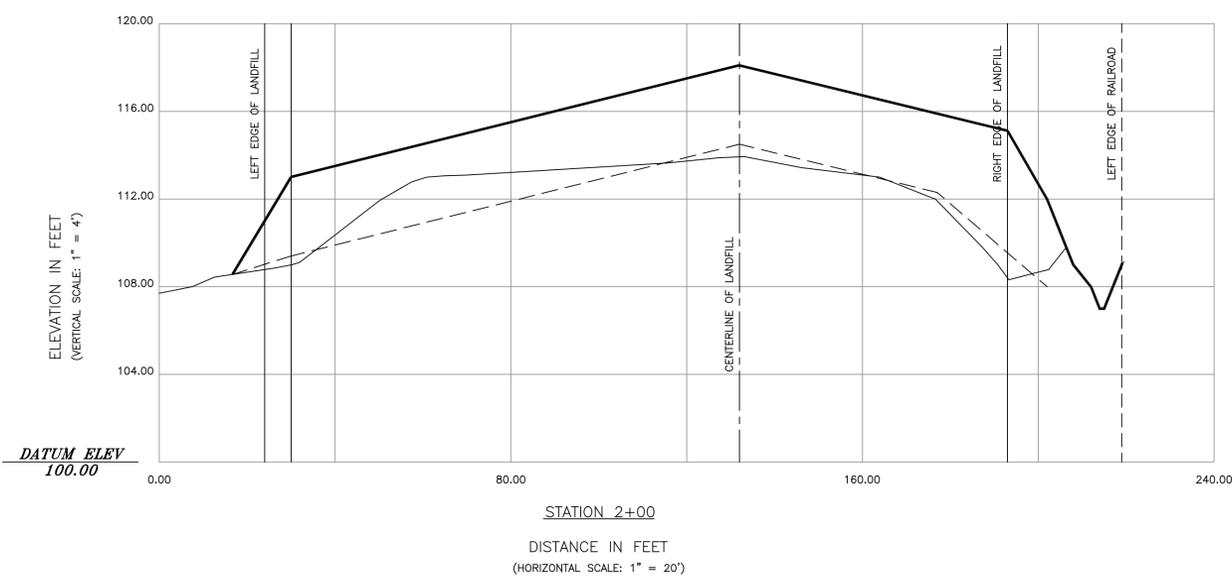
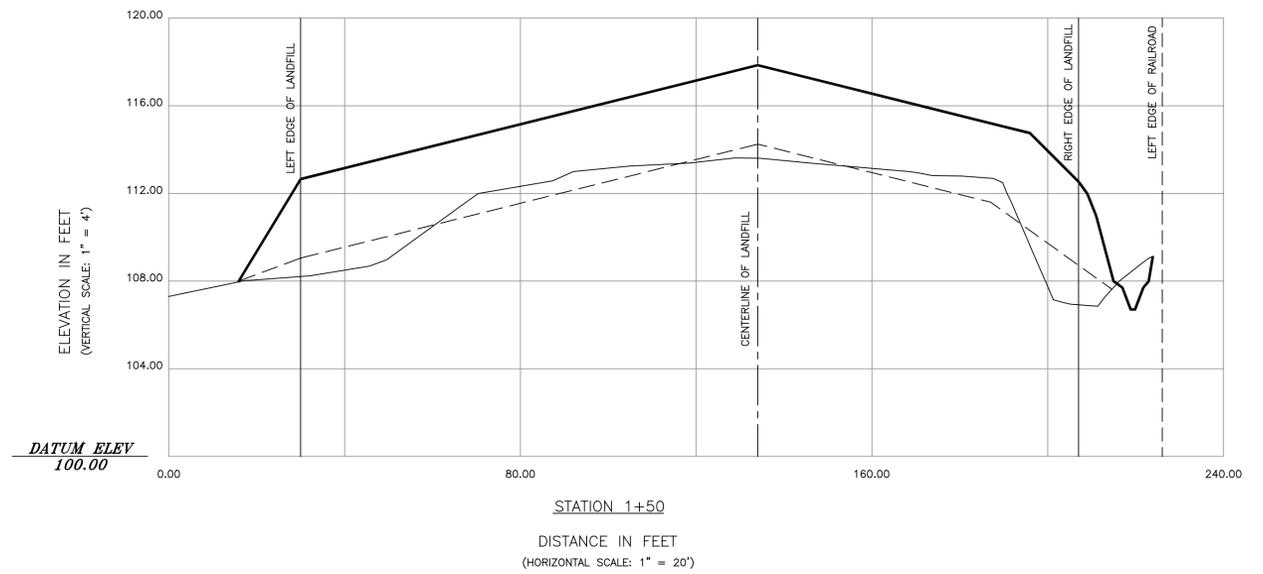
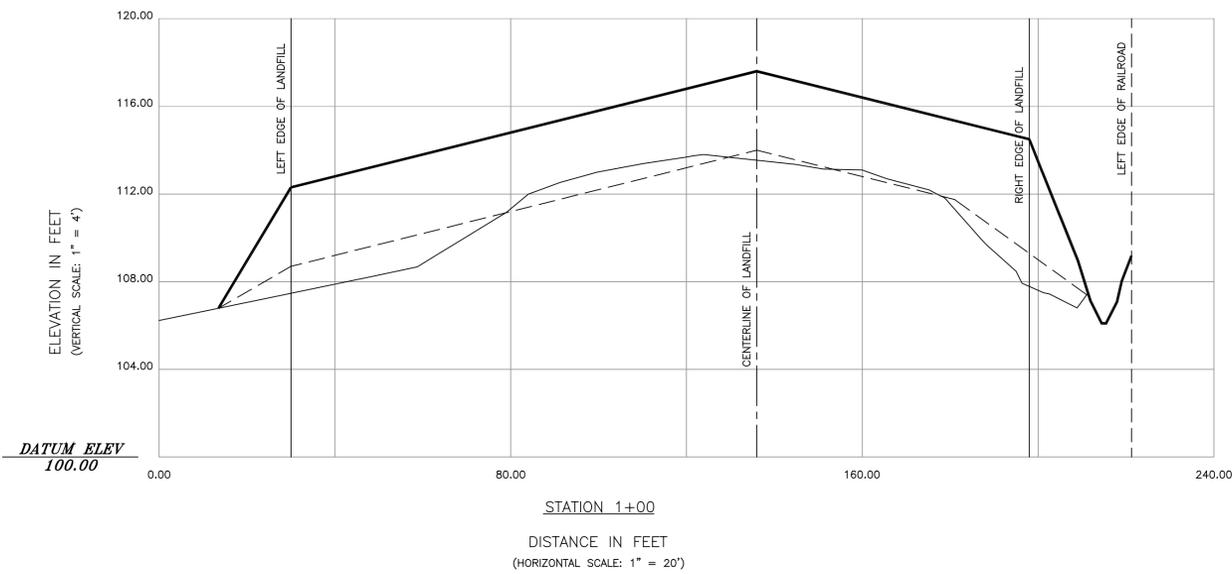
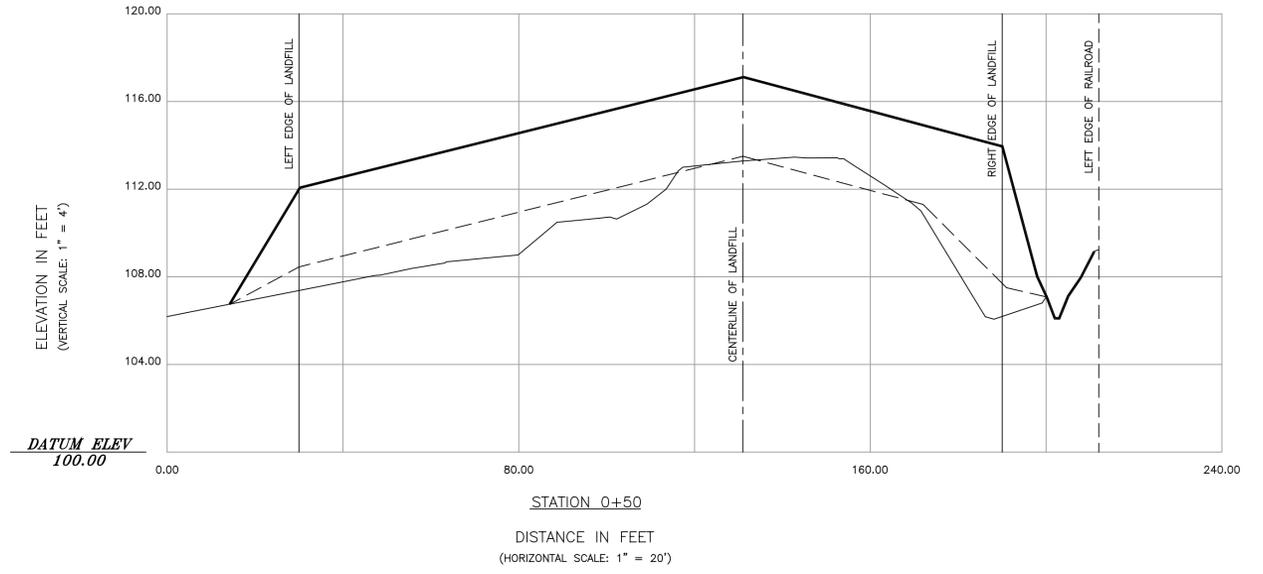
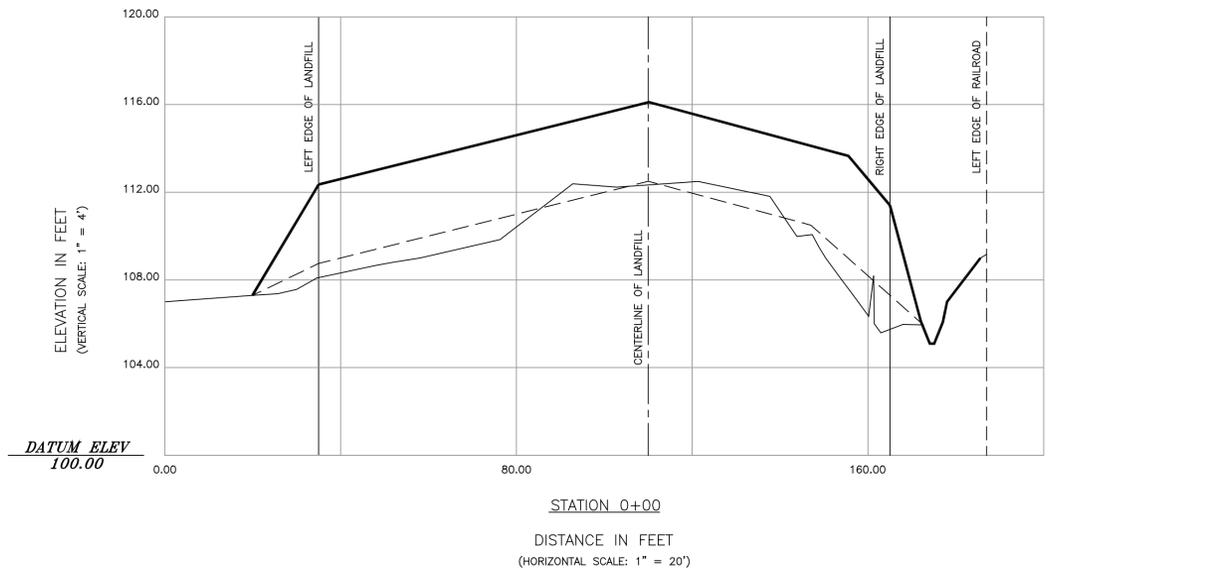




SCALE: VERTICAL 1" = 2'  
HORIZONTAL 1" = 20'

SECTION  $\frac{H}{C-7}$  ACCESS ROAD CENTERLINE  
N.T.S.

|  |                |           |
|--|----------------|-----------|
| DESIGNER: SP   | DATE: 07/26/02 | APPROVED: |
| SUPV: RW   | CHECKED: JAK   | DATE:     |
| SUBMITTED BY: KEVIN FITZGERALD<br>TITLE: PROJECT MANAGER |                |           |
| DRAWN BY: KEVIN FITZGERALD<br>TITLE: PROJECT MANAGER     |                |           |
| CHECKED BY: JAK<br>TITLE:                                |                |           |
| APPROVED BY: KEVIN FITZGERALD<br>TITLE: PROJECT MANAGER  |                |           |
| DATE: 07/26/02   |                |           |
| PROJECT: NAVAL WEAPONS STATION EARLE<br>SITE: 10         |                |           |
| DRAWING: PROPOSED SITE ACCESS ROAD SECTION               |                |           |
| DRAWING NO.: N62472-99-D-0032                            |                |           |
| SHEET 10 OF 12   |                |           |
| SIZE: D C-9  |                |           |



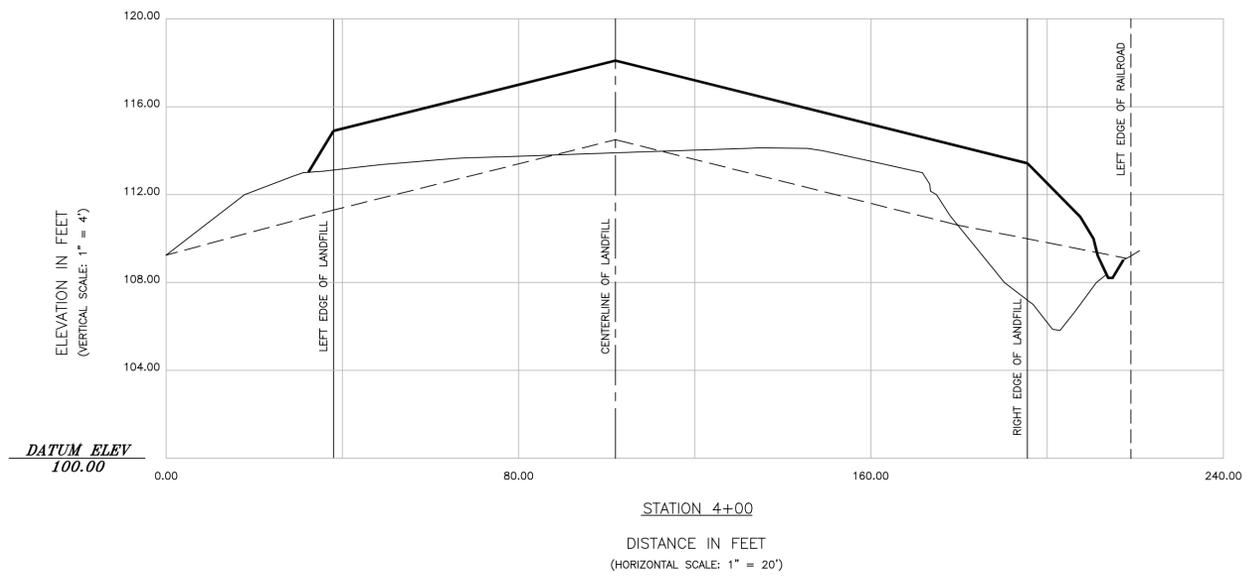
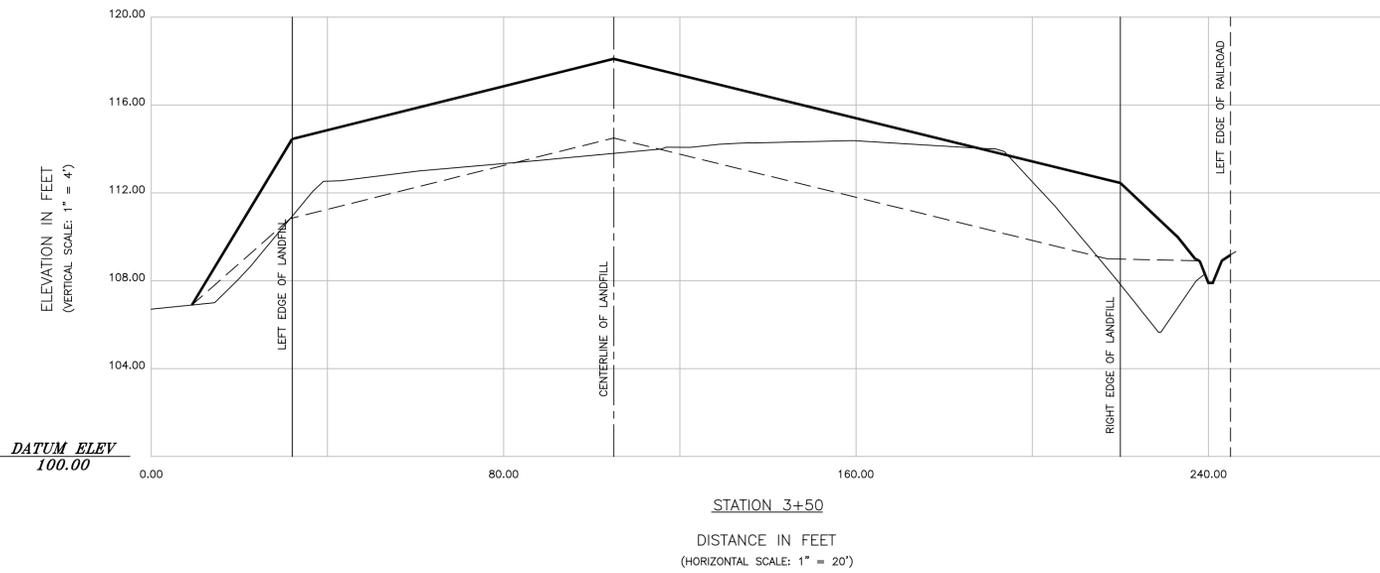
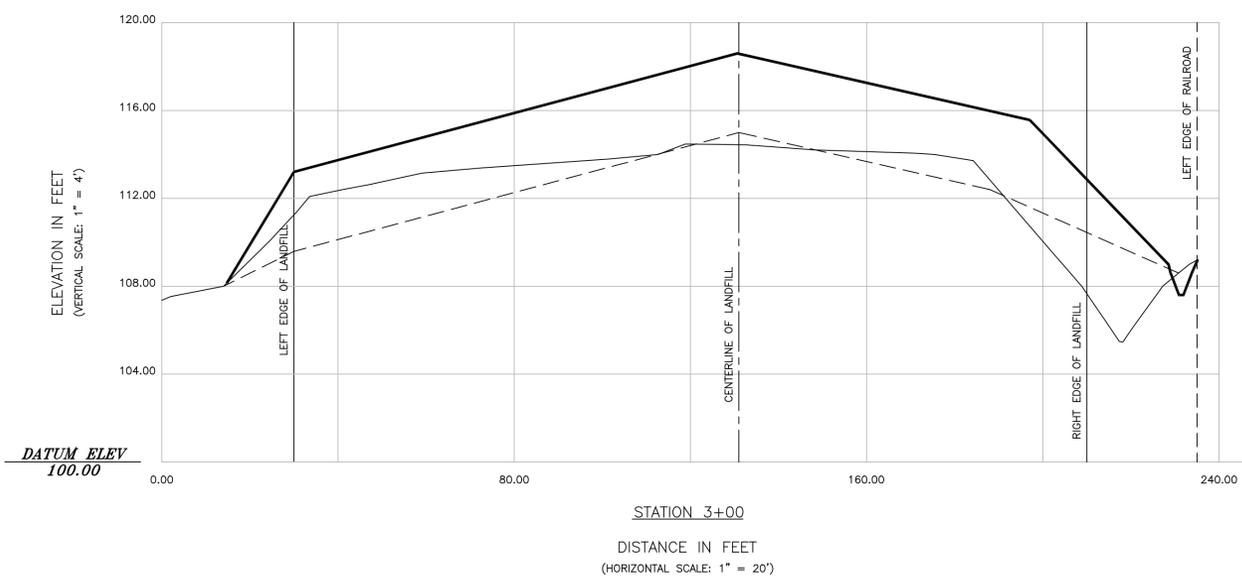
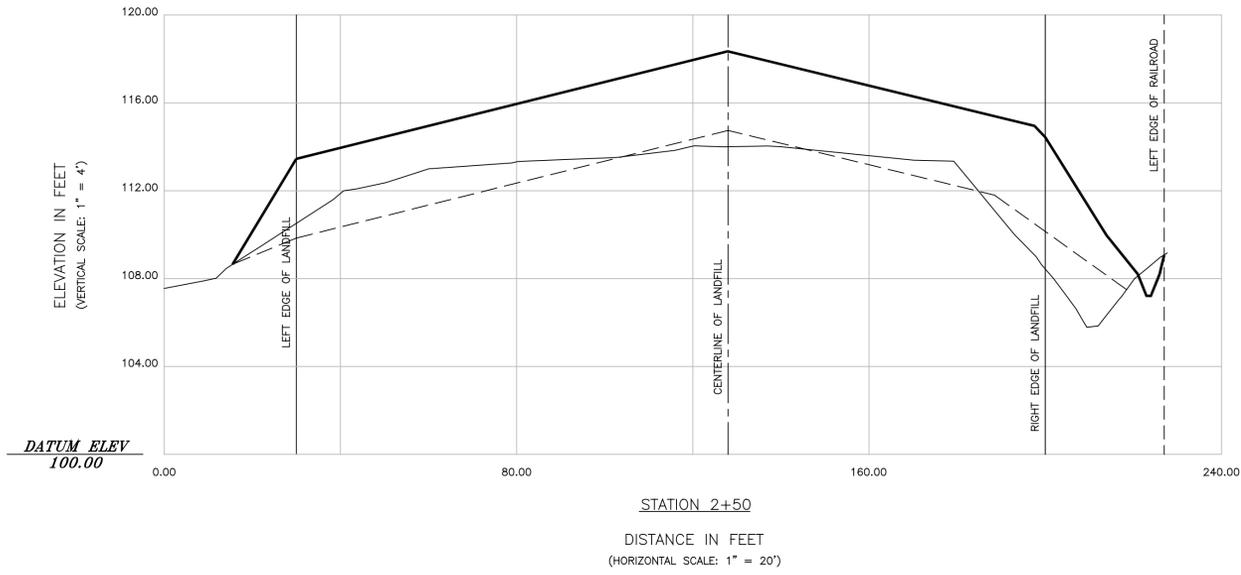
**LEGEND**

— EXISTING GRADE

- - - PROPOSED SUBGRADE

— PROPOSED FINAL GRADE

|  |                      |  |                 |                    |                 |
|--|----------------------|--|-----------------|--------------------|-----------------|
| DEPARTMENT OF THE NAVY<br>NAVAL FACILITIES ENGINEERING COMMAND<br>PENNSYLVANIA<br>NEW JERSEY |                      | <b>EPA NORTHEAST</b><br>NAVAL WEAPONS STATION EARLE<br>FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 10<br>GRADING SECTIONS |                 | APPROVED<br>DATE   |                 |
| SEAL AREA<br>KEVIN FITZGERALD, P.E.<br>NAJPE NO. GE31825                                     | LESTER<br>COLTS WEXK | REV.<br>DESCRIPTION<br>PREP BY<br>DATE<br>APPROVD  | DATE<br>APPROVD | DATE<br>APPROVD    | DATE<br>APPROVD |
| KEVIN FITZGERALD, P.E.<br>NAJPE NO. GE31825<br>SAT TO<br>DATE<br>7/26/02                     |                      | CODE ID. NO.<br>80091  |                 | SCALE : AS NOTED   |                 |
| SPEC. NO.<br>04-   |                      | CONSTR. CONTR. NO.<br>N62472-99-D-0032   |                 | NAVFAC DRAWING NO. |                 |
| SHEET<br>11<br>OF<br>12  | DIS. SH. NO.<br>C-10 | EFAVE FOR COMMANDER, NAVFAC  |                 |                    |                 |



- LEGEND**
- EXISTING GRADE
  - - - - - PROPOSED SUBGRADE
  - PROPOSED FINAL GRADE

|   |                                      |      |             |         |      |        |      |
|---|--------------------------------------|------|-------------|---------|------|--------|------|
| DEPARTMENT OF THE NAVY  | NAVAL FACILITIES ENGINEERING COMMAND | REV. | DESCRIPTION | PREP BY | DATE | APPROV | DATE |
| LESTER  | PENNSYLVANIA                         |      |             |         |      |        |      |
| COULTS NECK   | NEW JERSEY                           |      |             |         |      |        |      |
| <b>EPA NORTHEAST</b>  |                                      |      |             |         |      |        |      |
| NAVAL WEAPONS STATION EARLE   |                                      |      |             |         |      |        |      |
| FINAL DESIGN CONSTRUCTION DRAWINGS - LANDFILL CAP - SITE 10   |                                      |      |             |         |      |        |      |
| GRADING SECTIONS  |                                      |      |             |         |      |        |      |
| DATE  |                                      |      |             |         |      |        |      |
| EPA FOR COMMANDER, NAVFAC   |                                      |      |             |         |      |        |      |
| APPROVED  |                                      |      |             |         |      |        |      |
| KEVIN FITZGERALD, P.E.<br>NAPE NO. 0631825<br>SAT TO DATE<br>7/26/02<br>CODE I.D. NO. 80091<br>SCALE: AS NOTED<br>SPEC. NO. 04<br>CONSTR. CONTR. NO. N62472-99-D-0032<br>NAVFAC DRAWING NO. |                                      |      |             |         |      |        |      |
| SHEET 12 OF 12  |                                      |      |             |         |      |        |      |
| SIZE: D   | DIS. SH. NO. C-11                    |      |             |         |      |        |      |

**APPENDIX B**  
**SPECIFICATIONS**

# **REMEDIAL ACTION WORK PLAN**

## **FINAL Technical Specifications for Submission Remedial Action at Operable Unit 6 (Sites 3 and 10)**

### **VOLUME II of III**

#### **NAVAL WEAPONS STATION EARLE Colts Neck, New Jersey**

Prepared for:

**ENGINEERING FIELD ACTIVITY NORTHEAST (EFANE)  
10 Industrial Highway  
LESTER, PA 19113**

**Contract Number N62472-99-D-0032  
Contract Task Order 040**

**July 2002**

Prepared by:



**FOSTER WHEELER ENVIRONMENTAL CORPORATION (FWENC)  
One Oxford Valley, Suite 200  
LANGHORNE, PA 19047-1829**

**FINAL**  
**Technical Specifications**  
**for**  
**Design Submission**  
**Remedial Action at**  
**Operable Unit 6 (Sites 3 and 10)**

**NAVAL WEAPONS STATION EARLE**  
**Colts Neck, New Jersey**

Prepared for:

**ENGINEERING FIELD ACTIVITY NORTHEAST (EFANE)**  
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**One Oxford Valley, Suite 200**  
**LANGHORNE, PA 19047-1829**

| <u>Revision</u> | <u>Date</u> | <u>Prepared by</u> | <u>Approved by</u> | <u>Pages Affected</u> |
|-----------------|-------------|--------------------|--------------------|-----------------------|
| 0               | 07/23/01    | M. Lavin           | F. Ahtchi-Ali      | All                   |
| 1               | 09/10/01    | M. Lavin           | F. Ahtchi-Ali      | All                   |
| 2               | 07/15/02    | M. Lavin           | F. Ahtchi-Ali      | All                   |

**Design Analysis Report for the Final Design Submission  
Remedial Action at Operable Unit 6 (Sites 3 and 10)  
NAVAL WEAPONS STATION EARLE  
Colts Neck, New Jersey**

**TECHNICAL SPECIFICATIONS  
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SECTION 01010

SUMMARY OF WORK

PART 1. GENERAL

1.1 DESCRIPTION

- A. This Section describes in general the Project and the Work to be performed under this Delivery Order. Detailed requirements and the extent of all Work are stated in the applicable Specification Sections and are shown on the Contract Drawings.
- B. The following words and terms, for the purpose of this Contract, have the following meaning:
  - 1. Navy: shall mean the U. S. Navy Facilities Engineering Command – Engineering Field Activities – Northeast.
  - 2. Contracting Officer: shall mean the person or designee authorized by the Navy to administer the Contract and supervise all Project Work performed under the Contract.
  - 3. Engineer: shall mean Foster Wheeler Environmental Corporation (FWENC).
  - 4. Delivery Order Manager: shall mean the FWENC employee assigned such responsibility by the Navy, and shall also include FWENC employees designated by the Delivery Order Manager (e.g. on-site Construction Supervisor).
  - 5. Contractor: shall mean FWENC under contract with the Navy to perform the Work in accordance with approved Technical Specifications and Contract Drawings.
  - 6. Contract: shall mean all Project Work covered by the Contract Documents including Technical Specifications/Contract Drawings and sketches, and the Health and Safety Plan.
- C. This Section should be read in conjunction with other specifically referenced Sections and with the Contract Drawings to establish the total requirements of the Work.
- D. Specification Sections and Contract Drawings included in these documents establish the performance, quality requirements, location, and general arrangement of materials and equipment, and establish the minimum standards for quality workmanship and appearance.
- E. This Section does not provide the technical detail of the referenced Sections for particular Work Activities but describes the scope under general conditions work.
- F. The Contractor shall furnish all labor, equipment, appliances, and materials, and carry out all operations as necessary to complete the Work. The Contractor shall

also perform the Work in strict accordance with these Technical Specifications and the Contract Drawings.

- G. All Work is subject to the Terms and Conditions of the Navy's Remedial Action Contract (RAC).

## 1.2 REFERENCES

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

### SITE INVESTIGATION DATA

(2001) Proposed Plan for Site 3 and 10 (OU-6), Naval Weapons Stations Earle, Colts Neck, New Jersey, prepared by Tetra Tech NUS, Inc.

(2001) Contract Task Order No. 40, Statement of Work under Remedial Action Contract N67472-99-R-0032, Code 1821/JPK.

## 1.3 SUBMITTALS

### A. As-Built Drawings

The Contractor shall provide at the completion of the Work, red-lined Drawings showing all deviations which have been made from the Contract Drawings. These red-lined Drawings shall be used to generate As-Built Drawings for the Navy.

### B. Progress Schedule

The Contractor shall submit a progress schedule on a weekly basis to the Contracting Officer for approval. When Change Orders of field changes are authorized by the Contracting Officer, the Contractor shall submit a modified schedule for approval.

## 1.4 SCOPE OF WORK

The Work included in this Project as issued under the Navy's RAC (No. N62472-99-D-0032), Naval Facilities Engineering Command, Engineering Field Activity, Northeast, Delivery Order #40, consists of the proper closure of two landfills (Sites 3 and 10) located at the Naval Weapons Station Earle, Colts Neck, New Jersey. The closures generally include the construction of a 3-foot thick soil cover cap at Site 3 and a multi-layer system cap at Site 10.

- A. The Contractor shall be responsible for contacting the appropriate local officials to obtain information and requirements concerning Work affecting local municipalities including, but not limited to, permits, licenses, certifications and truck routes.
- B. The Contractor shall prepare and submit for approval a detailed Construction Work Plan with Construction Schedule and implement this plan, the Technical Specifications including the Erosion and Sediment Control Plan and the Site Specific Health and Safety Plan. All plans shall be approved by the Contracting

Officer and appropriate local authorities prior to the initiation of related Work. Work should consider the safety of and minimal disturbance to adjacent properties.

- C. In the instances where conflicts occur between the Contract Drawings and Technical Specifications, the Technical Specifications shall govern.

## 1.5 SITE 3 SCOPE OF WORK

The Work associated with Site 3 shall include, but not be limited to, the following:

### A. Mobilization

The Contractor shall furnish all necessary labor, materials, and equipment to perform the Work which shall include, but is not limited to, a temporary field office and storage facilities. The Contractor shall be responsible for performing all Site Work in accordance with the approved plans as required to provide for the complete installation/construction of the three foot cover landfill cap.

### B. Clearing and Grubbing

Clearing and grubbing shall consist of the removal and satisfactory disposal of vegetation designated for removal, including shrubs, snags and brush occurring within the Contractor's Work Area. Clearing operations shall be conducted in a manner that prevents damage to existing structures and installations, and that provides for the safety of employees and others.

### C. Erosion and Sediment Control

The Contractor shall be responsible for the installation and maintenance of all erosion and sediment control measures as detailed in these Technical Specifications and as shown on the Contract Drawings.

### D. Demolition

The Contractor shall be responsible for the proper and safe demolition of two existing small wooden structures located on-site. The locations of these wooden structures are shown on the Contract Drawings. These structures shall be disposed of off-site.

### E. Off-Site Transportation and Disposal

The Contractor shall be responsible for performing off-site transportation and disposal of existing construction debris, demolished wooden structures, the former skeet range, and materials generated during clearing and grubbing activities (e.g. all tree trunks, limbs, roots, stumps, brush, foliage, other vegetation, excess materials as determined by the Contracting Officer, and objectionable material from clearing and grubbing activities). The Navy shall be responsible for performing characterization sampling and analytical testing of materials to be disposed off-site. The Navy shall provide the results of characterization sampling and analytical testing within 48 hours of testing so as not to impact the project schedule.

F. Preparation of Subgrade

The Contractor shall be responsible for all Work to prepare the sub-grade of the three foot soil cap which includes, but is not limited to, all cut and fill operations necessary to bring the sub-grade to the elevations as shown on the Contract Drawings.

G. Placement of Three-Foot Soil Cover Cap

The Contractor shall be responsible for all Work associated with the construction of a three-foot soil cover cap on Site 3 including providing the required materials for constructing the cap to the final grades as detailed in these Technical Specifications and as shown on the Contract Drawings. The soil cover cap shall be constructed to promote surface run-off and shall be a minimum of 36 inches in thickness consisting of the following layers, listed in descending order:

1. Six inches of top soil to support final seeding and vegetation.
2. Thirty inches of cover soil material.

H. Seeding

The Contractor shall be responsible for all Work associated with seeding of Site 3 upon completion of construction of the three-foot soil cover cap including but not limited to scarifying the seed bed, furnishing and placing pulverized agricultural limestone, commercial fertilizer, seed, mulching and maintaining seeded areas. All limestone, fertilizer, seed and mulch mixtures and planting schedules shall comply with the requirements of the Freehold Soil Conservation District and the Navy's Forester.

I. Storm Water Management Measures

The Contractor shall be responsible for all Work associated with the installation of storm water control devices including the installation of all drainage ditches and reinforced concrete pipe and headwalls as detailed in these Technical Specifications and as shown on the Contract Drawings.

J. Site Access Road

The Contractor shall be responsible for all Work associated with the construction of the site access road. The Work shall be performed in accordance with these Technical Specifications and the Contract Drawings.

K. Monitoring Wells

The Contractor shall be responsible for all Work associated with the installation of new monitoring wells and extension of existing monitoring wells. The Work shall be performed in accordance with these Technical Specifications and the Contract Drawings.

L. Removal and Disposal of all Erosion and Sediment Control Measures

The Contractor shall be responsible for removal, and transportation and off-site disposal of all temporary erosion and sediment control measures upon final approval of the Work by the Contracting Officer.

M. Installation of Cable Fence with Warning Signs

The Contractor shall be responsible for providing all labor, materials, and equipment for the installation of the cable fence with warning signs as specified in the Technical Specifications and as shown on the Contract Drawings. The Contractor shall also be responsible for providing warning signs and their placement on the cable fence posts as specified in these Technical Specifications.

N. Demobilization

Upon the completion of the Project, the Contractor shall be responsible for decontaminating (if necessary) and cleaning all materials and equipment prior to removing them from the Site. All stockpiles of surplus materials shall be removed and disturbed areas graded and seeded. All temporary facilities and utilities shall be removed.

O. Project Closeout and Record Documents

The Contractor shall provide closeout documents, certifications, and As-Built Drawings upon completion of all field activities to the Contracting Officer.

1.6 SITE 10 SCOPE OF WORK

The Work associated with Site 10 shall include, but not be limited to, the following:

A. Mobilization

The Contractor shall furnish all necessary labor, materials, and equipment to perform the Work which shall include, but is not limited to, a temporary field office and storage facilities. The Contractor shall be responsible for performing all Site Work in accordance with the approved plans as required to provide for the complete installation/construction of the multi-layer system landfill cap.

B. Clearing and Grubbing

Clearing and grubbing shall consist of the removal and satisfactory disposal of vegetation designated for removal, including shrubs, snags and brush occurring within the Contractors Work Area. Clearing operations shall be conducted in a manner that prevents damage to existing structures and installations, and that provides for the safety of employees and others.

C. Erosion and Sediment Control

The Contractor shall be responsible for the installation and maintenance of all erosion and sediment control measures as detailed in these Technical Specifications and as shown on the Contract Drawings.

D. Off-Site Transportation and Disposal

The Contractor shall be responsible for performing off-site transportation and disposal of existing construction debris and materials generated during clearing and grubbing activities (e.g. all tree trunks, limbs, roots, stumps, brush, foliage, other vegetation, excess materials as determined by the Contracting Officer, and objectionable material from clearing and grubbing activities). The Navy shall be responsible for performing characterization sampling and analytical testing of materials to be disposed off-site. The Navy shall provide the results of characterization sampling and analytical testing within 48 hours of testing so as not to impact the project schedule.

E. Preparation of Subgrade

The Contractor shall be responsible for all Work to prepare the sub-grade of the multi-layer system landfill cap which includes, but is not limited to, all cut and fill operations necessary to bring the sub-grade to the elevations as shown on the Contract Drawings.

F. Placement of the Multi-Layer System Cap

The Contractor shall be responsible for all Work associated with the construction of a multi-layer system cap on Site 10 including providing the required materials for constructing the cap to the final grades as detailed in these Technical Specifications and on the Contract Drawings. This multi-layer system cap shall be a minimum of 42 inches in thickness and will consist of the following layers, listed in descending order:

1. Six inches of top soil to support final seeding and vegetation;
2. Twelve inches of cover soil material;
3. 8 ounce Geotextile Fabric layer;
4. Twelve inches of drainage layer (poorly graded sand);
5. 60 mil HDPE liner; and
6. Twelve inches of granular material as a gas management layer.

G. Seeding

The Contractor shall be responsible for all Work associated with seeding Site 10 upon completion of the construction of the multi-layer system cap including but not

limited to scarifying the seed bed, furnishing and placing pulverized agricultural limestone, commercial fertilizer, seed, mulching and maintaining seeded areas. All limestone, fertilizer, seed and mulch mixtures and planting schedules shall comply with the requirements of the Freehold Soil Conservation District and the Navy's Forester.

H. Storm Water Management Measures (Drainage Ditches)

The Contractor shall be responsible for all Work associated with the installation of storm water control devices including the installation of all drainage ditches as detailed in these Technical Specifications and as shown on the Contract Drawings.

I. Site Access Road

The Contractor shall be responsible for all Work associated with the construction of the site access road. The Work shall be performed in accordance with these Technical Specifications and the Contract Drawings.

J. Removal and Disposal of all Erosion and Sediment Control Measures

The Contractor shall be responsible for removal, and transportation and off-site disposal of all temporary erosion and sediment control measures upon final approval of the Work by the Contracting Officer.

K. Installation of Landfill Gas Controls

The Contractor shall be responsible for furnishing all materials and providing all labor necessary to install PVC piping through the multi-layer system cap. All landfill gas controls shall be installed in locations and to depths as detailed in these Technical Specifications and as shown on the Contract Drawings.

L. Installation of Cable Fence with Warning Signs

The Contractor shall be responsible for providing all labor, materials, and equipment for the installation of the cable fence with warning signs as specified in these Technical Specifications and as shown on the Contract Drawings. The Contractor shall also be responsible for providing warning signs and their placement on the cable fence posts as specified in these Technical Specifications.

M. Demobilization

Upon the completion of the Project, the Contractor shall be responsible for decontaminating (if necessary) and cleaning all materials and equipment prior to removing them from the Site. All stockpiles of surplus materials shall be removed and disturbed areas graded and seeded. All temporary facilities and utilities shall be removed.

N. Project Closeout and Record Documents

The Contractor shall provide closeout documents, certifications, and as-built Drawings upon completion of all field activities to the Contracting Officer.

## 1.7 PROJECT / SITE CONDITIONS

Data and information furnished or referred to below are for the Contractor's information. The Navy, the Engineer and/or the Contracting Officer shall not be responsible for any interpretation or conclusions drawn from the data.

### A. Site Description

The Naval Weapons Station Earle (NWS Earle) is located in Colts Neck, Monmouth County, New Jersey. A feasibility study (FS) was completed in September 2000 for Operable Unit 6 (OU-6) located within the ordnance area of NWS Earle to address contamination associated with Site 3 and 10 at NWS Earle. The Feasibility Study (FS) was completed as part of the Navy's Installation Restoration Program (IRP) and the Superfund Remedial Program (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA]).

The IRPs at NWS Earle were broken into operable units (OU) comprising Sites with similar characteristics through previous Remedial Investigations and to save time and money. The following is a description of the Sites which are included in OU-6 as part of this Contract:

1. Site 3 is a 5-acre landfill used from 1960 to 1968 for the disposal of domestic and industrial wastes. Available records, as well as test pits dug during the Remedial Investigation, indicate that the industrial waste disposed in Site 3 comprises a small portion of the approximately 4,800 tons of waste material buried there.
2. Site 10 is a 2-acre landfill adjacent to the former demilitarization furnace used from 1953 to 1965 for the disposal of demilitarized metals from munitions and spent munitions casings. Spent blasting grit and paint chips were also buried in Site 10.

### B. Data and information furnished or referred to below are for the Contractor's information. The Navy, the Engineer and/or the Contracting Officer shall not be responsible for any interpretation or conclusions drawn from the data.

1. Site Conditions: The indications of physical conditions on the Contract Drawings and in the Technical Specifications are the result of site investigations and surveys. The conditions represented prevailed at the time that the investigations and surveys were made. Before commencing Work, the Contractors shall verify the existing conditions noted on the Contract Drawings and in the Technical Specifications.
2. Transportation Facilities: The Contractor shall make his/her own investigations as to the use of Local, State, and Federal highways, roads, streets, and bridges.

## 1.8 SEQUENCING AND SCHEDULING

The Work shall be planned, scheduled, and performed in stages in order to complete the Work within the requirements of the Navy's Scope of Work Document.

### A. Stage 1 – Project Startup and Mobilization

Project startup shall include the following activities which shall not necessarily be conducted in the following order:

1. Develop and submit all required pre-construction submittals to the Contracting Officer for approval.
2. Conduct site-specific safety training.
3. Provide personnel lunch area and hygiene facilities.
4. Install barrier fencing, gates and signs as needed to establish Work Zones and restrict access to the Site.
5. Construct/maintain administration area.
  - a) Safety equipment and supply storage; and
  - b) Parking areas.
6. Install materials and equipment for decontamination operations, if necessary.
7. Provide all permit documentation and obtain necessary approvals.

### B. Stage 2 – Remedial Operations

The remedial operations shall include all activities as described in these Technical Specifications and in the Contract Drawings.

### C. Stage 3 - Demobilization

1. Decontaminate (if necessary), clean, and remove from Site all construction equipment and facilities.
2. Dispose of all materials generated during and after construction operations, at appropriate facilities.

## 1.9 AS-BUILT DRAWINGS

The Contractor shall maintain at the Job Site one set of full-size Drawings marked to show any deviations which have been made from the Contract Drawings, including buried or concealed construction and utility features revealed during the course of construction. The Contractor shall record the horizontal and vertical location of all buried utilities that differ from the Contract Drawings. These Drawings shall be available for review by the Contracting Officer at all times.

Upon completion of the Work, the Contractor shall submit the original marked set of prints to the Contracting Officer.

- A. Preparation of As-Built Drawings: Changes to the Contract Drawings shall be made in the Job Site set of prints at the time field changes are made, pertinent information is collected, or the need for corrections is established as a continuing process during the life of the Contract. As revised Drawings are issued by the Engineer, revised prints shall be introduced into the set to replace the superseded Drawings and all applicable notations previously made on the superseded Drawings transferred to the current prints. Carefully prepare sketches, on sheets not less than 8-1/2" by 11", may be used to depict changes or added information in lieu of notations on the actual prints. All plan views, sections, elevations, profiles, diagrams, details, or schedules affected by the change shall be marked up as required to reflect the change. All notations or changes made on the prints shall be in sufficient detail to clearly depict the change. Colored pens or pencils shall be used to make notations on As-Built Drawings as follows:

Red pen or pencil shall be employed to indicate added or corrected Work or information.

Green pen or pencil shall be employed to show the deleted or incorrectly depicted Work or information.

Blue or black pen or pencil shall be used to show information not to be recorded on the Drawings but included on the marked-up prints for explanatory or clarification purposes for the benefit of the Engineer.

#### 1.10 PROJECT SCHEDULE

- A. The Contractor shall prepare a schedule of construction activities to ensure the full coordination of Work and persons engaged to perform Work.
- B. All Work shall be coordinated between the Contractor, any Subcontractors, and existing facilities. The schedule shall be approved by the Contracting Officer prior to start of Work.
- C. The project schedule shall be a timeline of construction activities which clearly indicates the order of Work and the interrelationship of all items of Work as specified in Section 01300, Paragraph 1.9.
- D. The project schedule shall be updated for the weekly progress meetings to reflect any events affecting the schedule of Work and shall be included in the Weekly Summary Reports, as specified in the CQC Plan.
- E. The project schedule shall be in table format (GANTT chart) and include a written description of items.

## PART 2. PRODUCTS

### 2.1 MATERIALS

If items called for by this Technical Specification have been identified by a "brand name" description, such identification is intended to be descriptive, but not restrictive, and is to indicate the quality and characteristics of products that will be satisfactory, unless otherwise specifically provided in this Contract.

## PART 3. EXECUTION

### 3.1 GENERAL

- A. The Contractor is advised that the Work will be performed on a Hazardous Waste Site. The Contractor is responsible for developing and complying with the Site Specific Health and Safety Plan (SSHSP) accepted by the Contracting Officer for his/her operations. The Contractor shall implement this plan taking precautions necessary to protect the public and work force personnel from potential hazards. The Contractor shall utilize personnel with approved hazardous waste training.
- B. The Contractor shall protect existing underground and aboveground facilities from damage, whether or not they lie within the limits of the Contractor's Work Area, unless specifically designated for removal. Where such existing facilities must be removed in order to properly carry out the construction, or are damaged during construction, the Contractor shall restore them to their original condition. The Contractor shall notify the Contracting Officer of any damaged facilities and make repairs or replacements.
- C. The Contractor shall locate and verify the location of all active, existing facilities and structures on the Site.
- D. The Contractor shall verify the locations of utilities and facilities shown on the Drawings, and determine the presence of those not shown. Immediate and adjacent areas where excavations are to be made shall be thoroughly checked by visual examination for indications of underground utilities and also checked with electronic metal and pipe detection equipment prior to excavation.
- E. Where the Contractor's operations could cause damage or inconvenience to telephone, television, power, oil, gas, water or sewer utilities, the Contractor shall make arrangements necessary for the protection of these utilities and services. The Contractor shall replace existing utilities removed or damaged during construction, unless otherwise provide for in these documents.
- F. The Contractor shall notify utility offices that are affected by construction operations in writing at least 30 days in advance of Work. Under no circumstances shall the Contractor expose any utility without first obtaining permission from the appropriate agency. Once permission has been granted, the Contractor shall locate, expose, and provide temporary support for the utilities.

- G. In the event of interruption to domestic water, sewer, storm drain, or other utility services as a result of constructions operations, the Contractor shall promptly notify the proper agency or authority and the Contracting Officer. The Contractor shall cooperate with said agency or authority in restoration as promptly as possible at no cost to the Navy. The Contractor shall take all measures necessary to prevent the interruption of utility services unless so granted by the utility owner.
- H. The Contractor shall notify the applicable utilities if conflicts or emergencies arise during the Work.
- I. For Work performed in close proximity to the properties of businesses, utilities or other parties, the Contractor shall utilize every precaution to protect the property, utility lines, tress, walls and other structures from damage. Any damage that the Contractor may inflict shall be repaired or replaced in a prompt manner as directed by the Contracting Officer.

### 3.2 CONTRACTOR'S USE OF PREMISES

- A. The Contractor shall minimize the use of the Site Area for storage.
- B. The Contractor shall assume full responsibility for the protection and safe keeping of products under this Contract that are stored on-site during the construction activities.

### PART 4. FIELD SUPERVISION AND TESTING

Not used.

\*\*\* END OF SECTION \*\*\*

## SECTION 01019

### MOBILIZATION AND DEMOBILIZATION

#### PART 1. GENERAL

##### 1.1 DESCRIPTION

The Contractor shall be responsible for the Mobilization and Demobilization of all equipment, labor and materials as indicated in this Section. The Contractor shall follow all Site and Safety regulations.

##### 1.2 RELATED DIVISIONS

Related Work and/or equipment that is specified in other Divisions of the Contract Document includes, but is not limited to, the following:

|             |                      |
|-------------|----------------------|
| Division 1  | General Requirements |
| Division 2  | Site Work            |
| Division 3  | Concrete             |
| Division 15 | Mechanical           |

##### 1.3 SUBMITTALS

Not used.

##### 1.4 MOBILIZATION

###### A. Mobilization shall include:

1. Mobilization of all construction equipment, materials, supplies, and manpower required for commencing and performing the Work.
2. Preparation of the Contractor's Work Area.
3. Delivery and complete assembly of equipment, in working order, necessary to perform the required Work. Provide labor necessary for commencement and completion of the Work.

##### 1.5 DEMOBILIZATION

Demobilization shall include:

- A. Subsequent removal from the Site of all construction equipment, materials, supplies, and appurtenances.
- B. Cleaning and restoration of the Site, and staging areas, upon completion of the Work.
- C. Decontamination of all equipment prior to leaving the Site in accordance with the HASP and Emergency Response and Contingency Plan.

PART 2. PRODUCTS

Not Used.

PART 3. EXECUTION

Not Used.

PART 4. FIELD SUPERVISION AND TESTING

4.1 CONSTRUCTION QUALITY CONTROL

- A. Field Supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.

\*\*\*END OF SECTION\*\*\*

## SECTION 01052

### FIELD SURVEYS

#### PART 1. GENERAL

##### 1.1 DESCRIPTION

A land surveyor licensed in the State of New Jersey shall provide field surveying services. The Subcontractor shall provide initial field survey staking and will maintain control points outside the construction area. The Subcontractor shall be responsible for maintaining the survey stakes. The accuracy of all subsequent staking (if any), alignments and grades is the Subcontractor's responsibility.

##### 1.2 RELATED SECTIONS

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

- Section 01300 Submittals
- Section 01320 Submittal Register
- Section 01700 Project Closeout and Project Record Documents

##### 1.3 SUBMITTALS

The Subcontractor shall submit the following items in accordance with Section 01300, "Submittals":

- A. Name, address, telephone number, and proof of Land Surveyor registration of surveyor before start of survey work;
- B. On request, documentation verifying accuracy of survey work;
- C. Survey drawings;
- D. A copy of the field survey notes and computer printout; and
- E. Surveying Subcontractor close-out documents.

##### 1.4 PROJECT RECORD DOCUMENTS

- A. A complete and accurate log of control and survey Work shall be maintained as it progresses.
- B. The Subcontractor shall submit Project Closeout and Record Documents in accordance with Section 01700, "Project Closeout and Project Record Documents."

1.5 EXAMINATION

- A. The Subcontractor shall verify locations of survey control points prior to start of Work.
- B. The Contractor shall be notified of any discrepancies discovered.

1.6 SURVEY REFERENCE POINTS

- A. The Contractor and Subcontractor shall locate and protect survey control and reference points.
- B. Control datum for field surveys shall be described in the survey report which will be supplied by the Subcontractor.
- C. The Contractor and Subcontractor shall provide additional protection as necessary for the survey control points prior to starting Site Work. The Contractor and Subcontractor shall preserve permanent reference points during construction activities.
- D. The loss or destruction of any reference point or relocation required because of changes in grades or other reasons shall be promptly reported to the Contractor.
- E. If the Subcontractor disturbs survey control points, the Contractor shall be notified. The Contractor shall replace disturbed survey control points based on original survey control at the Subcontractor's expense. No changes shall be made without prior written notice to the Navy.
- F. Additional control points deemed necessary for performance of the Work shall be installed by the Subcontractor.
- G. If the Subcontractor disturbs or removes property boundary corners, the Contractor shall be notified. The Contractor shall replace disturbed or removed property boundary corners.

1.7 SURVEY REQUIREMENTS

- A. Recognized engineering survey practices shall be utilized.
- B. The Subcontractor shall periodically verify elevations, lines and levels by instrumentation and similar appropriate means: stakes for grading, fill placement, and slopes.
- C. Survey measurements shall have horizontal and vertical tolerances within  $\pm 0.1$  feet.
- D. Stakes shall not be installed over the geomembrane liner.
- E. A licensed surveyor shall sign the survey Drawings.

## 1.8 SURVEYS FOR MEASUREMENT

The Subcontractor shall perform surveys to determine quantities of unit work, to establish measurement reference lines. The Contractor shall be notified prior to start of Work.

## PART 2. PRODUCTS

### 2.1 MATERIALS

All Work shall be performed using sound and reliable materials and equipment.

## PART 3. EXECUTION

### 3.1 LAYING OUT THE WORK

- A. The Subcontractor shall install construction staking which shall include the use of vertical and horizontal survey control points to establish construction survey points and construction centerlines; and establish bench marks as necessary.
- B. The accuracy of all of the Subcontractor's stakes, alignments and grades is the responsibility of the Subcontractor. The Contractor may check the surveyor's stakes, alignments and grades at any time. However, this check does not relieve the Contractor and Subcontractor of their responsibilities to construct the Work in accordance with the Contract Documents.
- C. The surveyor shall provide the QC Engineer on a daily basis with the survey notes and calculations for checking of quantities. However, this check does not relieve the Contractor and Subcontractor of their responsibilities to construct the Work in accordance with the Contract Documents.
- D. The Subcontractor shall field survey the bottom of the subgrade, and each subsequent layer including the final grade elevations for Sites 3 and 10. In addition, the Subcontractor shall locate all drainage ditches, reinforced concrete pipe, and any other feature shown on the Contract Drawings.

### 3.2 SURVEY DRAWINGS

- A. The Subcontractor shall prepare field survey drawings including the following features:
  - 1. All above-ground utilities including the size and pipe invert elevations. All manholes and catch basins are to include the top and invert elevations;
  - 2. All buildings, fencing, pipelines, and all other man-made structures;
  - 3. All paved, gravel, and dirt roads;
  - 4. All active/non-active railways;
  - 5. Location and identification of all significant natural features including, wooded areas, water courses, wetlands, flood hazard areas, and depressions;

6. All areas of vegetation including all trees greater than 4 inches in diameter;
  7. All property data including owners of records for properties within 200 feet of the Site;
  8. All wells and equipment, if any;
  9. Flood hazard data and delineation, if applicable;
  10. All wetland delineation;
  11. A correctly positioned North indicator; and
  12. Latitude and longitude, if possible.
- B. The final drawings shall be electronically submitted to the Contractor and shall meet the following requirements:
1. Each drawing shall be a stand-alone file. A single file that requires various layers to be turned on/off to create different drawings shall not be accepted.
  2. All drawings shall be completed in either ANSI or architectural sizes only (i.e. Arch-D, ANSI-B, etc.)
  3. Drawing files shall be compatible with Hewlett-Packard inkjet plotters.
  4. All drawings shall be in AutoCAD Release 14 or 2000 (dwg) format only. Any documents that can be submitted in AutoCAD Land Development shall be encouraged.
  5. The drawings shall include:
    - a. An index of layers or clearly marked layers;
    - b. Indication of the appropriate state plane coordinate system used.
    - c. Surveyor's notes and locations of appropriate bench marks; and
    - d. An ASCII file of survey points required by other civil software programs. The ASCII file shall include topographic contours.

#### PART 4. FIELD SUPERVISION AND TESTING

##### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.

- B. The Contractor and Subcontractor shall follow the procedures outlined in the CQC Plan.
- C. The QC Engineer shall sign the surveyor's field notes or keep duplicate field notes and verify quantities.
- D. The QC Engineer shall verify layers of earthwork and liner, inverts and location of utilities and structures in accordance with the Technical Specifications and Contract Drawings.

\*\*\*END OF SECTION\*\*\*

## SECTION 01155

### HEALTH AND SAFETY REQUIREMENTS

#### PART 1. GENERAL

##### 1.1 DESCRIPTION

- A. The Contractor shall provide all materials, labor, and equipment necessary to perform the Work specified in this Section in accordance with these Technical Specifications and the Contract Drawings.
- B. The responsibility for development, implementation and enforcement of the Site Specific Health and Safety Plan (HASP) lies solely with the Contractor and his/her health and safety personnel.
- C. The HASP developed by the Contractor shall include programs for accident prevention, personnel protection, and emergency response/contingency planning, air monitoring and handling hazardous materials and chemicals on-site. The HASP shall meet all requirements of 29 CFR 1910 (General Industry Occupational Safety and Health Standards) and shall include enough detail to support the Contractor's Work.
- D. The following words and terms, for the purpose of this Section, have the following meanings:
  1. Project Environmental Safety Manager (PESM) – shall mean the Foster Wheeler employee assigned the complete and proper development and implementation of the HASP.
  2. Environmental Safety Supervisor (ESS) – shall mean the on-site Foster Wheeler employee assigned such responsibilities as verifying that all Work of these Technical Specifications are performed in accordance with the HASP and applicable occupational health and safety regulations. The ESS shall have the ability to stop all Work that is not in compliance with the HASP until he/she is satisfied that all requirements of the HASP have been met.

##### 1.2 REFERENCES

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies. The Contractor shall comply with Federal, State and Local regulations and guidelines, including all applicable Occupational Safety and Health Administration (OSHA) Regulations; 29 CFR 1910 (General Industry Standards) and 29 CFR 1926 (Construction Standards). These include, but are not limited to the following:

#### AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z88.2

(1980) Practice for Respiratory Protection

|             |  |
|-------------|--|
| ANSI Z41.1  | (1983) Emergency Eyewash and Shower Equipment                            |
| ANSI Z358.1 | (1981) Protective Footwear   |
| ANSI Z88.6  | (1984) Physical Qualifications for Respirator Use                        |
| ANSI Z87.1  | (1968) Practice for Occupational and Educational Eye and Face Protection |

US NAVY DEPARTMENT OF HEALTH AND HUMAN SERVICES (DHHS)

DHHS (NIOSH) Publication 84-100 "NIOSH Sampling and Analytical Methods"

OCCUPATIONAL AND HEALTH SAFETY ADMINISTRATION (OSHA)

|                            |   |
|----------------------------|---|
| OSHA 29 CFR 1910.120       | Hazardous Waste Operations Standard   |
| OSHA 29 CFR 1926.59        | Hazard Communication Standard   |
| OSHA 29 CFR 1926.650-652   | Construction Standards, Subpart P - Excavations   |
| OSHA 29 CFR 1926.132-137   | General Industry Standards, Subpart I - Personal Protective Equipment, OSHA Construction Standards, Subpart X - Stairways and Ladders, 29CFR 1926.1050 - 1060 |
| OSHA 29 CFR 1926.501 – 502 | Construction Standards for Fall Protection  |

NATIONAL INSTITUTE OF OCCUPATIONAL HEALTH AND SAFETY (NIOSH),  
OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION (OSHA), UNITED STATES  
COAST GUARD (USCG), ENVIRONMENTAL PROTECTION AGENCY (EPA)

NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance Manual  
for Hazardous Waste Site Activities

1.3 SUBMITTALS

A. Pre-Construction Submittals

1. The HASP shall include but not be limited to:
  - a. Personnel (item 3.1);
  - b. Hazard Assessment (item 3.2);
  - c. Safe Work Practices(item 3.3);
  - d. Training (item 3.4);
  - e. Work Zone categories (item 3.5);
  - f. Personal safety equipment and protective clothing (item 3.6);
  - g. Personnel & Equipment Decontamination (item 3.7);
  - h. Emergency equipment and first aid requirements (item 3.8);

- i. Emergency response and contingency planning (item 3.9);
  - j. Posted regulations (item 3.10);
  - k. Communications (item 3.11);
  - l. MSDS (item 3.12);
  - m. Medical Surveillance (item 4.3);
  - n. Environmental and Personnel Monitoring (item 4.4); and
  - o. Record Keeping and Reporting (item 4.6).
2. The Contractor shall prepare and submit the Site Specific HASP, as specified herein, to the Contracting Officer for review and acceptance. If required, the Contractor shall make all necessary amendments required by the Contracting Officer and resubmit the HASP to the Contracting Officer for acceptance. This procedure shall continue until such time that the Contracting Officer gives its written final acceptance. Mobilization on-site will not be permitted until written acceptance of the HASP by the Contracting Officer has been received.
3. Material Safety Data Sheets shall be submitted for all hazardous chemicals on-site and shall accompany all new shipments of hazardous chemicals.

**B. Construction Submittals**

- 1. Weekly Health and Safety Reports, which have been included as Figure 01155-2, shall be maintained by the Contractor and submitted to the Contracting Officer weekly. These reports shall include items specified in Section 4.6.
- 2. Accident/Incident Reports, which have been included as Figure 01155-3, shall be prepared and submitted by the Contractor to the Contracting Officer. Reports shall be completed for lost time occupational injury or illness, medical treatment cases, unplanned exposure to toxic materials, and for any significant occurrence resulting in property damage. These written reports shall be consistent with Figure 01155-3. The Contractor shall notify the Contracting Officer immediately of any accidents or incidents.

**C. Final Submittals**

A Closeout Safety Report shall be submitted by the Contractor to the Contracting Officer on completion of the Work. This report shall summarize the weekly safety reports and provide an overview of the Contractor's performance with regard to the HASP requirements.

**1.4 GENERAL REQUIREMENTS**

- A. The Contractor, via the Project Environmental Safety Manager (PESM) or the Environmental Safety Supervisor (ESS), shall be responsible for the development

and implementation of the HASP in accordance with the references listed in Section 1.2.

- B. The HASP shall be submitted for review and acceptance by the Contracting Officer.
- C. Site mobilization will not be permitted until the written acceptance of the HASP has been issued by the Contracting Officer.
- D. Determination of the appropriate level of worker safety equipment and procedures shall be made by the Contractor's PESH. This determination shall be based upon a thorough review of background information, analytical data from previous sampling events, an initial site survey and a continuing health and safety program. As Work progresses, the PESH shall specify the worker protection level based on Site Activity.
- E. Should the Contractor seek modification of any portion or provision of the HASP, such modification shall be requested in writing to the PESH, and if accepted, be authorized in writing by all that authorized the HASP. The modification shall be appended to the HASP. All on-site personnel shall be fully informed of the modifications and required actions.
- F. Specifications and requirements delineated in this Section are in addition to all applicable State and Federal regulations pertaining to this kind of Work. Any revision or addition to these regulations must be reviewed by the Contractor for the applicability to his/her Site Specific HASP. In such case, the Contractor shall revise or add the new requirement to his/her HASP and resubmit it to the Contracting Officer for review and acceptance.
- G. Any disregard for the provisions of these health and safety specifications shall be deemed just and sufficient cause for ordering the stopping of all Work beyond the Support Zone until the matter has been rectified to the satisfaction of the Contracting Officer and the ESS.
- H. During the geophysical investigation, ordnance materials were encountered. All ordnance materials appeared to be shell casings, shipping containers, and other components. No unexploded ordnance (UXO) materials were encountered. Foster Wheeler Environmental UXO personnel will be available during intrusive activities in the areas where ordnance materials were encountered. If ordnance-type materials are encountered, UXO personnel will inspect the materials and will determine the proper method for disposal.

## PART 2. PRODUCTS

Not Used.

## PART 3. EXECUTION

### 3.1 HEALTH AND SAFETY PERSONNEL

#### A. Project Environmental Safety Manager/Certified Industrial Hygienist

1. The Contractor's representative PESM shall be a Certified Industrial Hygienist (American Board of Industrial Hygiene) with specialized experience in the chemical hazardous waste industry and with hazards similar to those anticipated on this Project. This person shall also have demonstrable expertise in air monitoring techniques and in development of respiratory protection programs for working in potentially toxic atmospheres. The PESM shall have a broad working knowledge of State and Federal occupational safety and health regulations and formal educational training in occupational safety and health.
2. It is not anticipated that this individual will be assigned to this Site on a full-time basis. The PESM may delegate the implementation and enforcement of the HASP to the ESS defined below. Regular on-site supervision and continued evaluation of effectiveness of the plans are to be performed by the PESM; at a minimum, these evaluations shall meet the requirements detailed in Section 4.3.
3. The PESM will be responsible for the preparation, implementation and enforcement of the Site Specific HASP.

#### B. Environmental Safety Supervisor (ESS)

1. The Contractor's representative ESS shall have a minimum of two years of hazardous waste experience and a working knowledge of current Federal and State occupational safety and health regulations and formal training in occupational safety and health.
2. The ESS shall be assigned to the Work Site on a full-time basis for the duration of the Project with functional responsibility for implementation of the Site Specific HASP and shall report to the PESM.

#### C. Health and Safety Technician(s) (HST) (as needed)

The Contractor shall assign a Health and Safety Technician to each active Work Area to monitor the health and safety of personnel in that area. The HST(s) shall report to the ESS. The HST(s) shall be proficient in the use of the monitoring equipment described in this Specification. The HST(s) shall receive from the PESM, a minimum of eight hours of specialized training in the use and maintenance of the monitoring and sampling equipment and interpretation of the data required to implement the Site Specific HASP. The training shall also include instructions as to when and how to notify the PESM regarding monitoring data of concern. The PESM shall certify that all HSTs are proficient in the use of this equipment, by completing and signing training logs which shall identify the equipment demonstrated, outline of topics addressed in the training, date of training, and social security number of attendee(s).

- D. The Contractor is required to retain a medical consultant who is either a board certified or board eligible physician in occupational medicine. Certification information can be obtained from the American Board of Preventative Medicine. The Medical Consultant shall have extensive experience in the occupational health area and be familiar with the site hazards and remedial action projects.

### 3.2 HAZARD ASSESSMENT

A detailed hazard assessment shall be conducted to identify the chemical, physical and biological hazards that may be encountered during the performance of Work. An activity hazard analysis is then performed for each task to be completed, which includes assessing the likelihood of exposure to the identified hazards and the risk of exposure. Control measures that will be employed to reduce or minimize hazards completes the hazard assessment.

- A. The chemical hazards that are anticipated to present an occupational exposure hazard during site operations shall be identified. This identification shall include a thorough review of available analytical data from previous soil and groundwater sampling events at the Site. Each chemical hazard that is selected shall be identified as a contaminant of concern. For each contaminant of concern, the following information shall be provided:
  - 1. A brief summary of toxicity;
  - 2. OSHA PEL or ACGIH TLV;
  - 3. Hazardous properties (Flammable, toxic, reactive, etc.);
  - 4. Source of contaminant (Soil, groundwater, drums, etc.); and
  - 5. Skin designation - does contaminant have the skin designation as defined by OSHA?
- B. Include brief descriptions of all physical hazards that may be encountered during Work at the Site. Examples of physical hazards include, but are not limited to the following: slips/trips/falls, temperature extremes, noise, splash hazards, manual lifting, heavy equipment, excavations, electrical hazards, hand and power tools, motors and pumps, fire and explosion.
- C. Include a description of all biological hazards that may be encountered during Work at the Site. Examples of biological hazards include insects (ticks, bees, wasps and spiders), wild animals, and poisonous plants (poison ivy, oak and sumac).
- D. Conduct an activity hazard analysis for each task to be performed. This includes determining the likelihood of exposure to the chemical, physical and biological hazards identified in the previous Sections. Consider the routes of exposure, coming into contact with the contaminant or hazard and the procedures that will be utilized to complete the task.
- E. Describe the control measures that will be utilized to reduce or minimize the overall risks identified in the activities hazard analysis. Control measures include, but are

not limited to the following: engineering controls, work practice controls, administrative controls, air monitoring, adherence to decontamination and personal hygiene procedures, and the use of personal protective equipment.

### 3.3 SAFE WORK PRACTICES

The Site Specific HASP shall address the safe work practices to be employed for the Work covered in this Technical Specification. These shall include, but not be limited to, the following:

- A. Requirements for protective clothing including eye, head, hands, foot, body, and respiratory protection shall be included in the plan.
- B. The Contractor shall define the requirements for entry into a confined space (including excavation, treatment facilities and other facilities with limited access) and confined space permitting system in the HASP. The protocol shall include at a minimum:
  - 1. Monitoring the air quality (oxygen deficiency, combustible gases or vapors and toxic substances);
  - 2. Determination of the level of protection, checks of structural integrity;
  - 3. Emergency equipment and other available personnel (buddy system); and
  - 4. Excavation and trenching.

The Contractor's confined space permits shall be listed and provided to the Contracting Officer for review and acceptance. Entry procedures for these confined spaces shall also be approved by the Contracting Officer.

### 3.4 TRAINING

- A. The Contractor shall certify that all Contractor personnel performing or supervising Work, for health, safety, security, administrative or maintenance purposes or for any other site-related function, have received site specific health and safety training provided by the Contractor via the ESS. The Contractor shall maintain training logs, which have been included as Figure 01155-1.
- B. The Contractor shall ensure that all personnel assigned to or entering areas with hazardous materials or who are working with hazardous materials that have not been previously trained, complete a minimum of forty hours of general health and safety training, eight hour refresher and supervisory training (when appropriate) in accordance with 29 CFR 1910.120(e). The training program shall be conducted by a qualified instructor.
- C. The Contractor's PESM, or the ESS shall be responsible for site specific training of visitors in order to inform them of the hazards associated with the Site, to explain emergency procedures and instruct them in the use of protective gear required during the visit. No visitors or employees will be permitted in the Exclusion and Contamination Reduction Zones without documented training and medical clearance.

- D. The Contractor shall be responsible for, and ensure that personnel not successfully trained and/or who do not have the required medical clearance do not enter the Exclusion Zone or the Contamination Reduction Zone.
- E. The Contractor shall be responsible for providing hazard communication training in accordance with 29 CFR 1910.1200 for employee's working with chemicals brought to the Site. This training shall be documented and kept on file at the Site by the ESS.

### 3.5 DIFFERENT WORK ZONE CATEGORIES

Work and Support Zones shall be established in order to contain contamination within the smallest areas possible. The Contractor shall ensure that each employee has the proper personal protective equipment for the area or zone in which he/she is to perform Work. The Contractor shall include the delineated Work/Support Zones as part of the HASP for approval.

- A. Exclusion Zone (contaminated Work Areas) shall be outlined (as necessary) on Drawings provided in the HASP by the Contractor. The Exclusion Zone will require different levels of protective equipment. The required protective equipment for use by personnel working or entering the exclusion areas is specified in Section 3.6 - Personnel Safety Equipment and Protective Clothing. Emergency equipment (such as portable eyewashes, fire extinguishers) will be kept in the Exclusion Zone in a plastic bag to protect them from contamination.
- B. Contamination Reduction Zone shall be established as a buffer between the Exclusion Zone and the Support Zone. The Contamination Reduction Zone shall be designated on the Drawings by the Contractor. Other emergency equipment (i.e. - stretchers, emergency shower or eyewash, first aid kits) will be kept in the Support Zone. The personal protective equipment required for use by personnel working in this area is specified in Section 3.6 - Personnel Safety Equipment and Protective Clothing. Decontamination equipment, supplies and stations shall be established in this area.
- C. Site control shall include a visitor's log, which should include, but is not limited to, the following:
  - 1. Personnel visiting;
  - 2. Affiliation;
  - 3. Date;
  - 4. Arrival Time;
  - 5. Departure Time;
  - 6. Purpose of Visit.

No unauthorized personnel shall be permitted to enter the Site. The Contractor shall provide the Contracting Officer with a list of all Subcontractor and Contractor personnel who are authorized to enter the Site prior to the start of operations, updating the list as necessary.

### 3.6 PERSONAL SAFETY EQUIPMENT AND PROTECTIVE CLOTHING

- A. The Contractor shall provide all on-site personnel with appropriate personal safety equipment and protective clothing. The Contractor shall also provide personal safety equipment and protective clothing for five visitors. The Contractor shall ensure that all safety equipment and protective clothing is properly used, kept clean, and well maintained.
- B. As part of the HASP, a personal protective equipment hazard assessment shall be performed in accordance with 29 CFR 1910.132(d)(2) and shall include, at a minimum:
  - 1. Potential chemical, physical and biological hazards present;
  - 2. Work operations to be performed;
  - 3. Potential routes of exposure;
  - 4. Concentrations of contaminants present; and
  - 5. Characteristics, capabilities and limitations of PPE, and any hazards that the PPE presents or magnifies such as heat stress.

The hazard assessment shall be included in the HASP and will contain the identification of the work place evaluated, the person certifying that the evaluation has been performed, and the date(s) of the hazard assessment.

- C. Personal safety and protective clothing shall be compatible with and provide protection against the chemical, physical and biological hazards that may be encountered.
  - 1. Level D clothing protection shall consist of the following:
    - a. Work clothes (i.e., long pants, long or short-sleeved shirts);
    - b. Steel toe/shank boots that meet or exceed ANSI 24.1.1;
    - c. Work gloves;
    - d. Hearing protection (When necessary);
    - e. Safety glasses or goggles; and
    - f. Hardhat.

2. Level C clothing protection shall consist of the following:
    - a. Work clothes;
    - b. Polycoated Tyvek with hoods and booties attached;
    - c. Surgical inner gloves;
    - d. Chemical resistant outer gloves;
    - e. Chemical resistant steel toe/shank boots that meet or exceed ANSI 24.1.1;
    - f. Booties (optional);
    - g. Safety glasses or goggles;
    - h. Hard hat; and
    - i. Face shield attached to hardhat for tasks where a potential splash hazard exists.
  3. Level B clothing protection shall consist of the following:
    - a. Saran-coated Tyvek with hoods and booties attached; and
    - b. Items a, b, c, d, e, and f of level C protection.
  4. Non-disposable clothing may be substituted for some items required for level B and C protection. These substitutes shall be described in the Contractor's HASP.
- D. Programs for respiratory protection shall be described and documented in the HASP and shall be in conformance with 29 CFR 1910.134 and ANSI Z88.2. The different levels of respiratory protection are outlined as follows:
1. Level D - No respirator will be worn.
  2. Level C - Full face air purifying respirator with appropriate cartridges.
  3. Level B - Full-face positive-pressure SCBA, or full-face supplied air respirator equipped with 5-minute escape capability.
- E. The Contractor shall include in the Site Specific HASP a list of tasks and their related initial levels of protection. Levels of protection may be upgraded, downgraded, or modified at any time during Site Activities based upon air monitoring results and the judgment of the ESS in consultation with the PESM.
- F. On-site personnel unable to pass a qualitative respirator fit test as specified in 29 CFR 1910.134 and ANSI Z88.2 shall not be permitted to enter or work in the Exclusion Zone or Contamination Reduction Zone.

- G. Each respirator shall be individually assigned and not interchanged among employees without cleaning and sanitizing. Cartridges shall be changed in accordance with a respirator cartridge change-out schedule as required by 29 CFR 1910.134.
- H. All prescription eyeglasses brought on-site to be worn in the Exclusion or Contamination Reduction Zones shall be safety glasses. Prescription lenses for on-site employees requiring vision correction in respirators shall be provided in spectacle kits designed by the Manufacturer of the respirator; contact lenses are also permitted for use in full-face respirators.
- I. All personnel protective equipment worn on Site shall be decontaminated or properly disposed of at the end of each workday or when leaving the Exclusion Zone. The safety and health specialist shall ensure that all personal protective equipment is decontaminated before being reissued.

### 3.7 PERSONNEL AND EQUIPMENT DECONTAMINATION

- A. The Contractor shall establish procedures for small equipment (i.e. - respirators, instruments) decontamination and personnel decontamination which shall be included in the HASP. Boots, gloves, and respirators shall be decontaminated by means of decontamination procedures performed prior to entering Support Zones. All required breathing devices shall be provided and maintained by the Contractor. Eating, chewing gum or tobacco, smoking, drinking and application of cosmetics shall be prohibited except in facilities provided in the Support Zone.
- B. The Contractor shall provide a Personnel Decontamination Area, where all contaminated personal protective equipment shall be decontaminated, removed and appropriately disposed of or stored for further use.

#### 1. Layout and Features

The Contractor shall submit a Drawing for the Contracting Officer to review and accept, showing the proposed layout of the facilities to be established. The feature of the Personnel Decontamination Area shall include, but not be limited to, the following:

- a. Provisions for employees working in the Exclusion Zone to remove protective outer clothing and to wash hands, face, and other exposed skin prior to eating.
  - b. Provisions for Contamination Reduction Zone employees to remove protective outer clothing and wash-up before eating.
2. The Personnel Decontamination Area is the initial area where surface contamination and outer protective clothing are removed. This area shall include provisions for washing contamination and mud from boots and protective clothing and containers for collecting of outer protective clothing. This area shall include provisions for washing contamination and mud from boots, gloves, protective clothing and respirators. Boots and gloves shall be

washed with a mixture of water and Alconox or equivalent. Respirators shall be washed with a non-alcohol sanitizer solution, such as MSA brand or equivalent. Containers for collection of contaminated tyveks, gloves, etc. shall be provided. Provisions for drumming the boot and glove washes and rinses shall be made.

3. Used disposable outerwear shall not be re-used and shall be placed inside designated disposal containers provided by the Contractor for that purpose in the Contamination Reduction Zone and disposed by the Contractor.

C. Equipment Decontamination

1. The Contractor shall provide an equipment decontamination station within the Contamination Reduction Zone for removing soil from all vehicles and equipment leaving the Work Area. As a minimum, this station shall include a high-pressure water wash area for equipment and vehicles and a steam-cleaning system for use after the mud and/or dirt has been cleaned from the equipment. The Contractor shall also provide storage tank(s) to collect the wastewater resulting from the decontamination of the equipment.
2. In general, any item taken into an Exclusion Zone must be assumed to be contaminated and must be carefully inspected and/or decontaminated before the item leaves the Site. Vehicles, equipment, and materials brought into the Exclusion Zone shall remain in the Exclusion Zone until no longer necessary to the Project. All contaminated vehicles, equipment, and materials shall be cleaned and decontaminated to the satisfaction of the ESS prior to leaving the Site. All construction material shall be handled and brought onto the Site in such a way as to minimize the potential for contaminants being carried off-site. Separate, clearly marked parking and delivery areas shall be established in the Support Zone.

3.8 SANITATION

- A. The Contractor shall develop a program that addresses sanitation at the Project Site, which shall include, at a minimum, the following: potable water, toilet facilities, lunch room and washing facilities.
- B. An adequate supply of potable water shall be provided at the Site.
- C. Toilet facilities shall be provided in accordance with the requirements of 29 CFR 1910.120 (n)(3).
- D. Washing facilities shall be provided for employees to remove hazardous substances which may be harmful.

All personnel exiting the Exclusion or Contamination Reduction Zones shall thoroughly cleanse their hands, faces, and other exposed area before eating, drinking or smoking.

1. The Contractor shall ensure that all on-site personnel entering the Exclusion Zone or the Contamination Reduction Zone, who are subject to exposure to

hazardous chemical vapors, liquids or contaminated solids, shall observe and adhere to the personal hygiene-related provisions in this Section. The HASP shall address the procedures to be utilized for compliance with these provisions.

2. On-site employees found to be disregarding the personal hygiene-related provisions of the HASP shall be barred from the Site.

### 3.9 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

- A. Each active Work Area shall be provided with, at a minimum, a portable emergency eye bottle and 2A-10 B: C type dry chemical fire extinguisher. The Contamination Reduction Zone shall be equipped with a 15-minute emergency eyewash that meets or exceeds ANSI Standard 2358.1. Water shall be potable and tempered.
- B. At least one "industrial" first aid kit shall be provided and maintained, fully stocked at an easily accessible, uncontaminated, manned location. Should active Work Areas be isolated or separated as to make one first aid location impractical, then another first aid station shall be established as required in close proximity to the Work, but not inside a hazardous Work Area.
- C. The first aid kit location shall be specially marked and provided with adequate water and other supplies necessary to cleanse and decontaminate burns, wounds, or lesions.
- D. The Contractor shall have at least two persons certified in First Aid and CPR on the Site at all times. This person may perform other duties, but must be immediately available to tender first aid or CPR when needed. Certification shall be by the American Red Cross or other approved agency.
- E. Dry chemical fire extinguishers, as specified in Section 3.9, Paragraph A shall be provided at any Site Location where flammable or combustible material may present a fire risk.

### 3.10 EMERGENCY RESPONSE AND CONTINGENCY PLANNING

- A. In addition to the regulation to be posted as specified in general requirements, the Contractor shall develop and submit with the HASP an Emergency Response and Contingency Plan. The Emergency Response and Contingency Plan shall meet the requirements of 29 CFR 1910.120 (I). After approval, this plan shall be posted at all Support Zone offices and at all entrances to the Exclusion and Contamination Reduction Zones. This plan shall include, but not be limited to:
  1. Name, address and telephone number of the occupational physician;
  2. Procedure for prompt notification of local health facilities and fire for emergency assistance;
  3. Specific procedure for handling personnel with any skin or respiratory exposure to chemical or contaminated soil;

4. Special procedures for fires, explosions, evacuation of on-site personnel, or other unplanned hazardous incidents;
  5. Procedures for treatment of personnel with occupational injuries or illnesses;
  6. Procedure for notifying the Contracting Officer in case of accident or emergency; and
  7. Emergency phone numbers for the local police, rescue service, hospitals, local fire company, National Response Center, Poison Control Center, and EPA Emergency Response. The Contractor shall provide all phone numbers for the above and any additional numbers which he/she deems necessary for emergency contacts.
- B. The Contractor shall arrange for emergency medical care services at a nearby medical facility and establish emergency routes prior to any Work on Site. The staff at the facility shall be advised of potential medical emergencies including the possibility of contamination of skin and clothing by specific chemicals from the NWS Earle Site. The Contractors shall establish procedures and facilities for emergency communication with health and emergency services.
- C. Site support vehicles designated for use in transportation of injured or ill personnel shall be provided with a route map to the medical facility(s). All on-site employees shall be thoroughly familiar with the emergency routes to the medical facility(s).
- D. In the event of any emergency associated with construction activities, the Contractor shall, without any delay, take diligent action to safeguard the employees, remove or otherwise mitigate the cause of the emergency, alert the Contracting Officer, and institute whatever measures might be necessary to prevent any repetition of the conditions or actions leading to, or resulting in, the emergency.

### 3.11 POSTED REGULATIONS

- A. The Contractor shall develop a series of posted regulations which shall be reviewed and accepted by the Contracting Officer. These regulations shall address the on-site protocol regarding use of personal protective equipment, personal hygiene, and provision for smoking and eating.
- B. These protocols shall be posted on all on-site trailers and shall be reviewed with the Contractor's personnel.

### 3.12 COMMUNICATIONS

- A. The Contractor shall provide hard-line telephone communication at its Site field office.
- B. Emergency numbers, as listed in item 3.10 A8 above, shall be prominently posted near all on-site telephones.

- C. The Contractor shall provide two-way radio site communication between the Control Center, each of the Site activity areas and the Contracting Officer.
- D. The Contractor shall provide air horns for use during emergencies should two-way radios malfunction.
- E. The use of hand signals shall be used during emergencies when necessary.

### 3.13 MATERIAL SAFETY DATA SHEETS (MSDS)

- A. The Contractor shall provide all employees with information on the potential hazards of materials brought onto the Site in accordance with 29 CFR 1910.120(e) and (i).
- B. A list of hazardous chemicals shall be developed for the Site.
- C. An MSDS shall accompany all new shipments of hazardous chemicals.
- D. Each container of hazardous chemicals shall be labeled, marked, or tagged with the following information:
  - 1. Identity of hazardous chemical; and
  - 2. Appropriate hazard warnings and labeling.
- E. Label warning systems shall comply with the National Fire Protection (NFPA) Standards and labels on containers shall reflect:
  - 1. Emergency health hazard;
  - 2. Fire hazard; and
  - 3. Instability or reactivity hazard.
- F. Workers shall be trained on the NFPA labeling system.

## PART 4. FIELD SUPERVISION AND TESTING

### 4.1 CONSTRUCTION QUALITY CONTROL

Not used.

### 4.2 CONSTRUCTION QUALITY CONTROL TESTING

Not used.

### 4.3 MEDICAL SUPERVISION

- A. Details of the medical supervision program shall be included in the HASP and shall include at a minimum, a Medical Consultant. The Contractor shall utilize the services of a Medical Consultant (see Section 3.1 – Health and Safety Personnel)

to oversee and/or provide the medical examinations and supervision specified herein.

B. The medical supervision protocol to be implemented is the occupational physician's responsibility, but shall meet the requirements of OSHA Standard 29 CFR 1910.120 and ANSI Z88.2 (1980). The medical supervision protocol shall, as a minimum, cover the following:

1. Medical and Occupational History;
2. General physical examination (including evaluation of major organ system);
3. Electrocardiogram (frequency to be determined by the Medical Consultant);
4. Biological Blood profile (SMAC-21 or equivalent);
5. CBC;
6. Chest X-ray (performed no more frequently than every four years, except when otherwise indicated);
7. Pulmonary Function Testing (FVC and FEV<sub>1.0</sub>);
8. Urinalysis with microscopic examination;
9. Ability to wear respirator;
10. Visual Acuity; and
11. Audiometric testing.

Additional clinical tests may be included at the discretion of the Medical Consultant.

C. In addition, non-scheduled medical examination may be conducted under the following circumstances after consulting with the Medical Consultant:

1. After acute exposure to any toxic or hazardous materials;
2. At the discretion of the Contracting Officer, the PESH or occupational physician; and
3. Upon receipt of a request for a medical examination from an employee with demonstrated symptoms of exposure to hazardous substances.

D. The ability of on-site employees to wear respiratory protection shall be certified by the occupational physician based on criteria specified in ANSI Z88.2, Appendix A.4, and OSHA 1910.134.

E. The Contractor shall include protocols and requirements for heat and cold stress monitoring and protective measures in the HASP. These shall include, as a minimum, work/rest schedules (based on ambient conditions and the level of

protection being utilized), and physiological monitoring requirements. Procedures to monitor and avoid heat/cold stress shall be followed in accordance with expert advice for heat stress and the guidance of the American Conference of Governmental Industrial Hygienists (ACGIH), in its TLV booklet, 2001. Such monitoring shall be performed by the PESM or his/her designee.

- F. The Contractor shall maintain accurate records of medical supervision in accordance with 29 CFR 1910.1020.

Any employee who incurs lost-time due to occupational injury or illness during the period of the Contract must be evaluated by the occupational physician. The employee's supervisor shall be provided with a written statement indicating the employee's fitness (ability to return to work), signed by the occupational physician, prior to allowing the employee to re-enter the Work Site. An accident report shall be completed and copies of such reports shall be submitted to the Contracting Officer in accordance with Section 01300, "Submittals."

#### 4.4 ENVIRONMENTAL AND PERSONNEL SUPERVISION

- A. The Contractor shall design, develop and implement an air monitoring program as specified in Section 4.5 - Air Monitoring, of this Specification as part of the environmental monitoring to assure that Site Personnel will not be exposed to harmful levels of airborne vapors, particulates, or to explosive atmospheres.

- B. Heat Stress Monitoring

The climate combined with the requirements for personal protective equipment may create heat stress. For monitoring the body's recuperative abilities to excess heat, one or more of the following techniques shall be used. Monitoring of personnel wearing impervious clothing should commence when the ambient temperature is 70°F or above. Monitoring frequency should increase as the ambient temperature exceeds 85°F. Workers shall be monitored for heat stress after every work period. Monitoring shall be performed by a person with a current first aid certificate who is trained to recognize the symptoms of heat stress.

The heat stress monitoring shall include, but not be limited to, the following:

1. Heart Rate (HR);
2. Body temperature; and
3. Visual observation of skin, eyes, etc.

The PESM/ESS shall specify the work cycle period and the rest period based on this heat stress monitoring in accordance with 2001 ACGIH TLV's. The action levels at which the corrective action shall be taken shall be addressed in the Contractor's HASP.

C. Cold Stress Monitoring

To guard against cold injury, the Contractor shall provide appropriate clothing, warm shelter for the rest periods and shall monitor worker's condition using one or more of the following techniques: Workers who are exposed to temperature below -10°F with wind speed of less than five miles per hour shall be medically certified as suitable for such exposure. All workers certified for exposure shall adhere to the work warm-up schedule as specified in the 2001 ACGIH TLV's.

4.5 AIR MONITORING

Air monitoring shall be performed to detect and quantify volatile organic compounds in the Work Area and will determine the level of respiratory protection required. This Section details air monitoring and sampling protocols for cases where contaminated soil will be encountered. Air monitoring and sampling will be performed on an as-needed basis.

A. General Requirements

1. The Contractor shall comply with the air monitoring requirements as outlined in this Section.
2. The Contractor's PESM and/or ESS shall design, develop and implement an Air Monitoring Program to detect and quantify any volatilization of soil contaminants associated with Remedial Work in the surrounding air. The program shall be submitted as part of the HASP for review and acceptance by the Contracting Officer.
3. Information gathered during the air monitoring program shall be used to determine appropriate safety and personnel protective measures to be implemented during the Site Activities, to document on-site employee's exposures, and to assess off-site migration of contaminants released during remedial activities so that appropriate control measures and/or contingency plans can be implemented.
4. Information gathered during the air monitoring program shall be cataloged and included in the project records and safety and health log.

B. General Responsibilities

1. The Contractor's PESM and/or ESS shall be responsible for establishing air monitoring strategies and protocols using real time instrumentation and appropriate industrial hygiene sampling and analytical procedures in order to characterize and qualify the airborne release and transport of contaminants during Remediation Work. These strategies and protocols shall address appropriate air monitoring for volatile organic compounds and particulate matter in the active Work Zones of the Site and the active Site perimeter.
2. The Contractor shall be responsible for establishing and documenting baseline (background) air quality conditions prior to commencement of Work and for conducting continuous air monitoring during on-site Work.

3. All air monitoring equipment required shall be provided by the Contractor and shall be maintained and calibrated according to the Manufacturers' recommendations. Such maintenance and calibration data shall be recorded and included in the project record documents.
4. All air monitoring equipment shall be operated by personnel trained in their specific use (i.e.- ESS or the Health and Safety Technician).
5. The Contractor shall be responsible for establishing and documenting the minimum action levels to be followed during the implementation of the HASP. These action levels will determine the minimum level of protection/action to be taken; such as level D, C, or B, adequacy of air monitoring, stop work, or emergency/contingency action. The decision logic for selection of the action levels shall be included in the HASP.
6. The Contractor shall provide the support necessary for the sampling and analysis of all samples collected during the program, for the interpretation of the analytical results and for the recording, presentation and documentation of all results.

C. Real-Time Air Monitoring

1. The Contractor shall furnish and maintain real-time air monitoring equipment to include: an explosimeter, an organic vapor monitor (photoionization detector or flame ionization detector), an airborne dust monitor (GCA mini-RAM or equivalent) and all necessary calibration/audit equipment and supplies as deemed necessary by the Contractor's HASP.
2. The Contractor shall perform real-time air monitoring prior to commencement of Work in order to establish baseline conditions. Monitoring shall be provided during active site operations both on-site and near each active Work Zone. This real-time air quality monitoring is required during excavation, staging or loading of potentially contaminated soils and/or handling of contaminated liquids. Real-time air monitoring shall also be performed adjacent to each Work Zone. This monitoring shall be performed in the area of highest employee exposure risk in the Exclusion Zone.
3. The Contractor shall provide real-time air monitoring for volatile organic compounds with a photoionization detector (PID - HNu or equivalent) or a flame ionization detector (FID - Century Organic Vapor Analyzer or equivalent) and an explosimeter as specified in the HASP.
4. The frequency of real-time monitoring for all on-site activities shall be, at a minimum:
  - a) Monitoring for organic vapors and dust adjacent to all Exclusion Zone Work at intervals specified in the HASP.
  - b) Monitoring for organic vapors, dust, and combustible gas adjacent to all excavation activities at intervals specified in the HASP.

- c) Periodic monitoring in the CRZ and Support Zone.
5. Action levels for upgrading of PPE will apply to all Site Work. Action levels are for contaminants using direct reading instruments in the breathing zone (BZ) for organic vapor and dusts, and at the source for combustible gas.
  6. If the real-time air monitoring shows or the ESS feels that an imminent health hazard exists then that Work Location shall be shut down and personnel evacuated to a predetermined upwind location. The PESM shall be notified immediately and Work will not resume until:
    - a) Appropriate corrective measures are implemented; or
    - b) Authorization to continue Work is given by the PESM.
  7. Should organic vapor levels at the Support Zone exceed the baseline ambient levels or the Action Levels, appropriate action shall be taken as directed by the ESS. During such time that the organic vapor levels exceed the aforementioned limits in the Support Zone, personnel shall be notified and all personnel within this area shall don respiratory protective equipment as described by the HASP.
  8. The following information shall be recorded in the designated health and safety log book by the PESM/ESS:
    - a. Date and time of monitoring;
    - b. Air monitoring location;
    - c. Instrument, model #, serial #;
    - d. Calibration/background levels;
    - e. Results of monitoring;
    - f. ESS Signature; and
    - g. Interpretation of the data and any further recommendations by the ESS in consultation with the PESM.
- D. Dust and Volatile Organic Emission Control
1. The Contractor shall conduct operations and maintain the Project Site so as to minimize the creation and dispersion of dust and the volatilization of organics. Visible dust is not necessarily the criterion if hazardous wastes are involved.
  2. The Contractor shall provide foam or water spraying equipment and clean potable water, free from salt, oil, and other deleterious materials for dust and volatile organic emission control.

3. The Contractor shall implement dust control procedures as required to minimize off-site transport of particulates.

- a. Equipment

The Contractor shall supply appropriate water spraying equipment capable of accessing all Work Areas for dust control during Project Activities.

- b. Execution

The Contractor shall apply water to the Site when dust control is necessary. For this Project, the dust levels shall be kept to below visible levels while working in the Exclusion Zone and below levels established at the perimeter of the Site. Dust shall be controlled by arranging spray bar height, nozzle spacing, and spray pattern to provide complete coverage of ground or excavation area. Water shall be applied without interfering with excavation equipment or site operations and without creating nuisance conditions such as ponding.

#### 4.6 RECORD KEEPING AND REPORTING OF FIELD SUPERVISION

- A. The Contractor shall maintain logs and reports covering the implementation of the HASP. The format shall be developed by the Contractor and shall include Training Log and Record Books, Daily Safety Log Book, and Weekly Safety Reports. These logs and reports shall be submitted to the Contracting Officer as specified.
- B. Training logs, which have been included as Figure 01155-1, shall be completed by the ESS prior to allowing personnel on Site. Figure 01155-1 has been provided as examples of these logs and Contractor shall generate his/her own log. These logs shall include:
  1. Employee's name, Social Security number, and attendance record;
  2. Time allocation in the training session;
  3. Topics covered;
  4. Materials used;
  5. Equipment demonstrated;
  6. Equipment practice for each employee;
  7. Prohibitions covered;
  8. Explanation of the buddy system;
  9. Signature of trainer; and
  10. Other pertinent information.

- C. Daily Safety Log Book, shall be completed daily by the ESS. These log books shall include:
1. Date;
  2. Work Area(s) checked;
  3. Employees present in Work Area(s);
  4. Equipment being utilized by employees;
  5. Protective clothing being worn by employees;
  6. Protective devices being used by employees; and
  7. Accidents or breaches of procedure.
- D. Air Monitoring Results shall be completed by the ESS and included in the safety log book. These results shall include:
1. Equipment utilized for air monitoring;
  2. Real-Time air monitoring results from each Work Location;
  3. Time-Weighted-Average of personnel sampling, date of actual sampling, and personnel sampled; and
  4. Calibration methods of equipment and results.
- E. Weekly Safety Reports shall be completed by the ESS and submitted weekly to the PESM. Figure 01155-2 has been provided as examples of these logs and the Contractor shall generate his/her own log. These reports shall include:
1. Non-use or misuse of protective devices in an area where required;
  2. Non-use or misuse of protective clothing;
  3. Disregard of the buddy system;
  4. Violation of eating, smoking, drinking, or chewing prohibition;
  5. Job-related injuries and illness including Accident/Incident Reports; and
  6. Summary of air monitoring done that week including results of perimeter monitoring sample analysis completed that week.
- F. Close-Out Safety Report

At the completion of the Work, the Contractor shall submit a close-out safety report. The report shall summarize the weekly safety reports and provide an

overview of the Contractor's performance with regard to the HASP requirements. The report shall be signed and dated by the PESM and submitted to the Contracting Officer. The report shall include:

1. Equipment decontamination certificate and
2. Procedures and techniques used to decontaminate equipment, vehicles, toiler and decontamination facilities.

Final acceptance of the Work will not be given before the close-out safety report has been received and approved by the Contracting Officer.

#### 4.7 INSPECTION / AUDIT PROGRAM

An Inspection/Audit Program is to be established by the Contractor, to identify substandard conditions and employee work practices that could potentially cause or lead to personal injuries or illnesses, and/or equipment damage; and to recognize and reinforce good housekeeping, good work practices, and compliance with regulatory standards.

- A. This Section sets forth the minimum responsibilities for the Contractor's inspection program.
  1. The PESM shall be responsible for:
    - a. Ensuring that inspections are conducted at the frequency stated;
    - b. Reviewing the weekly and monthly site inspections for completeness, thoroughness, and trends;
    - c. Performing quarterly project inspections; and
    - d. Training Site Personnel on proper inspection techniques.
  2. The ESS shall be responsible for:
    - a. Ensuring that weekly and monthly inspections are conducted;
    - b. Assisting management with the weekly and monthly inspections;
    - c. Reviewing the inspections findings and corrective actions for applicability and thoroughness;
    - d. Providing the PESM and the Contractor's Project Manager with a summary of inspection findings each month; and
    - e. Performing informal daily inspections of the Work Site.

B. The Contractor shall, at a minimum, perform various types of inspections described below.

1. Once each week, the Site Supervisors shall conduct an inspection of the his/her area(s) of responsibility. The purpose of this inspection will be to observe and document site conditions and employee work practices.

These weekly inspections shall be documented and kept on file at the Site. The inspection report will identify the date, time, site conditions/operations, personnel conducting the inspection, findings, and recommended corrective actions. Figure 01155-3 is a sample project inspection form for the weekly inspections. The Contractor shall generate his/her own log.

2. Once each month, the Contractor's Project Manager shall conduct an inspection of the Site accompanied by the ESS. The forms and documentation will be the same as for the weekly inspections. Copies of the inspection report will be sent to the PESM.
3. The PESM shall conduct an inspection at the Site for each three months of active field operations at the Project Site. Figure 01155-4 has been provided as an example of the PESM project inspection format. The Contractor shall generate his/her own report. Copies of the inspection report will be sent to the Contractor's Project Manager, the Project Superintendent, and the ESS.

\* \* \* END OF SECTION \* \* \*

**FIGURE 01155-1**  
**TRAINING LOG**

**FIGURE 01155 - 1**

**TRAINING LOG**

Date: \_\_\_\_\_

Employees in Attendance (If needed use additional sheets):

| Name  | S.S. # | Name  | S.S. # |
|-------|--------|-------|--------|
| _____ | _____  | _____ | _____  |
| _____ | _____  | _____ | _____  |
| _____ | _____  | _____ | _____  |
| _____ | _____  | _____ | _____  |
| _____ | _____  | _____ | _____  |
| _____ | _____  | _____ | _____  |

Description of Training Activity/Topics Covered: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Equipment Demonstrated: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Special Training and Other Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Name of Person Conducting Training

\_\_\_\_\_  
Title

\_\_\_\_\_  
Signature

**FIGURE 01155 - 2**  
**WEEKLY HEALTH AND SAFETY REPORT**

**NWS EARLE SITES 3 AND 10  
WEEKLY HEALTH AND SAFETY REPORT**

|   |                               |              |
|---|-------------------------------|--------------|
| <b>Project Name:</b><br>_____   |                               |              |
| <b>Location:</b><br>_____   |                               |              |
| <b>SITE INFORMATION</b>   | <b>INJURIES AND ILLNESSES</b> |              |
| Week Ending _____   | Yes _____                     | No _____     |
| Hours Worked: Craft: _____ PS: _____ Subs: _____  | Describe:<br>_____            |              |
| Check Level of Protection<br>For the week: A ___ B ___ C ___ D ___  | _____<br>_____                |              |
| <b>MAJOR ACTIVITIES CONDUCTED THIS WEEK:</b><br>(drum handling, sampling, excavation, abatement/T&D, etc.)<br>_____<br>_____<br>_____               |                               |              |
| <b>SIGNIFICANT EVENTS THIS WEEK:</b><br>(regulatory visits, equipment malfunctions, process start-up or shutdown):<br>_____<br>_____<br>_____       |                               |              |
| <b>FUTURE ISSUES:</b><br>(schedule, manpower allocation, monitoring equipment, other resources needed)<br>_____<br>_____<br>_____<br>_____<br>_____ |                               |              |
| <b>ACTIVITIES:</b>  |                               |              |
| Hot Work  | Yes _____ No _____            | Dates: _____ |
| Lockout/Tagout  | Yes _____ No _____            | Dates: _____ |
| Confined Space Entry  | Yes _____ No _____            | Dates: _____ |
| Soils Analysis Classification   | Yes _____ No _____            | Dates: _____ |
| Excavation Daily Check List   | Yes _____ No _____            | Dates: _____ |
| Crane On-Site   | Yes _____ No _____            | Dates: _____ |
| Critical Lift Plan Performed  | Yes _____ No _____            | Dates: _____ |

**NWS EARLE SITES 3 AND 10  
WEEKLY HEALTH AND SAFETY REPORT**

| <b>REAL TIME AIR MONITORING</b>                      |                  |                             |                            |                           |                        |       |
|--|------------------|-----------------------------|----------------------------|---------------------------|------------------------|-------|
| Major Activity                                       | Location(s)      | Worker Occupation Monitored | FID/PID Range and Readings | CGI/O2 Range and Readings | PDM Range and Readings | Other |
|  |                  |                             |                            |                           |                        |       |
| <b>SUBCONTRACTORS ON SITE</b>                        |                  |                             |                            |                           |                        |       |
| Company Name   | Task or Function | Return to Site Next Week    | Performed Subcontractor    |                           |                        |       |
|  |                  |                             |                            |                           |                        |       |
| _____<br>Environmental Safety Supervisor - Signature |                  |                             | _____<br>Date              |                           |                        |       |

**FIGURE 01155-3**  
**INCIDENT REPORT AND INVESTIGATION**



| <b>MEDICAL TREATMENT INFORMATION</b>   |                                     |   |
|--|-------------------------------------|---|
| WAS MEDICAL TREATMENT PROVIDED?:   | <input type="checkbox"/> YES        | <input type="checkbox"/> NO   |
| IF YES, WAS MEDICAL TREATMENT PROVIDED:  | <input type="checkbox"/> ON SITE    | <input type="checkbox"/> DR.'S OFFICE <input type="checkbox"/> HOSPITAL |
| NAME OF PERSON(S) PROVIDING TREATMENT:   |                                     |   |
| ADDRESS WHERE TREATMENT WAS PROVIDED:  |                                     |   |
| TYPE OF TREATMENT:   |                                     |   |
| <b>VEHICLE AND PROPERTY DAMAGE INFORMATION</b>   |                                     |   |
| VEHICLE/PROPERTY DAMAGED:  |                                     |   |
| DESCRIPTION OF DAMAGE:   |                                     |   |
| <b>SPILL AND AIR EMISSIONS INFORMATION</b>   |                                     |   |
| SUBSTANCE SPILLED OR RELEASED:   | FROM WHERE:                         | TO WHERE:   |
| ESTIMATED QUANTITY/DURATION:   |                                     |   |
| CERCLA HAZARDOUS SUBSTANCE? YES <input type="checkbox"/> NO <input type="checkbox"/> RQ EXCEEDED? YES <input type="checkbox"/> NO <input type="checkbox"/> SPECIFY: _____                                |                                     |   |
| REPORTABLE TO AGENCY? YES <input type="checkbox"/> NO <input type="checkbox"/> SPECIFY: _____ (place report of telecon in project file)  |                                     |   |
| WRITTEN REPORT? YES <input type="checkbox"/> NO <input type="checkbox"/> TIME FRAME: _____ (place report in project file)  |                                     |   |
| RESPONSE ACTION TAKEN  |                                     |   |
| <b>PERMIT EXCEEDENCE</b>   |                                     |   |
| TYPE OF PERMIT:  | PERMIT #:                           |   |
| DATE OF EXCEEDENCE:  | DATE FIRST KNOWLEDGE OF EXCEEDENCE: |   |
| PERMITTED LEVEL OR CRITERIA (e.g., Water quality):   |                                     |   |
| EXCEEDENCE LEVEL OR CRITERIA:  | EXCEEDENCE DURATION:                |   |
| REPORTABLE TO AGENCY? YES <input type="checkbox"/> NO <input type="checkbox"/> SPECIFY: _____ (place telecon in project file)  |                                     |   |
| WRITTEN REPORT? YES <input type="checkbox"/> NO <input type="checkbox"/> TIME FRAME: _____ (place report in project file)  |                                     |   |
| RESPONSE ACTION TAKEN:   |                                     |   |
| <b>NOTIFICATIONS</b>   |                                     |   |
| NAME(S) OF FWENC PERSONNEL NOTIFIED:   | DATE/TIME:                          |   |
| CLIENT NOTIFIED:   | DATE/TIME:                          | BY WHOM:  |
| AGENCY NOTIFIED:   | DATE/TIME:                          | BY WHOM: <input type="checkbox"/> N/A                                   |
| CONTACT NAME:  |                                     |   |
| <b>PERSONS PREPARING REPORT</b>  |                                     |   |
| EMPLOYEE'S NAME: (PRINT)   | SIGN:                               |   |
| EMPLOYEE'S NAME (PRINT)  | SIGN:                               |   |
| SUPERVISOR'S NAME: (PRINT)   | SIGN:                               |   |
| <b>NOTE: Supervisor to forward a copy of Incident Report to immediate supervisor, PESM, ESS or ESC, and other personnel as identified in Table 1 of this procedure ASAP, but no later than 24 hours.</b> |                                     |   |



## INVESTIGATIVE REPORT

DATE OF INCIDENT: \_\_\_\_\_

DATE OF INVESTIGATION REPORT: \_\_\_\_\_

|   |                    |  |                             |                             |                             |
|---|--------------------|--|-----------------------------|-----------------------------|-----------------------------|
| <b>INCIDENT COST:</b>   |                    | ESTIMATED: \$ _____                          | ACTUAL: \$ _____            |                             |                             |
| <b>OSHA RECORDABLE(S):</b>  |                    | <input type="checkbox"/> YES                 | <input type="checkbox"/> NO | # RESTRICTED DAYS _____     | # DAYS AWAY FROM WORK _____ |
| <b>CAUSE ANALYSIS</b>   |                    |  |                             |                             |                             |
| <b>Was the activity addressed in an AHA?</b>  |                    | <input type="checkbox"/> YES (Attach a copy) |                             | <input type="checkbox"/> NO |                             |
| <b>IMMEDIATE CAUSES</b> – WHAT ACTIONS AND CONDITIONS CONTRIBUTED TO THIS EVENT? (USE NEXT PAGE)  |                    |  |                             |                             |                             |
|   |                    |  |                             |                             |                             |
| <b>BASIC CAUSES</b> - WHAT SPECIFIC PERSONAL OR JOB FACTORS CONTRIBUTED TO THIS EVENT? (USE NEXT PAGE)  |                    |  |                             |                             |                             |
|   |                    |  |                             |                             |                             |
| <b>ACTION PLAN</b>  |                    |  |                             |                             |                             |
| <b>REMEDIAL ACTIONS</b> - WHAT HAS AND OR SHOULD BE DONE TO CONTROL EACH OF THE CAUSES LISTED? INCLUDE MANAGEMENT PROGRAMS (SEE ATTACHED LIST) FOR CONTROL OF INCIDENTS IF APPLICABLE.  |                    |  |                             |                             |                             |
| ACTION  | PERSON RESPONSIBLE | TARGET DATE                                  | COMPLETION DATE             |                             |                             |
|   |                    |  |                             |                             |                             |
|   |                    |  |                             |                             |                             |
|   |                    |  |                             |                             |                             |
|   |                    |  |                             |                             |                             |
| <b>PERSONS PERFORMING INVESTIGATION</b>   |                    |  |                             |                             |                             |
| INVESTIGATOR'S NAME: (PRINT)  |                    | SIGN:  |                             | DATE:                       |                             |
| INVESTIGATOR'S NAME: (PRINT)  |                    | SIGN:  |                             | DATE:                       |                             |
| INVESTIGATOR'S NAME: (PRINT)  |                    | SIGN:  |                             | DATE:                       |                             |
| <b>MANAGEMENT REVIEW</b>  |                    |  |                             |                             |                             |
| PROJECT/OFFICE MANAGER (PRINT)  |                    | SIGN:  |                             |                             |                             |
| COMMENTS:   |                    |  |                             |                             |                             |
| PESM or ESC (PRINT)   |                    | SIGN:  |                             |                             |                             |
| COMMENTS:   |                    |  |                             |                             |                             |
|   |                    |  |                             |                             |                             |
| <b>NOTE:</b> Attach additional information as necessary. Supervisor to forward copy of Investigative Report to the PM or OM, PESM or ESC ASAP, but no later than 72 hours after the incident. A copy shall be sent to the Director, Health and Safety Programs within 24 hours of completion of the report. |                    |  |                             |                             |                             |

**EXAMPLES OF IMMEDIATE CAUSES**

| <u>SUBSTANDARD ACTIONS</u>               | <u>SUBSTANDARD CONDITIONS</u>      |
|--|------------------------------------|
| 1. OPERATING EQUIPMENT WITHOUT AUTHORITY | 1. GUARDS OR BARRIERS              |
| 2. FAILURE TO WARN                       | 2. PROTECTIVE EQUIPMENT            |
| 3. FAILURE TO SECURE                     | 3. TOOLS, EQUIPMENT, OR MATERIALS  |
| 4. OPERATING AT IMPROPER SPEED           | 4. CONGESTION                      |
| 5. MAKING SAFETY DEVICES INOPERABLE      | 5. WARNING SYSTEM                  |
| 6. REMOVING SAFETY DEVICES               | 6. FIRE AND EXPLOSION HAZARDS      |
| 7. USING DEFECTIVE EQUIPMENT             | 7. POOR HOUSEKEEPING               |
| 8. FAILURE TO USE PPE PROPERLY           | 8. NOISE EXPOSURE                  |
| 9. IMPROPER LOADING                      | 9. EXPOSURE TO HAZARDOUS MATERIALS |
| 10. IMPROPER PLACEMENT                   | 10. EXTREME TEMPERATURE EXPOSURE   |
| 11. IMPROPER LIFTING                     | 11. ILLUMINATION                   |
| 12. IMPROPER POSITION FOR TASK           | 12. VENTILATION                    |
| 13. SERVICING EQUIPMENT IN OPERATION     | 13. VISIBILITY                     |
| 14. UNDER INFLUENCE OF ALCOHOL/DRUGS     |                                    |
| 15. HORSEPLAY                            |                                    |

**EXAMPLES OF BASIC CAUSES**

| <u>PERSONAL FACTORS</u> | <u>JOB FACTORS</u>                                     |
|-------------------------|--|
| 1. CAPABILITY           | 1. SUPERVISION   |
| 2. KNOWLEDGE            | 2. ENGINEERING   |
| 3. SKILL                | 3. PURCHASING  |
| 4. STRESS               | 4. MAINTENANCE   |
| 5. MOTIVATION           | 5. TOOLS/EQUIPMENT                                     |
|                         | 6. WORK STANDARDS                                      |
|                         | 7. WEAR AND TEAR                                       |
|                         | 8. ABUSE OR MISUSE                                     |
|                         | 9. CHANGE (Conditions, scope, work methods, personnel) |

**MANAGEMENT PROGRAMS FOR CONTROL OF INCIDENTS**

|                                  |                             |
|----------------------------------|-----------------------------|
| 1. LEADERSHIP AND ADMINISTRATION | 10. HEALTH CONTROL          |
| 2. MANAGEMENT TRAINING           | 11. PROGRAM AUDITS          |
| 3. PLANNED INSPECTIONS           | 12. ENGINEERING CONTROLS    |
| 4. TASK ANALYSIS AND PROCEDURES  | 13. PERSONAL COMMUNICATIONS |
| 5. TASK OBSERVATION              | 14. GROUP MEETINGS          |
| 6. EMERGENCY PREPAREDNESS        | 15. GENERAL PROMOTION       |
| 7. ORGANIZATIONAL RULES          | 16. HIRING AND PLACEMENT    |
| 8. ACCIDENT/INCIDENT ANALYSIS    | 17. PURCHASING CONTROLS     |
| 9. PERSONAL PROTECTIVE EQUIPMENT |                             |

**NOTIFICATION REMINDER**

Fatalities or hospitalization (admittance) of three or more individuals requires notification to OSHA within 8 hours. Contact the Director, Health and Safety Programs or Director, ESQ Programs to make the notification. If unavailable, the senior operations person on site should make the notification.

**FIGURE 01155-4**  
**PHYSICAL CONDITIONS EVALUATION GUIDE**  
**AND**  
**PROJECT INSPECTION CHECKLIST**

**CONFIDENTIAL**

\_\_\_\_\_  
Project Title

\_\_\_\_\_  
Delivery Order

\_\_\_\_\_  
Contract/Client Name

\_\_\_\_\_  
Contract Number

\_\_\_\_\_  
Date of Report

Prepared by: \_\_\_\_\_  
Inspector Date

Reviewed by: \_\_\_\_\_  
Project Manager Date

Reviewed by: \_\_\_\_\_  
Regional ESQ Manager Date



| <b>I. Background Information</b>   |  |
|--|--|
| <b>1. Project Information.</b>   |  |
| Project Name:  |  |
| Client Name:   |  |
| Contract/Delivery Order:   |  |
| Site Location:   |  |
| Project Manager:   |  |
| Site Manager:  |  |
| Inspector/Location:  |  |
| Date of Inspection:  |  |
| Date Field Activities Commenced:   |  |
| Date Field Activities Anticipated to be Completed:   |  |
| Prime Contractor:  |  |
| Subcontractors:  |  |
| Operations Evaluated: <input type="checkbox"/> Yes <input type="checkbox"/> No   |  |
| Site Personnel Interviewed:  |  |
| <b>2. Project Documentation.</b> Provide a list of project documentation reviewed prior to inspection.   |  |
|  |  |
| <b>3. Regulatory Background.</b> List the lead and support regulatory agencies; the regulatory program under which the cleanup activity is being conducted; and any Decision Documents applicable to the activities. |  |
|  |  |

|  |   |   |                         |                    |               |  |  |  |
|--|---|---|-------------------------|--------------------|---------------|--|--|--|
| <p><b>4. Project Activities.</b> Provide a list of project activities and current status (e.g., completed, ongoing, not completed). <i>Note: Ensure EHS Plan accurately identifies these project activities.</i></p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center; width: 60%;"><u>Activity</u></td> <td style="text-align: center; width: 40%;"><u>Status</u></td> </tr> </table>  | <u>Activity</u>                           | <u>Status</u>                             |                         |                    |               |  |  |  |
| <u>Activity</u>  | <u>Status</u>                             |   |                         |                    |               |  |  |  |
| <p><b>5. Regulatory Permits, Approvals, Plans, And Agreements.</b> List the regulatory permits, approvals, plans, and agreements that have been/will be obtained to conduct project activities. For permit equivalencies, list the project documentation that identifies substantive requirements and regulatory agency concurrence with those requirements. <i>Note: Ensure EHS Plan accurately identifies these permit requirements.</i></p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center; width: 60%;"><u>Permit/Plan Agreement</u></td> <td style="text-align: center; width: 40%;"><u>Status (including expiration date)</u></td> </tr> </table>   | <u>Permit/Plan Agreement</u>              | <u>Status (including expiration date)</u> |                         |                    |               |  |  |  |
| <u>Permit/Plan Agreement</u>   | <u>Status (including expiration date)</u> |   |                         |                    |               |  |  |  |
| <p><b>6. Training.</b> List training requirements and status at time of inspection. Indicate whether project files contained documentation to demonstrate compliance with the training requirements. <i>Note: Ensure EHS Plan accurately identifies these training requirements.</i></p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center; width: 70%;"><u>Training</u></td> <td style="text-align: center; width: 30%;"><u>Status</u></td> </tr> </table>  | <u>Training</u>                           | <u>Status</u>                             |                         |                    |               |  |  |  |
| <u>Training</u>  | <u>Status</u>                             |   |                         |                    |               |  |  |  |
| <p><b>7. Project Waste Streams.</b> Complete the following table for each waste stream. Include the amount generated, how it is being managed (e.g., type of containerization), characterization, whether sampling and analysis is pending, how it will/has been dispositioned, and whether waste is currently on or off-site, replaced in excavation, etc. Waste streams should include, at a minimum, investigation-derived wastes, excavated wastes, treatment residues, debris, and PPE. Describe also Foster Wheeler Environmental’s responsibility for characterization, packaging, managing, transportation, and disposal. <i>Note: Ensure EHS Plan accurately identifies these waste management requirements.</i></p> <table style="width: 100%; border: none;"> <tr> <td style="text-align: center; width: 25%;"><u>Waste Stream</u></td> <td style="text-align: center; width: 25%;"><u>Amount/Mgmt</u></td> <td style="text-align: center; width: 25%;"><u>Characterization</u></td> <td style="text-align: center; width: 25%;"><u>Disposition</u></td> </tr> <tr> <td colspan="4"><u>Status</u></td> </tr> </table> | <u>Waste Stream</u>                       | <u>Amount/Mgmt</u>                        | <u>Characterization</u> | <u>Disposition</u> | <u>Status</u> |  |  |  |
| <u>Waste Stream</u>  | <u>Amount/Mgmt</u>                        | <u>Characterization</u>                   | <u>Disposition</u>      |                    |               |  |  |  |
| <u>Status</u>  |   |   |                         |                    |               |  |  |  |

*ATTACH ACTION ITEM REPORT AND APPLICABLE COMPLETED PESM INSPECTION CHECKLISTS.*

### III. Applicable Checklists

*Please place a checkmark (✓) next to each checklist which is attached to this report.*

- ENVIRONMENTAL, HEALTH AND SAFETY/EMS PROGRAMS (*MUST BE COMPLETED FOR ALL INSPECTIONS*)
- AIR QUALITY
- ASBESTOS
- CONSERVATION RESOURCES AND ENVIRONMENTAL REVIEWS
- DRINKING WATER, SOLE SOURCE AQUIFER, WELLHEAD PROTECTION AND WATER WITHDRAWAL
- FIELD, CONSTRUCTION AND ROAD IMPACTING ACTIVITIES
- HAZARDOUS WASTE: STORAGE TREATMENT DISPOSAL IN LESS THAN 90 DAYS
- HAZARDOUS WASTE: PERMITTED FACILITIES
- LEAD-BASED PAINT ABATEMENT
- OIL AND HAZARDOUS SUBSTANCES MANAGEMENT
- RADIOACTIVE WASTE
- SOLID WASTE
- TSCA: POLYCHLORINATED BIPHENYLS
- UNDERGROUND/ABOVE-GROUND STORAGE TANK INSTALLATION AND CLOSURE
- WASTEWATER/STORMWATER DISCHARGES/UIC
- WETLANDS/STREAMS/FLOODPLAINS

SECTION 01200  
PROJECT MEETINGS

PART 1. GENERAL

1.1 DESCRIPTION

The Contractor shall attend any and all meetings requested by the Contracting Officer and as required by the Construction Quality Control Plan.

1.2 RELATED SECTIONS

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

Section 01400 Construction Quality Control Plan

1.3 SUBMITTALS

Not used.

1.4 DAILY MEETINGS

The Contracting Officer's and the Contractor's representatives shall attend the Daily Safety Meeting. The meeting will be held at a time and location designated by the Contracting Officer. All personnel attending the meeting shall have knowledge of the scope of work, project schedule, forecasted daily schedule and site conditions.

1.5 WEEKLY PROGRESS MEETINGS

The Contracting Officer's and the Contractor's representatives shall attend a weekly meeting at a time and location designated by the Contracting Officer.

- A. The Contracting Officer's and the Contractor's representatives shall have knowledge of the complete project schedule, the schedule for each Subcontractor, delivery dates, milestones, outstanding approvals/design changes/Change Orders and the critical path for the completion of the Work.
- B. If the Project falls behind schedule, additional meetings may be requested by the Contracting Officer, at any time, to review causes for delays and plans for improving productivity.

1.6 SAFETY MEETINGS

The Contractor shall attend additional safety meetings, as requested by the Contracting Officer, to correct violations and incidents and to review procedures related to safety. Subcontractors may also be requested to attend these meetings.

PART 2. PRODUCTS

Not used.

PART 3. EXECUTION

Not used.

PART 4. FIELD SUPERVISION AND TESTING

Not used.

\*\*\*END OF SECTION\*\*\*

SECTION 01300

SUBMITTALS

PART 1. GENERAL

1.1 DESCRIPTION

- A. This Section includes general requirements and procedures necessary for scheduling, preparation, and submission of submittals. For the purpose of these documents, submittals necessary shall include Shop Drawings, substitutions, product data, samples, and other submittals required by the Technical Specifications.
- B. All Work shall comply with the requirements specified in the Construction Quality Control (CQC) Plan. Any conflicts with these requirements will be resolved by the Contracting Officer.
- C. This Section covers the general requirements and procedures for submittals. The following items are covered in this Section.
  - 1. General Submittal Requirements;
  - 2. Submittal Form;
  - 3. Items Requiring Submittal for Approval;
  - 4. Submittal Register;
  - 5. Construction Project Schedule;
  - 6. Progress Reports;
  - 7. Product and Equipment Data;
  - 8. Shop Drawings;
  - 9. Procedures and Methods;
  - 10. Contracting Officer's/Contractor's Responsibilities; and
  - 11. Record Drawings.
- D. Types of Work-Related Submittals
  - 1. Substitutes or "Or Equal" Items

Includes material or equipment, Contractor requests the Contracting Officer to accept as substitute for items specified or described by using proprietary name or name of particular Supplier.

2. Shop Drawings

- a) Includes technical data and Drawings specially prepared for this Project, including fabrication and installation Drawings, diagrams, actual performance curves, data sheets, schedules, templates, patterns, reports, instructions, design mix formulas, measurements, and similar information not in standard printed form.
- b) Standard information prepared without specific reference to a project is not considered to be a Shop Drawing.

3. Product Data

Includes standard printed information on manufactured products and systems that has not been specifically prepared for this Project, including Manufacturer's Product Specifications and installation instructions, catalog cuts, standard wiring diagrams, printed performance curves, mill reports, and standard color charts.

4. Samples

Includes both fabricated and manufactured physical examples of materials, products, and units of Work, includes complete units, partial cuts of manufactured or fabricated work, swatches showing color, texture, and pattern, and units of Work to be used for independent inspection and testing.

5. Miscellaneous Submittals

Work-related submittals that do not fit in the four previous categories include guarantees, warranties, certifications, experience records, maintenance agreements, workmanship bonds, survey data and reports, physical work records, quality testing and certifying reports, copies of industry standards, record Drawings, field measurement data, overrun stock, keys, and similar information, devices, and materials applicable to Work.

1.2 RELATED DIVISIONS

Related Work and/or equipment that is specified in other Divisions of the Contract Document include, but is not limited to, the following:

|             |                      |
|-------------|----------------------|
| Division 1  | General Requirements |
| Division 2  | Site Work            |
| Division 3  | Concrete             |
| Division 15 | Mechanical           |

1.3 SUBMITTALS

Not used.

#### 1.4 GENERAL SUBMITTAL REQUIREMENTS

- A. The submittal procedure shall be in accordance with the following:
  - 1. The Contractor shall transmit to the Contracting Officer a Submittal Form and five copies of each submittal or revision.
  - 2. Transmittal forms shall have a number unique to that submittal. Revisions shall have the original number with an alphabetic suffix (-A, -B, -C, etc.) to indicate the sequence of the revision.
- B. The Contracting Officer's review of the Contractor's submittal shall be 10 consecutive business days in length and shall commence on the first business day immediately following the date of arrival of the submittal.
- C. The Contracting Officer's review of the Contractor's submittal (including drawings, data and samples) with or without comments is for conformance with the design documents and for conformation of physical interface of items shown with related systems.
- D. The Contractor shall make all required corrections and/or changes in the submittals and resubmit two copies to the Contracting Officer. Samples of the products or materials may also be requested by the Contracting Officer to aid in the review process.
- E. All costs for the preparation, correction, samples, and delivery of the submittals shall be borne by the Contractor.

#### 1.5 QUALITY ASSURANCE / QUALITY CONTROL

Records of approved submittals and approved construction activities shall be the responsibility of the QC Engineer. The Contracting Officer shall review procedures followed by the QC Engineer to ensure that all applicable QC procedures have been followed. Generation of reports and final record documentation is the responsibility of the QC Engineer.

#### 1.6 SUBMITTAL FORM

Each submittal and revision shall be accompanied by a completed Submittal Form or letter acceptable to the Contracting Officer. Submittals will not be accepted or approved without an appropriate Submittal Form.

#### 1.7 ITEMS REQUIRING SUBMITTAL FOR APPROVAL

Items that are required to be submitted, by the Contractor, for approval include:

- A. Project Schedule;
- B. Progress Report;

- C. Product Data and Test Results;
- D. Shop Drawings;
- E. Samples; and
- F. Procedures and Methods.

#### 1.8 SUBMITTAL REGISTER

- A. The Contractor shall be responsible for updating the Submittal Register. The Comprehensive Submittal Register shall include the name of the submittal, the scheduled date for submission, and a reference to the corresponding Section of the Technical Specifications.
- B. In addition to items listed in the Contractor's Submittal Register, the Contractor shall furnish submittals for any deviation from the Technical Specifications and/or Contract Drawings. The scheduled submittal dates must be recorded on the document for each item for control purposes.
- C. All submittal requirements from within the Technical Specifications must be shown on the Submittal Register.

#### 1.9 PROJECT SCHEDULE

- A. The Contractor shall provide a Preliminary Construction Schedule for the scope of Work. The Preliminary Construction Schedule shall be submitted with the Bid.
- B. The Contractor shall, within ten calendar days after receipt of Notice to Proceed, provide and submit to the Contracting Officer for approval, the "Final Construction Schedule" for his/her planned operations, and general approach for completion of the Work. The Final Construction Schedule shall graphically show the order and interdependence of all activities necessary to complete the Work, and the sequence in which each activity is planned to be accomplished including start and finish dates for each task or activity. The Contractor shall include in the Final Construction Schedule the activities of all trades, Subcontractors, and material suppliers. The Contracting Officer shall approve the Final Construction Schedule before any construction begins.
- C. The Contractor shall monitor, update, and submit an up-to-date version of the Final Construction Schedule to the Contracting Officer on a weekly basis. The revised schedule shall clearly show actual progress, revised milestones, completed activities, partially completed activities, and future activity completion dates.
  - 1. All activities that are behind schedule shall be identified and reported as to the effect to the future activities and overall schedule

2. All activities that change from the previously approved schedule in method, labor intensity, or rate of productivity will be identified and the changes discussed
  3. Restraints imposed by delayed material deliveries shall also be identified and discussed
- D. The Contractor shall participate in the Contracting Officer's review and evaluation of the revised schedule and shall make all revisions to the schedule in accordance with the review comments, and resubmit it to the Contracting Officer for approval. The approved schedule shall then be used by the Contractor for planning, organizing, and directing the Work and for reporting progress.
- E. The Contractor shall work diligently to complete the scheduled Work in a timely manner, so that no delay will be caused in the Work.

#### 1.10 PROGRESS REPORTS

- A. A progress report shall be furnished by the Contractor to the Contracting Officer with each application for progress payment. If the Work falls behind schedule, the Contractor shall submit additional progress reports at such intervals as requested by the Contracting Officer.
- B. Each progress report shall include sufficient narrative to describe Work completed to date and, if necessary, anticipated delaying factors, their effect on the Final Construction Schedule, and proposed corrective actions. Any portion of the Work reported to be complete, but which is not readily apparent as complete to the Contracting Officer, must be substantiated with satisfactory evidence.
- C. Each progress report shall also include three copies of the accepted schedule marked to indicate actual progress.

#### 1.11 PRODUCT AND EQUIPMENT DATA

- A. Within 10 days after the date of Contracting Officer's Notice to Proceed, the Contractor shall submit to the Contracting Officer a complete list of major products to be used.
- B. A Submittal Form shall be submitted for each group of products, including the uses and Manufacturer's name and address. For each item listed, include the trade or brand name, product number, guarantees/warranties, reference standards, installation instructions, and any supplemental technical data or information that may be required for approval.
- C. A Submittal Form shall be submitted for each separate mechanical and electrical equipment, including the use of Manufacturer's name and address. For each item, include the model number, technical data, performance information, ratings, capacities, guarantees/warranties,

reference standards, installation instructions, and any other information that may be required for approval.

#### 1.12 SHOP DRAWINGS

- A. Shop Drawings, as may be specified in individual Work Sections, include, but are not limited to, custom-prepared data such as fabrication and erection/installation Drawings. Schedule information, setting diagrams, actual Manufacturer's instructions, custom templates, special wiring diagrams, coordination Drawings, system or equipment inspection procedures and testing and verification reports including performance curves and certifications, as applicable to the Work.
- B. All Shop Drawings submitted by the Contractor for approval shall be not less than 8 ½ by 11 inches nor more than 30 by 42 inches and include the following information: Project Title and Location, Contract Number and Task Order; Drawing Title; Drawing Number; Date of Drawing; and Number and Date of any Revisions.
- C. Shop Drawings shall be reviewed by Foster Wheeler prior to submitting to the Contracting Officer. The Contractor shall be responsible for their timely submission so as to prevent delays in delivery of materials.
- D. The Contracting Officer shall check all the Contractor's Shop Drawings regarding measurement size of individual members, materials, and details to satisfy that they conform to the intent of the Contract Drawings and these Technical Specifications. Drawings found to be inaccurate or otherwise in error shall be returned to the Contractor for correction.
- E. All details on Shop Drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure, and where correct fabrication of the Work depends upon field measurements, such measurements shall be made and noted on the submittal Drawings before being submitted for approval.

#### 1.13 SAMPLES

- A. The Contractor shall submit to the Contracting Officer samples of products to be used in construction which are adequate to indicate color, texture, and material variations.
- B. For samples of material where variations are expected three samples shall be submitted. These samples shall be representative of the two extreme conditions and the middle condition.
- C. Samples shall be of the following sizes: cut down or sized up to 8 ½ by 11 for solid materials; 10 inches for linear materials; 1 pint for non-solid materials.
- D. The Contractor is required to provide additional samples at the Contracting Officer's request. When requested by the Contracting Officer sample

panels or installations may also be required for approval of product or procedures.

- E. In certain cases where directed by the Contracting Officer approved samples may be incorporated into the Work. Incorporated samples shall be in undamaged condition at the time of use.

## PART 2. PRODUCTS

Not used.

## PART 3. EXECUTION

### 3.1 CONTRACTING OFFICER'S / CONTRACTOR'S RESPONSIBILITIES

- A. Within 10 days after date of Notice to Proceed or at least one month prior to installation, the Contractor shall submit the items that are required to be submitted for approval in order to meet the Contract Requirements.
- B. The Contractor shall review Shop Drawings, product data, and samples prior to submitting them to the Contracting Officer. As a minimum, the Contractor shall determine and verify the following:
  - 1. Field measurements;
  - 2. Field construction criteria;
  - 3. Catalog numbers and similar data; and
  - 4. Conformance with the Technical Specifications.
- C. The Contractor shall provide with each Shop Drawing, working drawing, sample and catalog data submitted to the Contracting Officer a signed certificate stating that he/she has determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and has checked and coordinated each item with other applicable approved Shop Drawings and all Contract Requirements.
- D. The Contractor shall notify the Contracting Officer in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.
- E. The review and approval of Shop Drawings, samples or catalog data by the Contracting Officer shall not relieve the Contractor from his/her responsibility to fulfill the terms and conditions of the Contract. All risks of error and omission are assumed by the Contractor and the Contracting Officer shall therefore have no responsibility.
- F. No Work requiring a Shop Drawing, working Drawing, sample, or catalog data shall start, nor shall any materials be fabricated or installed prior to their approval by the Contracting Officer. Fabrication performed, materials

purchased or on-site construction accomplished that does not conform to approved Shop Drawings and data shall be at the Contractor's risk. The Contracting Officer shall not be liable for any expense or delay due to correction or remedies required to accomplish conformity.

- G. All Work, materials, fabrication, and installation shall conform with approved Shop Drawings, working Drawings, applicable samples, and catalog cuts.

### 3.2 SUBMITTAL PROCEDURES

- A. The Contractor shall submit to the Contracting Officer all items listed on the Submittal Register or specified in the other Sections of these Technical Specifications. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with Contract Requirements.
- B. The Contracting Officer reserves the right to modify the procedures and requirements for submittals, as necessary to accomplish the specific purpose of each submittal. The Contracting Officer may request submittals in addition to those listed when deemed necessary to adequately describe the Work covered in the respective Sections. The Contractor shall direct inquiries to the Contracting Officer regarding the procedure, purpose, or extent of any submittal.
- C. Submittals processed by the Contracting Officer do not become Contract Documents and are not to be considered Change Orders by the Contractor. The purpose of submittal review is to establish a reporting procedure and is intended for the Contractor's convenience in organizing the Work, and to the Contracting Officer to monitor the progress and understanding of the design.
- D. The Contractor shall revise and resubmit submittals as required; identify all changes made since previous submittals.
- E. When submittals have been reviewed by the Contracting Officer, one copy will be returned by the Contracting Officer to the Contractor appropriately annotated. If major changes or corrections are necessary, the submittal may be rejected and one set will be returned to the Contractor with such changes or corrections indicated. The Contractor shall correct and resubmit the submittal in the same manner and quantity as specified for the original submittal.

### 3.3 SUBMITTAL REVIEW / ACCEPTANCE

- A. If a submittal is acceptable, it will be marked "Accepted for Construction" or "Corrections as noted – Resubmit." One copy of the submittal will be returned to the Contractor for all submittals.
- B. Upon return of a submittal marked "Accepted for Construction" or "Corrections as Noted- Resubmit" the Contractor may order, ship, or fabricate the materials included on the submittal, provided it is in accordance with the corrections indicated.

- C. If a submittal is marked "Corrections as Noted- Resubmit" the Contractor shall make the corrections indicated thereon and resubmit the submittal for record purposes.
- D. Submittals that are for information only will be marked "No Action Required."
- E. If a submittal is unacceptable, one copy will be returned to the Contractor with one of the following notations:
  - 1. "Revise and Resubmit"; or
  - 2. "Not Acceptable- Not Per Contract".
- F. Upon return of a submittal marked "Revise and Resubmit", the Contractor shall make the corrections indicated then repeat the initial acceptance procedure.
- G. The "Not Accepted" notation is used to indicate material or equipment that is not acceptable. Upon return of a submittal so marked, the Contractor shall repeat the initial approval procedure utilizing acceptable material or equipment at no additional cost to the Navy.
- H. Submittals lacking adequate detail or other information to allow the Contracting Officer to determine whether or not the submittal meets the Contract Requirements shall be marked "Incomplete or Deficient Submittal" and returned without further comment.
- I. Shop Drawings or other submittals not bearing the Contracting Officer's "Accepted for Construction" notations shall not be utilized for construction purposes. No Work shall be performed or requirement installed without a Drawing or submittal bearing this notation.

### 3.4 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent Drawings shall be so scheduled. Adequate time shall be allowed on the register for review and approval. The Contractor shall carefully control his/her operations to ensure that each individual submittal is made on or before the Contractor scheduled date shown on the approved "Submittal Register."

### 3.5 INFORMATION ONLY SUBMITTALS

Normally, submittals for information will not be returned. Approval of the Contracting Officer is not required on information only submittals. These submittals will be used for information purposes. The Contracting Officer reserves the right to require the Contractor to resubmit any item found to comply with the Contract. This does not relieve the Contractor from the obligation to furnish material conforming to the Contract Drawings and Technical Specifications and will not prevent the Contracting Officer from

requiring removal and replacement if nonconforming material is incorporated in the Work. This does not relieve the Contractor of the requirement to furnish samples for testing by the Contracting Officer's laboratory or check testing by the Contracting Officer in those instances where Technical Specifications so prescribe.

### 3.6 RECORD DRAWINGS

- A. The Contractor shall maintain on Site a set of up-to-date Record Drawings which clearly indicate all changes to the Contract Drawings. The Record Drawings shall indicate all changes to the original Contract Work and additional Work in red. The Record Drawings shall also indicate exact routing of all power and control wiring, locations of all manual and automatic controls and amperage readings for all motors taken from the equipment under normal load conditions.
- B. A complete and accurate set of Record Drawings shall be signed and dated by the Contractor and shall be labeled with the following,
  - “These Record Drawings completely and truly represent the Contract Work as installed.”
- C. Record Drawings shall be delivered to the Contracting Officer within 30 days of final approval of the Work and shall be on one set of reproducible Drawings and on electronic media in AutoCAD Release 14.
- D. Record Drawings shall include the name, address, phone number, and signature of the Contracting Officer and any Contractors.
- E. Record Drawings shall show all deviations in “Clouds” to clearly identify any deviations from the Contract Drawings.
- F. All utilities, structures, or other deviations to the Drawings encountered during construction shall be shown on Record Drawings. Any locations that are different than those shown on the Drawings shall be clearly identified in their correct locations.

### PART 4. FIELD SUPERVISION AND TESTING

Not used.

\*\*\*END OF SECTION\*\*\*

SECTION 01320

SUBMITTAL REGISTER

PART 1. GENERAL

1.1 DESCRIPTION

- A. This Section includes a listing of submittals required by other Sections of the Technical Specifications, the Contract Drawings, and the CQC Plan.
- B. Submittals shall include Shop Drawings, substitutions, product data, samples, and other submittals required by the Technical Specifications, Contract Drawings, and the CQC Plan.
- C. All submittals listed shall be submitted in accordance with procedures outlined in Section 01300, "Submittals."

1.2 RELATED DIVISIONS

Related Work and/or equipment that is specified in other Divisions of the Contract Document include, but is not limited to, the following:

- Division 1 General Requirements
- Division 2 Site Work
- Division 3 Concrete
- Division 4 Mechanical

1.3 SUBMITTALS

Not used.

PART 2. PRODUCTS

Not used.

PART 3. EXECUTION

3.1 PREPARATION OF SUBMITTAL REGISTER

All submittal requirements from within the Technical Specifications must be shown on the Submittal Register with reference to the Section and Paragraph of the Technical Specifications where stated.

3.2 ADDITIONAL ITEMS

In addition to items listed in the Contractor's Submittal Register, the Contractor shall furnish submittals for any deviation from the Technical Specifications and/or Contract Drawings. The scheduled submittal dates must be recorded on the document for each item for control purposes.

### 3.3 UPDATING THE SUBMITTAL REGISTER

The Contractor shall be responsible for updating the Submittal Register to reflect newly required submittals, status of submittals, and any other changes that affect the register.

### PART 4. FIELD SUPERVISION AND TESTING

Not used.

\*\*\*END OF SECTION\*\*\*

SUBMITTAL REGISTER

| TITLE AND LOCATION                              |                |              |   |              |                                  |                           |                    |                    |                   |                | CONTRACTOR                                 |                        |                           |             |  |         |                |
|---|----------------|--------------|---|--------------|----------------------------------|---------------------------|--------------------|--------------------|-------------------|----------------|--|------------------------|---------------------------|-------------|--|---------|----------------|
| LANDFILL CAPS FOR SITES 3 AND 10, NWS EARLE, NJ |                |              |   |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
| ACTIVITY NO                                     | TRANSMITTAL NO | SPEC SECTION | DESCRIPTION OF ITEM SUBMITTED             | PARAGRAPH NO | CLASSIFICATION: GVT OR A/E REVMR | CONTRACTOR SCHEDULE DATES |                    |                    | CONTRACTOR ACTION |                |  | APPROVING AUTHORITY    |                           |             | MAIL TO CONTR/ DATE RCD FROM APPR AUTH | REMARKS |                |
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|   |                | 01010        | As-Built Drawings                         | 1.9          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Project Schedule                          | 1.10         |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 01052        | Land Surveyor Information                 | 1.3A         |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | a. Name and Address                       |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | b. Proof of Registration                  |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Documentation of Accuracy of Work         | 4.1C         |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Survey Drawings                           | 3.2          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Field Survey Notes and Computer Printouts | 3.1C         |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Surveyor Close-out Documents              | 1.4B         |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 01155        | Site Specific Health and Safety Plan      |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | a. Personnel                              | 3.1          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | b. Hazard Assessment                      | 3.2          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | c. Safe Work Practices                    | 3.3          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | d. Training                               | 3.4          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | e. Work Zone Categories                   | 3.5          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |

SUBMITTAL REGISTER

| TITLE AND LOCATION                              |                |              |  |              |                                  |                           |                    |                    |                   |                | CONTRACTOR                                 |                         |                           |             |  |         |                |
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| LANDFILL CAPS FOR SITES 3 AND 10, NWS EARLE, NJ |                |              |  |              |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
| ACTIVITY NO                                     | TRANSMITTAL NO | SPEC SECTION | DESCRIPTION OF ITEM SUBMITTED                        | PARAGRAPH NO | CLASSIFICATION: GVT OR A/E REVWR | CONTRACTOR SCHEDULE DATES |                    |                    | CONTRACTOR ACTION |                |  | APPROVING AUTHORITY     |                           |             | MAIL TO CONTR/ DATE RCD FROM APPR AUTH | REMARKS |                |
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|   |                | 01155        | f. Personal Safety Equipment and Protective Clothing | 3.6          |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | g. Personnel and Equipment Decontamination           | 3.7          |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | h. Sanitation  | 3.8          |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | i. Emergency Equipment and First Aid Requirements    | 3.9          |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | j. Emergency Response and Contingency Planning       | 3.10         |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | k. Posted Regulations                                | 3.11         |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | l. Communication                                     | 3.12         |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | m. Material Safety Data Sheets                       | 3.13         |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | n. Medical Surveillance                              | 4.3          |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | o. Environmental and Personnel Monitoring            | 4.4          |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | p. Record Keeping and Reporting                      | 4.5          |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | q. Inspection/Audit Program                          | 4.7          |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |

SUBMITTAL REGISTER

| TITLE AND LOCATION                              |                |              |  |              |                                 |                           |                    |                    |                   | CONTRACTOR     |  |                        |                          |             |  |         |                |
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| LANDFILL CAPS FOR SITES 3 AND 10, NWS EARLE, NJ |                |              |  |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
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|   |                | 01155        | Weekly Health and Safety Reports           | 4.6E         |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Monthly Safety Report                      |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Close-out Safety Report                    | 4.6F         |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                | 01350        | Pre-construction Photographs and Videotape | 2.1          |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Construction Photographs and Videotape     | 2.2          |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Monthly Photographs and Videotape          | 2.3          |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                | 01400        | Construction Quality Control (CQC) Plan    | 2.1          |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                | 01565        | Buildings/Trailers Information             | 2.2          |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Temporary Electrical Supply and Lighting   | 3.3          |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Sketch of Temporary Electrical System      | 3.3          |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |

SUBMITTAL REGISTER

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| LANDFILL CAPS FOR SITES 3 AND 10, NWS EARLE, NJ |                |              |   |               |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
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|   |                | 01565        | Water Supply ad Sanitary Facilities             | 3.4           |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Temporary Environmental Control Work Plans      | 3.7-3.19      |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 01700        | Compliance Documentation                        | 4.1A          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Lien Releases                                   | 1.4           |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Demonstration of Equipment Operability          | 4.1C          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Record Documents and Manuals                    | 1.5, 1.7, 1.8 |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 02050        | Revised Demolition Drawings                     | 1.3           |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 02210        | Tree Wound Paint                                | 2.1           |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 02240        | Silt Fencing Material: type and size            | 2.1A          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Sieve analysis test results for entrance stones | 2.1D          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 02250        | Equipment and Material Handling Plan            | 3.1           |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |

SUBMITTAL REGISTER

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| LANDFILL CAPS FOR SITES 3 AND 10, NWS EARLE, NJ |                |              |                                     |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
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|   |                | 02250        | Off-Site Disposal Plan              | 3.2,<br>3.3  |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Waste Profiles                      | 4.2          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Shipping Manifests                  | 3.4          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Disposal Manifests                  | 3.4          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 02310        | Fill Material Test Results          | 2.1B         |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | a. Moisture Density Test Results    |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | b. Sieve Analysis Test Results      |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | c. Atterburg Limit Test Results     |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | d. Acid Producing Soil Test Results |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Field Test Results                  | 4.2          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 02320        | Geotechnical Test Reports           | 2.1          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | a. Sieve Analysis Test              |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | b. Permeability Test                |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | c. Maximum/ Minimum Density         |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |

SUBMITTAL REGISTER

| TITLE AND LOCATION                              |                |              |  |              |                                  |                           |                    |                    |                   |                | CONTRACTOR                                 |                        |                           |             |  |         |                |
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|   |                | 02320        | d. Gradation                               |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | e. Hydraulic Conductivity                  |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Field Test Reports                         | 4.2          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | a. Sieve Analysis                          |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | b. Permeability Test                       |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | c. Maximum/ Minimum Density                |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | d. Gradation                               |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Letter of purity                           | 2.1A1        |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 02323        | Location and source of bedding and rip-rap | 2.1          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Sieve Analysis Test Results                | 4.2          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Soundness Test Results                     | 4.2          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Certification of Mean Weight               | 2.1B3        |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Certification of Gradation                 | 2.1B3        |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | 5 gallon bucket of material                | 2.1          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |

SUBMITTAL REGISTER

| TITLE AND LOCATION                              |                |              |   |              |                                 |                           |                    |                    |                   |                | CONTRACTOR                                 |                        |                          |             |  |         |                |
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| LANDFILL CAPS FOR SITES 3 AND 10, NWS EARLE, NJ |                |              |   |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
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|   |                | 02324        | Geotechnical Test Reports                           | 2.1          |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | a. Sieve Analysis                                   |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | b. Modified Proctor Test                            |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | c. Maximum/ Minimum Density                         |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Field Test Reports                                  | 4.2          |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | a. Sieve Analysis                                   |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | b. Density  |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | c. Relative Compaction                              |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | d. Sand Cone Test                                   |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | e. Thickness  |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Letter of purity                                    | 2.1          |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                | 02326        | Cover Soil  |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | 5 gallon bucket of material from each Borrow Source | 2.1C         |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Geotechnical Test Reports                           | 4.4          |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | a. Sieve Analysis                                   |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | b. Atterburg Limits                                 |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | c. Modified Proctor Test                            |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | d. pH   |              |                                 |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |

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| TITLE AND LOCATION                              |                |              |  |              |                                  |                           |                    |                    |                   |                | CONTRACTOR                                 |                         |                           |             |  |         |                |
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| LANDFILL CAPS FOR SITES 3 AND 10, NWS EARLE, NJ |                |              |  |              |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
| ACTIVITY NO                                     | TRANSMITTAL NO | SPEC SECTION | DESCRIPTION OF ITEM SUBMITTED                                | PARAGRAPH NO | CLASSIFICATION: GVT OR A/E REVWR | CONTRACTOR SCHEDULE DATES |                    |                    | CONTRACTOR ACTION |                |  | APPROVING AUTHORITY     |                           |             | MAIL TO CONTR/ DATE RCD FROM APPR AUTH | REMARKS |                |
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|   |                | 02326        | Letter of purity   | 2.1B         |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                | 02327        | Source and Quality of Concrete Materials                     | 2.2, 2.5     |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                | 02501        | Manufacturer's Specifications, data sheets, and instructions | 2.1          |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | Certificates of Compliance                                   | 4.1          |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | Material Certificates and Test Results                       | 2.1, 2.2     |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                | 02600        | Driller Information  | 3.1          |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | a. Name and Address  |              |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | b. Name of Driller   |              |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | c. NJ Certification  |              |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | Manufacturer's Catalog Information                           | 1.3B         |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | As-Built Drawings  | 1.3C3 .7     |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | Driller's Reports  | 1.3D3 .8     |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                | 02714        | Guaranteed Minimum Average Roll Length                       | 2.1          |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | Geotextile Production Information                            | 2.2          |                                  |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |

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| LANDFILL CAPS FOR SITES 3 AND 10, NWS EARLE, NJ |                |              |  |              |                                  |                           |                    |                    |                   |                |  |                         |                           |             |                |  |         |
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|   |                | 02714        | Geotextile Manufacturer's Test Results                 |              |                                  |                           |                    |                    |                   |                |  |                         |                           |             |                |  |         |
|   |                |              | Field Test Results                                     |              |                                  |                           |                    |                    |                   |                |  |                         |                           |             |                |  |         |
|   |                | 02771        | Manufacturing Capabilities                             | 1.4B         |                                  |                           |                    |                    |                   |                |  |                         |                           |             |                |  |         |
|   |                |              | a. Quality Control Procedures                          |              |                                  |                           |                    |                    |                   |                |  |                         |                           |             |                |  |         |
|   |                |              | b. List of Material Properties                         |              |                                  |                           |                    |                    |                   |                |  |                         |                           |             |                |  |         |
|   |                |              | Manufacturer's References                              | 1.4B         |                                  |                           |                    |                    |                   |                |  |                         |                           |             |                |  |         |
|   |                |              | Origin and identification of Resin                     | 2.1A         |                                  |                           |                    |                    |                   |                |  |                         |                           |             |                |  |         |
|   |                |              | Certification of compatibility between resins          | 2.3A         |                                  |                           |                    |                    |                   |                |  |                         |                           |             |                |  |         |
|   |                |              | Resin Supplier Quality Control Certificates            | 2.3A         |                                  |                           |                    |                    |                   |                |  |                         |                           |             |                |  |         |
|   |                |              | Geomembrane Manufacturer's Test Results                | 2.3B         |                                  |                           |                    |                    |                   |                |  |                         |                           |             |                |  |         |
|   |                |              | Certification of no Post Consumer Resin                | 2.1A         |                                  |                           |                    |                    |                   |                |  |                         |                           |             |                |  |         |
|   |                |              | Manufacturing Specifics and Test Results for each Roll | 2.2A         |                                  |                           |                    |                    |                   |                |  |                         |                           |             |                |  |         |

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| LANDFILL CAPS FOR SITES 3 AND 10, NWS EARLE, NJ |                |              |  |              |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
| ACTIVITY NO                                     | TRANSMITTAL NO | SPEC SECTION | DESCRIPTION OF ITEM SUBMITTED                    | PARAGRAPH NO | CLASSIFICATION: GVT OR A/E REWWR | CONTRACTOR SCHEDULE DATES |                    |                    | CONTRACTOR ACTION |                |  | APPROVING AUTHORITY    |                          |             | MAIL TO CONTR/ DATE RCD FROM APPR AUTH | REMARKS |                |
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|   |                | 02771        | Quality Control Certificates                     | 2.3          |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Manufacturer's Warranty                          | 1.5          |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Installation layout                              | 3.3A         |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Installation schedule                            | 3.1B3        |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Contractor's letter of approval for Manufacturer | 1.4          |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Installation capacities                          | 1.4C         |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | a. Equipment Information                         |              |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | b. Average Daily Production                      |              |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | c. Quality Control Procedures                    |              |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Installer's References                           | 1.4C         |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Resumes of supervisors and seamers               | 1.4C         |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | Certificate of Calibration                       | 3.4D2        |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                | 02800        | Proposed Material and Material Sources           | 2.1, 2.2     |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |
|   |                |              | 5 gallon bucket of material from each source     | 2.1, 2.2     |                                  |                           |                    |                    |                   |                |  |                        |                          |             |  |         |                |

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|   |                | 02800        | Top Soil Composition Tests                   | 4.2          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Factory Test Reports for Acid Producing Soil | 2.3B         |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 02810        | Concrete Mix Design and Test Results         | 1.3          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 02830        | Product Data                                 | 2.1-2.5      |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | As-Built Drawings for Fences                 | 3.1D         |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 02840        | Certificate of Seed Purity and Germination   | 2.1          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Fiber Mulch Information                      | 2.5          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Manufacturer's Catalog Data for Fertilizer   | 2.3          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Factory Test Results                         | 2.1-2.5      |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | Soil Content Test Results                    | 4.2          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 03200        | Certified Mill Reports                       | 1.3          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 03300        | Concrete Mix Design and Test Results         | 2.3          |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                | 15100        | Driller Information                          | 4.1C         |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | a. Name and Address                          |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |
|   |                |              | b. Name of Driller                           |              |                                  |                           |                    |                    |                   |                |  |                        |                           |             |  |         |                |

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|   |                | 15100        | c. NJ Certification                      |              |                                 |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | Manufacturer's Catalog Information       | 2.1-2.5      |                                 |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | Well Modification Plan                   | 1.3C         |                                 |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | As-Built Drawings                        | 3.6          |                                 |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | Driller's Reports                        | 3.7          |                                 |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                | 15483        | Manufacturer's Installation Instructions | 3.2          |                                 |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | Drawing of Geomembrane Seal              | 3.3A         |                                 |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |
|   |                |              | Manufacturer's Warranty                  | 2.1, 2.3     |                                 |                           |                    |                    |                   |                |  |                         |                           |             |  |         |                |

## SECTION 01350

### CONSTRUCTION PHOTOGRAPHS

#### PART 1. GENERAL

##### 1.1 DESCRIPTION

This Work includes photographs and videotapes that are to be provided by the Contractor to document pre-construction conditions, construction progress, and the completed Project.

##### 1.2 RELATED SECTIONS

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

- Section 01300 Submittals
- Section 01320 Submittal Register
- Section 01400 Construction Quality Control Plan

##### 1.3 SUBMITTALS

The following items shall be submitted in accordance with Section 01300, "Submittals":

- A. Pre-construction Photographs and Videotape;
- B. Construction Photographs and Videotape; and
- C. Monthly Photographs and Videotape.

#### PART 2. PRODUCTS

##### 2.1 PRECONSTRUCTION PHOTOGRAPHS AND VIDEOTAPE

- A. The Contractor shall take pre-construction color photographs and videotape before commencement of Work at the Site. The photographs shall be taken on 35-millimeter size film. The videotape shall be VHS-C format. A photograph log shall be prepared to identify the date, name of work item, and the location where the photograph was taken. The back of each photograph shall be marked to correspond with the log entry for that photograph. The videotape shall show the entire Work Area and have voice narrative. The date and time shall be shown on the tape and case. The photographer shall be equipped to photograph exterior exposures, with lenses ranging from wide angle to 135 millimeters. Copies of the photographs shall be retained by the Contractor in a 3-ring album together with the negatives and photograph log and shall be available at all times for inspection by the Contracting Officer.

- B. Photographs selected by the Contracting Officer, together with the negatives and the photograph log shall be submitted to the Contracting Officer by the Contractor within 10 working days following the selection of individual photographs. Videotapes shall be submitted to the Contracting Officer by the Contractor within 10 working days following selection.

## 2.2 CONSTRUCTION PHOTOGRAPHS AND VIDEOTAPE

- A. The Contractor shall take construction photographs and videotape showing the progress of Work at the Site. The photographs shall be taken on 35-millimeter size film. A photograph log shall be prepared to identify the date, name of work item, and the location where the photograph was taken. The back of each photograph shall be marked to correspond with the log entry for that photograph. The videotape shall be VHS-C format and shall show the entire work area with voice narrative. The date and time shall be shown on the tape and case.
- B. Starting one month after the date of start of construction, and continuing as long as the Work is in progress, a copy of the log for photographs taken during the month shall be submitted to the Contracting Officer within 10 working days following the end of the month. The photographs, negatives, videotape, and photograph log shall be available at all times for inspection by the Contracting Officer.
- C. Photographs selected by the Contracting Officer, together with the negatives and the photograph log, shall be submitted to the Contracting Officer by the Contractor within 10 working days following the selection of individual photographs. Videotapes shall be submitted to the Contracting Officer by the Contractor within 10 working days following.

## 2.3 PHOTOGRAPHS AND VIDEOTAPE AT COMPLETION OF CONSTRUCTION

- A. Color exposure photographs and videotape shall be made of Work after the final inspection is conducted and Work is approved by the Contracting Officer. The photographer shall be equipped to take exterior exposures, with lenses ranging from wide angle to 135 millimeters. Copies of the photographs shall be retained by the Contractor in a 3-ring album together with the negatives and photograph log. The photographs, negatives, and photograph log shall be available at all times for inspection by the Contracting Officer. The videotape shall be VHS-C format and shall show the entire Work Area with voice narrative. The date and time shall be shown on the tape and case.
- B. Photographs selected by the Contracting Officer, together with the negatives and the photograph log shall be submitted to the Contracting Officer by the Contractor within 10 working days following the selection of individual photographs. Videotapes shall be submitted to the Contracting Officer by the Contractor within 10 working days following selection.

PART 3. EXECUTION

Not used.

PART 4. FIELD SUPERVISION AND TESTING

Not used.

\*\*\*END OF SECTION\*\*\*



## Section 02250 Off-Site Transportation and Disposal

### 1.3 SUBMITTALS

The Contractor shall review the attached Construction Quality Control Plan (CQC Plan). The Contractor shall submit a list of personnel, procedures, control, instructions, tests, records, and forms to be used. Construction will be permitted to begin only after approval of the revised CQC Plan by the Contracting Officer.

- A. The submittal shall include at least four phases of inspection for all definitive features of Work as follows.
  - 1. Preparatory Inspection;
  - 2. Initial Inspection;
  - 3. Follow-up Inspection; and
  - 4. Completion Inspection.
- B. The controls shall also include site testing, reporting of noncompliance conditions, field change activities, and inspection of all Site Activities.

Procedures and/or other documents relating to construction activities shall be submitted to the Contracting Officer for review and acceptance for conformance to Contract Requirements. Any comments by the Contracting Officer shall be resolved, and the Contractor shall not begin any fabrication or construction activities until the Contracting Officer is assured that Contractor's implementing procedures are in accordance with the Contract Requirements.

## PART 2. PRODUCTS

### 2.1 CONSTRUCTION QUALITY CONTROL PLAN

A CQC Plan for equipment and material supplied to the Work Site, and for controlling the quality of construction (non-chemical) activities includes at a minimum, the following:

- A. Schedule of inspection activities to cover at least the following items:
  - 1. Temporary Environmental Controls;
  - 2. Clearing and Grubbing;
  - 3. Grading;
  - 4. Excavation;
  - 5. Fill and Backfill;
  - 6. Drainage;

7. Landscaping;
  8. Testing Laboratories; and
  9. Temporary Site Facilities.
- B. Procedures for implementing and scheduling inspection, documentation, and submittals, including those of Subcontractors, off-site Fabricators, Suppliers and Purchasing Agents;
  - C. A list of all tests to be performed with testing procedures for each specific test, other than chemical testing;
  - D. Reporting procedures including proposed reporting formats;
  - E. Noncompliance conditions control procedure;
  - F. Procedures for field changes; and
  - G. Name and qualification of testing laboratory.

### PART 3. EXECUTION

#### 3.1 APPROVAL

Approval of the Contractor's CQC Plan is required prior to start of construction. Approval is conditional and will be predicted on satisfactory performance during the construction. The Contracting Officer reserves the right to require the Contractor to make changes in his/her CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

Note: After approval of the CQC Plan, the Contractor shall notify the Contracting Officer in writing a minimum of seven calendar days prior to any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

#### 3.2 MEETINGS

Prior to acceptance by the Contracting Officer of the CQC Plan, the Contractor shall meet with the Contracting Officer to discuss the Contractor's CQC Plan. The CQC Plan shall be submitted for review a minimum of seven calendar days prior to the meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC Plan operations, control activities, testing, administration of the system for both on-site and off-site Work, and the interrelationship of Contractor's Management and control with Navy's Quality Assurance. Minutes of the meeting shall be prepared by the Contractor and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions where subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC Plan which may require corrective action by the Contractor.

### 3.3 QUALITY CONTROL PERSONNEL ORGANIZATION

- A. The Contractor shall establish and execute a CQC Plan which shall clearly define the organizational structure within which the CQC Plan is to be planned, implemented, and executed.
- B. The authority and responsibility of personnel performing quality control activities shall be stated in writing. The Quality Control organization shall document the functional lines of authority within the Quality Control organization.
- C. The Contractor's QC Engineer shall be responsible for overall management of the QC activities and shall have the authority to act in all QC matters for the Contractor. The QC Engineer for this Contract shall be an approved, qualified hazardous materials removal Engineer or comparable individual whose sole responsibility is to ensure compliance with the Construction Quality Control Plan and Technical Specifications. This person shall demonstrate his/her ability to perform correctly the duties required of him/her to the satisfaction of the Contracting Officer and shall be physically at the Project Site whenever Work is in progress. The QC Engineer will be in charge of the Contractor's Quality Control program for this Project. All of the Contractor's submittals for approval shall be reviewed and modified or corrected as needed by him/her or authorized assistants and approved prior to forwarding of such submittals to the Contracting Officer. The QC Engineer may designate some of his/her responsibilities to another qualified person who shall be approved in advance by the Contracting Officer.
- D. The person or organization responsible for measuring the effectiveness of the CQC Plan shall be designated and shall have direct access to responsible management at a level able to take appropriate action.
- E. Staff shall be maintained under the direction of the QC Engineer to perform all Quality Control activities. The actual number of the staff during any specific work period may vary to cover work phase needs. The personnel of this staff shall be fully qualified by experience and technical training to perform their assigned responsibilities and shall be directly hired by and work for the Contractor.

### 3.4 NOTIFICATION OF NONCOMPLIANCE

- A. The Contractor shall establish and document a system to control services or activities which do not comply with the Contract Requirements. The system shall provide for prompt noncompliance as well as notification to affected organizations. The system shall provide for immediate action to withhold Work until disposition is determined. The responsibility and authority for the disposition of non-compliances shall be clearly defined. Non-complying conditions can be resolved by requesting a modification or shall be reviewed, re-tested, and re-inspected and then accepted or rejected in accordance with documented procedures as required. All non-

complying conditions shall be clearly identified as to non-complying status, segregated from acceptable sample, analysis, and test results.

- B. The Contracting Officer will notify the Contractor of any noncompliance with the Contract Requirements. The Contractors shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his/her representative at the Site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the Work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.
- C. The corrective action shall not simply be limited to the specific local condition at hand, but must address itself to system non-compliance's that may be the contributing factor resulting in the deviation or non-compliance's. The cause of adverse conditions, therefore, shall be determined and corrective action shall be made in the system to preclude recurrence of non-compliances. A description of the adverse condition, its cause and corrective action shall be documented and reported to appropriate levels of management.

#### PART 4. FIELD SUPERVISION AND TESTING

##### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.

##### 4.2 CONSTRUCTION QUALITY CONTROL TESTING

###### A. Procedures

When testing is required by the Contracting Officer or by the Technical Specification, the Contractor shall establish a test program to assure that all required testing is properly identified, documented and performed under suitable environmental conditions including cleanliness, and shall be performed in accordance with written test procedures. Test procedures shall incorporate or reference the requirements as contained in Technical Specifications, codes, standards, and Federal, State, and Local regulations. The Contractor shall submit the test procedures to the Contracting Officer for review and acceptance prior to their implementation. Test procedures shall contain the following information at a minimum:

1. Test objective;
2. Reference to tests being conducted by qualified personnel trained in the proper application and use of various instruments and methods involved; and
3. Reference to use of calibrated instrumentation, appropriate and adequate test equipment, preparation conditions and items to be tested.

B. Testing

The Contracting Officer will have the right of access to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the Technical Specifications and to check the testing procedures and techniques. The acceptability of the proposed laboratory shall be subject to compliance with the specific criteria listed in this Section.

C. Testing Equipment

All test and measuring equipment shall be individually identified, calibrated, and maintained at prescribed intervals or prior to use, and be traceable to certain equipment having known valid relationships to nationally recognized standards (i.e. National Bureau of Standards). If no national standards exist, the basis for calibration shall be documented. Equipment shall be marked to indicate calibration status. Records shall be maintained which include information specific to individual equipment, date of last calibration, by whom it was calibrated and the next calibration due date.

#### 4.3 COMPLETION INSPECTION

At the completion of all Work, the QC Engineer shall conduct an inspection of the Work and develop a "punch list" of items which do not conform to the approved Contract Drawings and Technical Specifications. Such a list of deficiencies shall be included in the Quality Control documentation, and shall include the estimated date by which the deficiencies will be corrected. The QC Engineer or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Contracting Officer. These inspections and any deficiency corrections required by this paragraph will be accomplished within the time stated for completion of the entire Work or any particular increment thereof if the Project is divided into increments by separate completion dates.

#### 4.4 SUPERVISION AND TESTING RECORDS

- A. Sufficient records shall be prepared by the Contractor as Work is performed to furnish documentary evidence of the quality of construction and laboratory analysis and of activities affecting quality. Records shall be consistent with applicable portions of the Contract.
- B. The records shall include the results of review, inspections, tests, monitoring of work performance, and laboratory analysis. The records shall also include, as appropriate, closely related data such as qualifications of

personnel, procedures and equipment, and other documentation required by applicable parts of this Technical Specification and the Contract. Inspection and test records shall, at a minimum, identify the date of inspection or test, the inspector or data recorder, the type of observation, the results, the acceptability, and the action taken in connection with any deficiencies noted. Required records shall be identifiable, meaningful and maintained in an appropriate manner.

- C. The Contractor shall maintain current records of quality operations, activities, and tests performed including the Work of Suppliers and Subcontractors. These records shall be of an acceptable form and indicate a description of trades working on the Project, the numbers of personnel working, the weather conditions encountered, any delays encountered and acknowledgment of non-compliance's noted along with corrective actions taken on current and previous non-compliance's. In addition, these records shall include factual evidence that required activities or test have been performed, including but not limited to the following:
  - 1. Type and number of control activities and test involved;
  - 2. Results of control activities or tests, with authorized signature;
  - 3. Nature of non-compliance's, causes for rejection, etc.;
  - 4. Proposed corrective action; and
  - 5. Corrective action taken.
- D. These records shall cover both complying and defective or non-complying features and shall include a statement that supplies and materials incorporated in the Work comply with the Contract. Legible copies of these records shall be furnished to the Contracting Officer.
- E. Records shall be readily retrievable. All records shall be available for inspection and audit, at any time, by the Contracting Officer.
- F. The CQC Plan shall include written procedures for the storage of Quality Assurance records prior to the time of turnover to the Contracting Officer.
- G. All of the above items related to this Section shall be documented in the Daily Quality Control Report to be prepared and signed by the QC Engineer.

\*\*\*END OF SECTION\*\*\*

## SECTION 01430

### FIELD SAMPLING, ANALYSIS, AND DATA EVALUATION

#### PART 1. GENERAL

##### 1.1 DESCRIPTION

- A. The Contractor has no responsibility for field sampling, analysis, or data evaluation. The field sampling, analysis, and data evaluation are the responsibility of the Navy. The Contractor shall provide all materials, labor, and equipment to assist the Navy with the field sampling.
- B. This section describes the technical requirement for field sampling, analysis and data evaluation activities associated with off-site disposal of construction debris, such as demolished buildings, forms, and skeet range, and material generated during clearing and grubbing activities.
- C. The object of this Specification is to ensure that all the appropriate material has been removed from the areas for off-site disposal.

##### 1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

#### ENVIRONMENTAL PROTECTION AGENCY (EPA)

|                  |  |
|------------------|--|
| EPA-600/2-80-018 | Samplers and Sampling Procedures for Hazardous Waste Streams |
| EPA-600/4-84-043 | Soil Sampling Quality Assurance User's Guide                 |

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

- Section 01300 Submittals
- Section 01320 Submittal Register
- Section 01400 Construction Quality Control Plan
- Section 02250 Off-Site Transportation and Disposal

##### 1.3 SUBMITTALS

No submittals are required of the Contractor. However, since the Contractor will be assisting the Navy with the field sampling, analysis, and data evaluation, the Contractor shall review the Field Sampling and Analysis Plan to be supplied by the Navy.

#### PART 2. PRODUCTS

Not used.

PART 3. EXECUTION

3.1 SAMPLING

The Contractor shall assist the Navy with the field sampling in accordance with the Navy's Field Sampling and Analysis Plan

3.2 SAMPLE ANALYSIS AND DATA EVALUATION

The Navy is responsible for sample analysis and data validation.

PART 4. FIELD SUPERVISION AND TESTING

Not used.

\*\*\*END OF SECTION\*\*\*

SECTION 01565

TEMPORARY FACILITIES AND ENVIRONMENTAL CONTROLS

PART 1. GENERAL

1.1 DESCRIPTION

- A. The Contractor shall provide all materials, labor and equipment necessary to execute the Work contained in these Technical Specifications and as shown on the Contract Drawings.
- B. This Section includes furnishing, installing, operating, and maintaining the following temporary facilities, controls and utilities in order to create safe and adequate working conditions at the Site throughout the progress of the Work and as long as needed.
  - 1. Facilities:
    - a. Contractor's and Contracting Officer's Field Offices;
    - b. Equipment Storage;
    - c. Storage Areas; and
    - d. Fences and barriers.
  - 2. Utilities:
    - a. Electricity and lighting;
    - b. Telephone service;
    - c. Water supply; and
    - d. Sanitary facilities.
- C. For the purpose of this Section, environmental protection is defined as the retention of the environment in its natural state to the greatest extent possible during project construction and to enhance the natural appearance in its final condition. Environmental protection requires consideration of air, water, and land resources and involves noise, solid waste management and management of other pollutants. In order to provide for abatement and controls of any environmental pollution arising from the construction activities in performance of this Contract, the Contractor shall comply with all applicable or relevant and appropriate Federal, State, and Local laws.
- D. The Contractor shall be responsible for designing, furnishing, and installing all temporary site facilities for the performance of the Work contained in these Technical Specifications and on the Contract Drawings.

- E. The Contractor shall provide and maintain all temporary environmental controls as necessary for protection of the environment throughout the performance of the Work of this Project.
- F. The Contractor shall remove all temporary environmental controls and restore disturbed areas as the Work progresses and when the need for such controls are gone.
- G. The Contractor shall provide and maintain proper barricades and warning signs at all closures, holes, hazards, material stockpiles and equipment storage areas.

## 1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In the case of contradiction, the most stringent code applies.

### NATIONAL FIRE PROTECTION AGENCY (NFPA)

NFPA 70 (1990) National Electrical Code

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

Section 01010 Summary of Work  
Section 01019 Mobilization and Demobilization  
Section 01300 Submittals  
Section 01320 Submittal Register  
Section 02240 Erosion and Sediment Control  
Section 02250 Off-Site Transportation and Disposal  
Section 02324 Site Access Roads

## 1.3 SUBMITTALS

The following items shall be submitted in accordance with Section 01300, "Submittals":

- A. Buildings/Trailers: floor plans, materials of construction and siting locations;
- B. Temporary Electric Supply and Lighting: source point, layout locations, fixtures and materials;
- C. Sketch of the proposed temporary electrical system including metering;
- D. Water supply and sanitary facilities: source point, layout locations, fixtures, materials and methods of disposal; and
- E. The Contractor shall submit a work plan to the Contracting Officer for approval prior to starting any field activities. The temporary environmental controls shall be described in the work plan.

## PART 2. PRODUCTS

### 2.1 MATERIALS

- A. All materials shall be suitable for their intended use and shall conform to applicable codes and standards. Manufacturer's requirements shall be strictly adhered to. Recycled (post-consumer) materials may be used provided that they are sound and capable of performing their intended function.
- B. All materials used as tenting for temporary heated enclosures where oil-fired or gas temporary heaters are used will be of fire resistant materials. Clear polyethylene plastic materials or similar material will be permitted.

### 2.2 CONTRACTING OFFICER'S FIELD OFFICE

- A. The field office shall be a trailer approximately 10 feet x 30 feet and shall be for the exclusive use of the Contracting Officer throughout the period of construction. The office trailer shall be weathertight, have a tight floor not less than 8 inches off the ground and shall be insulated with rigid insulation board not less than ½ inch thick and suitable ventilation. The office shall have at least three screened windows capable of being opened, a screen door and a solid door provided with a cylinder lock and three keys. The office shall be provided with weekly janitorial services, trash services, heating and air conditioning equipment, electrical wiring, outlets, and fixtures suitable to light the tables and design adequately as directed.
- B. The office shall have the following furniture and equipment:
  - 1. One plan table, 3 feet x 5 feet and one stool;
  - 2. One desk, 3 feet x 5 feet with desk chair;
  - 3. Six additional chairs;
  - 4. Plan rack, as directed;
  - 5. Shelves, as directed;
  - 6. Four-drawer filing cabinet with lock;
  - 7. Coat rack and hooks;
  - 8. Air conditioner (12,000 Btu);
  - 9. Duplicating machine (Xerox Model 1025 I or equal);
  - 10. Two 6 foot long conference tables;
  - 11. Twelve folding chairs;
  - 12. First Aid kit suitable for ten people;

13. Phone, fax, and modem;
14. Water cooler, water and cups (10 gallons per week for project duration); and
15. Trash cans.

C. The Contractor shall supply all fuel for heating and pay electric bills. All equipment shall be supplied and maintained by the Contractor and returned to the Contractor upon project closeout.

## 2.3 FACILITY REQUIREMENTS

A. Prior to the installation of offices and storage sheds, the Contractor shall consult with the Contracting Officer in regard to location, access, and related facilities. All building and trailers other than storage sheds shall be provided with the following minimum requirements:

1. Lighting – Lighting shall be electric, non-glare type producing a minimum illumination level of 50-candles measured at desk height;
2. Heating and Cooling – Heating and cooling shall be capable of maintaining ambient temperatures within the structure of 70°F (+/- 3 °F);
3. Potable bottled water;
4. Fire Extinguisher – Fire extinguishers shall be non-toxic dry chemical type, UL-approved for Class A, B, and C fires (minimum rating of 2A, 10B, and 10C) and shall comply with NFPA 10 and 241 for classification, extinguishing agent, size required by location, and class of fire exposure; and
5. Telephone – Separate telephone lines shall be supplied for each of the temporary offices and for modems.

B. The Contractor shall be responsible for providing a weekly janitorial service for each of the temporary offices.

C. Facilities shall be structurally sound and weathertight, with floors raised above the ground and open to allow free circulation of air beneath the facility.

D. At the Contractor's option, portable or mobile facilities may be used as on-site project facilities.

E. Contractor living quarters will not be established on-site.

F. Upon completion of the Work contained in these Technical Specifications and as shown on the Contract Drawings and receipt of final acceptance of the Work by the Contracting Officer, it shall be the Contractor's responsibility to remove all trailers and equipment from the premises, leaving the premises clean and free from nuisance.

### PART 3. EXECUTION

#### 3.1 REGULATORY REQUIREMENTS

- A. The Contractor shall furnish electricity and lighting in accordance with all Local, State, and Federal regulations as well as the local utility company requirements. All Work shall be in accordance with the National Electrical Code.
- B. Sanitary facilities, and disposal of sanitary wastes furnished by the Contractor shall be in accordance with State and Local regulations.

#### 3.2 CONTRACTOR RESPONSIBILITY

- A. The Contractor shall operate and maintain all equipment and systems in a manner to ensure that necessary services are provided without disruption.
- B. The Contractor shall be responsible for all electrical charges including source connection, installation, service charges and shut-off.
- C. The Contractor shall be responsible for all telephone charges including installation, service charges, and discontinuance.

#### 3.3 ELECTRICAL SERVICE

- A. The Contractor shall provide extensions to existing power drops for necessary temporary electrical power, including temporary wiring, distribution and safety inspections.
- B. Lock-out/Tag-out procedures shall be followed as appropriate during electrical work.
- C. Upon completion of the Work contained in these Technical Specifications and as shown on the Contract Drawings and receipt of final acceptance of the Work by the Contracting Officer, it shall be the Contractor's responsibility to remove the temporary electrical service from use.

#### 3.4 SANITARY WASTE SYSTEM

- A. The Contractor shall provide self-contained, single occupant toilet units of the chemical type to minimize potable water requirements, properly vented and fully enclosed in fiberglass or other approved non-absorbent shell.
- B. The units shall be properly secluded from public view and maintained by the Contractor in such a manner as specified or approved by the Contracting Officer.
- C. The units shall be maintained by the Contractor at all times without nuisance.
- D. The wastes from sanitary facilities shall be collected in holding tanks, either stationary or tank trucks of suitable size, for subsequent transfer to an off-site disposal facility by the Contractor in accordance with Section 02250, "Off-Site Transportation and Disposal."

- E. Upon completion of the Work contained in these Technical Specifications and as shown on the Contract Drawings and receipt of final acceptance of the Work by the Contracting Officer, it shall be the Contractor's responsibility to remove the conveniences from the premises, leaving the premises clean and free from nuisance.

### 3.5 ADDITIONAL TEMPORARY FACILITIES

- A. Additional temporary facilities shall be provided by the Contractor in accordance with the Health and Safety Requirements as per Section 01155.
- B. The decontamination pad (if necessary) shall be large enough to fully contain the largest vehicle used by the Contractor requiring decontamination and shall be able to sustain routine traffic without damage to the impermeable containment structure. The facility shall have a positive drainage to a sump facility with adequate capacity for a full day's decontamination activity.

### 3.6 CONTRACTOR TEMPORARY OFFICES

- A. The Contractor shall supply a temporary field office for his/her own use and shall be established on the Job Site where approved or directed by the Contracting Officer. The field office shall be adequately furnished to conduct everyday site operations, maintain record documents and shall be maintained in a clean and orderly condition by the Contractor. The Contractor and his/her representative shall be present in the field office at all times while the Work is in progress. Instructions received there from the Contracting Officer shall be considered as delivered to the Contractor.
- B. The Contractor shall provide portable UL-rated, Class A fire extinguishers for temporary offices and similar spaces.

### 3.7 FLOOD / STORM WATER RUNOFF CONTROL

- A. Flood/storm water runoff control shall be performed in accordance with Section 02240, "Erosion and Sediment Control."
- B. Site inspections before and after storm events shall be routinely conducted by the Contractor. The Contractor shall provide storm water control and conduct inspections in the construction areas. As requested by the Contracting Officer, the Contractor shall prepare inspection reports following storm events.
- C. The Contractor shall furnish all equipment necessary to handle all water, sewage, storm, seepage, surface and flood flows which may be encountered at any time during construction.
- D. The Contractor shall divert any storm water away from the active on-site construction areas toward existing drainage features.
- E. The Contractor shall place bale dikes, sandbags and earth berms to effectively direct runoff to the nearest drainage course when rainfall is anticipated during

construction. If the Contractor constructs earth berms, the berms will be compacted by earth-moving equipment. The Contractor shall also place rock check dams in earthen and/or concrete ditches, as necessary, to mitigate erosion.

- F. All locations of storage or material stockpiles shall be graded with a positive slope to promote run-off and shall be protected from puddling or running water by the use of water barriers as required to protect the Site from soil erosion.
- G. The Contractor shall supply, operate, and maintain pumping or de-watering equipment necessary to maintain all excavations free of standing water.
- H. Upon completion of the Work contained in these Technical Specifications and as shown on the Contract Drawings and receipt of final acceptance of the Work by the Contracting Officer, it shall be the Contractor's responsibility to remove all flood/storm run off control measures from the premises, leaving the premises clean and free from nuisance.

### 3.8 DUST CONTROL

- A. The Contractor shall take all necessary precautions and furnish all equipment required to execute Work by methods to minimize raising dust from construction operations.
- B. The Contractor shall be responsible for providing the means to prevent air-borne dust from dispersing into the atmosphere.
- C. Whenever directed by the Contracting Officer, the Contractor shall be responsible for providing a source of water for immediate application as a means to control dust at locations and in such quantities and frequencies as required to prevent dust from becoming a nuisance to the surrounding area.
- D. All dust control measures shall be subject to acceptance by the Contracting Officer.

### 3.9 EROSION AND SEDIMENT CONTROL

- A. The Contractor shall minimize erosion of exposed soil surfaces during construction and install permanent erosion control measures as defined in Section 02240, "Erosion and Sediment Control." As practical, the Contractor shall disturb only small portions of the construction area at any given time to minimize soil loss. The Contractor will complete clearing, grubbing, and grading as soon as possible. If possible, the Contractor shall seed areas in stages as Work progresses.
- B. For temporary sedimentation control during construction, the Contractor shall install silt fences. During or in preparation for storm events, the Contractor may also place straw bales or sand dikes to limit soil loss and to facilitate surface water drainage as requested by the Contracting Officer.

### 3.10 POLLUTION CONTROL

- A. The Contractor's construction and related activities shall prevent entrance of contaminants, debris and other objectionable pollutants and wastes in to streams

and underground water sources. Pollutants and wastes shall be disposed in accordance with applicable permit provisions or in a manner approved by the Contracting Officer.

- B. Petroleum products used for equipment shall be stored in such a way as to prevent contamination of soil or ground and surface waters.

### 3.11 SAFETY EQUIPMENT

The contractor shall provide and install first aid kits and other safety equipment for its employee's use in readily accessible locations and in accordance with the requirements of OSHA and the HASP.

### 3.12 FIRE EXTINGUISHERS

The Contractor shall provide fire extinguishers of the type and capacity required by pertinent safety and other regulations to protect the Site and ancillary facilities in the vicinity of the Work. Fire extinguishers shall be placed in readily accessible locations.

### 3.13 WARNING DEVICES AND BARRICADES

For the duration of construction activities, the Contractor shall provide and maintain warning signs and devices, and, where necessary, physical barriers/barricades necessary for the protection of persons and property in accordance with all safety and other regulations. All structures, utilities, sidewalks, pavements, and other facilities shall be protected from damage caused by settlement, lateral movement, washout, and other hazards created by the operations of the Contract Work.

### 3.14 HAZARDS IN PUBLIC RIGHT-OF-WAY

The Contractor shall have the responsibility of covering with appropriate steel plates and supports, all trenches, excavated areas, open holes, and depressions occurring as part of the Work. The Contractor shall also mark, at reasonable intervals, all trenches, excavated areas, open holes, and depressions by placing traffic cones or posting warning lights at areas of public access or adjacent to public access points. Warning lights shall be operational during the hours from dusk to dawn each day and as otherwise required.

### 3.15 TRAFFIC REGULATION AND CONTROL

#### A. Vehicular Flow

The Contractor shall maintain vehicular traffic flow on roads used to access the Site during the progress of the Work. The Contractor shall erect caution signs along both directions of all roads used to access the Site warning of slow-moving construction traffic entering and exiting the Site. The signs shall be constructed and located as prescribed by Freehold Township. Such warning signs shall be covered or removed as soon as they have served their purpose.

B. Site Entrance

During operations involving access road construction at the Site entrance, the Contractor shall provide signs, equipment and personnel to protect and regulate traffic in accordance with Freehold Township regulations.

3.16 ACCESS ROADS

- A. The Contractor shall provide and maintain temporary roadways necessary to carryout construction operations in a clean, dust-free and driveable condition. The Contractor shall exercise caution in operating machinery at the Site, maintaining safe overhead clearance from power lines at all times.
- B. The Contractor shall extend and relocate roadways, as required as the Work progresses and shall provide detours necessary for unimpeded site operation and traffic flow.

3.17 PROJECT SECURITY

The Contractor shall provide for the protection of the Work from fire, theft, and vandalism and for the protection of the public from injury in the Work Area. The Contractor shall also be responsible for maintaining a site security fence during the course of the Work.

3.18 RECORDING AND PRESERVING HISTORICAL AND ARCHAEOLOGICAL FINDS

All items having any apparent historical or archaeological interest which are discovered in the course of any construction activity shall be carefully preserved. The Contractor shall leave the archaeological find undisturbed and shall immediately report the find to the Contracting Officer so that the proper authorities may be notified.

3.19 PROTECTION OF WATER RESOURCES

- A. The Contractor shall not pollute any streams, rivers, or waterways with fuels, oils, bitumens, calcium chloride, acids, insecticides, herbicides or other harmful materials. The Contractor shall comply with all applicable or relevant and appropriate Federal and State laws.
- B. Disposal of any debris resulting from the Contract Work and any wastes, effluents, trash, garbage, oil, grease, chemicals, etc., in or adjacent to the Work Area is not acceptable. If any waste material is dumped in unauthorized areas, the Contractor shall remove the material and restore the area to its original condition. If necessary, contaminated areas shall be excavated, disposed of as directed by the Contracting Officer, replaced with suitable fill material, compacted and finished with top soil, and planted as required to reestablish vegetation or otherwise restored to a useable condition as directed by the Contracting Officer and at no additional cost to the Navy.
- C. All contaminated debris resulting from the construction activities of this Contract shall be disposed of in accordance with all applicable or relevant and appropriate Local, State, and Federal laws and Section 02250, "Off-Site Transportation and

Disposal.” Such materials shall be removed from the Site before the date of Project Closeout.

PART 4. FIELD SUPERVISION AND TESTING

4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.

4.2 CONSTRUCTION QUALITY CONTROL TESTING

The Contractor, at the discretion of the QC Engineer, shall perform QC testing as specified in the CQC Plan.

\*\*\* END OF SECTION \*\*\*

SECTION 01700

PROJECT CLOSEOUT AND RECORD DOCUMENTS

PART 1. GENERAL

1.1 DESCRIPTION

- A. This Section includes procedures for closeout at the completion of the Contract and for maintaining Record Documents.
- B. The Work shall be determined to be complete in accordance with the acceptance criteria outlined in this Section. This Section includes descriptions of specific inspection and verification methods that shall be performed prior to the completion of Work. All acceptance and testing requirements described in this Section shall be addressed prior to the Contractor's demobilization and final acceptance of the Work by the Contracting Officer. The Contractor shall maintain and protect his/her Work in good condition until formal acceptance.
- C. The Contractor shall maintain, on-site, Record Documents for the Contracting Officer. Record Documents consist of one copy of the following:
  - 1. Contract Drawings;
  - 2. Technical Specifications;
  - 3. Addenda;
  - 4. Design Changes, Clarifications, Change Orders and other modifications to the Contract;
  - 5. Contracting Officer's field orders or written instructions;
  - 6. Daily Construction Quality Control Reports;
  - 7. Health and Safety Monitoring Logs;
  - 8. Meeting Logs;
  - 9. Monitoring Equipment Calibration Logs;
  - 10. Request for Information;
  - 11. Field test records;
  - 12. Laboratory test records;
  - 13. Inspection records and material certifications;
  - 14. Construction photographs;

15. Record mylars of submittals; and

16. Safety, Health and Emergency Response Plan.

## 1.2 RELATED SECTIONS

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

Section 01010 Summary of Work  
Section 01200 Construction Meetings  
Section 01300 Submittals  
Section 01320 Submittal Register  
Section 01350 Construction Photographs  
Section 01400 Construction Quality Control  
Section 01430 Field Sampling, Analysis and Data Evaluation

## 1.3 SUBMITTALS

- A. The Contractor shall submit written certification that the Contract Documents have been reviewed, the Work has been inspected, and that the Work is complete in accordance with the Contract Documents and ready for final inspection by the Contracting Officer.
- B. The Contractor shall submit documentation of lien releases from Subcontractors and Suppliers documenting payment to Subcontractors and Suppliers for all Work performed under this Contract.
- C. The Contractor shall demonstrate to the Contracting Officer that all equipment and materials are operational and are installed in a satisfactory condition. At minimum, the Contractor shall provide for the following inspections and verifications prior to acceptance of the Work:
  - 1. Verify that the caps are installed to the correct final elevations in accordance with these Technical Specifications and as shown on the Contract Documents;
  - 2. Verify that site cleanup has been performed satisfactorily; and
  - 3. Verify that all materials provided for the Work are in accordance with the Contract Documents.
- D. The Contractor shall submit to the Contracting Officer all necessary and completed Record Documents and manuals containing Manufacturer's equipment operating instructions for all equipment furnished in accordance with these Contract Documents.
- E. The Contractor shall provide all submittals to the Contracting Officer that are required by governing or other authorities.
- F. The Contractor shall submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due. The Contractor shall

use a form approved by the Contracting Officer. Payment for final project application will not be made until all Record Documents, warranties, guarantees, submittals and similar documents have been received and approved by the Contracting Officer.

#### 1.4 RELEASE OF LIENS AND CONSENT OF SURETY

No application for final payment will be accepted until satisfactory evidence of Release of Liens and Consent of Surety to Final Payment has been submitted to the Contracting Officer.

#### 1.5 MANUFACTURERS' EQUIPMENT OPERATING INSTRUCTIONS / WARRANTIES

The Contractor shall submit to the Contracting Officer a final Manufacturers' Equipment Operating Instruction Manuals and Warranties (if applicable) in accordance with Section 01300, "Submittals."

#### 1.6 MAINTENANCE OF DOCUMENTS

- A. The Contractor shall store documents in his/her field office, apart from those documents used for construction purposes.
- B. The Contractor shall maintain documents in a clean, dry, legible condition and in good order. The Contractor shall not use Record Documents for construction purposes.
- C. The Contractor shall make documents available at all times for inspection by the Contracting Officer.

#### 1.7 AS -BUILT DRAWINGS

- A. Drawings
  - 1. The Contractor shall provide and maintain a complete and accurate set of As-Built Drawings continuously as the Work progresses. A separate set of prints, for this purpose only, shall be kept at the Job Site at all times.
  - 2. The Contractor shall indicate clearly and correctly all Work installed differently from that shown and shall keep records up-to-date as the Work progresses.
  - 3. All deviations from the Contract Drawings, exact locations of permanent property markers or monuments, all utilities and services, details and other Work shall be finally incorporated on this reproducible set.
  - 4. During the course of construction, actual locations to scale shall be identified on the As-Built Drawings for all Work.
  - 5. No Work shall be permanently concealed until the required information has been recorded.
  - 6. Where the Drawings are not of sufficient size, scale or detail, the Contractor shall furnish his/her own drawings for incorporation of details and dimensions.

7. The final record set of As-Built Drawings shall be signed and dated by the Contractor, and shall be delivered to the Contracting Officer, prior to the Contracting Officer's acceptance of the Work.

B. Design Changes

1. Any changes to the design shall be tracked through the Design Change Review (DCR) process. Changes may be proposed by the Contractor, the Engineer, or the Contracting Officer via memoranda, addenda, or Change Order. When a proposed change is submitted to the Contracting Officer for review, the Contracting Officer will assign a unique tracking number to be used by the Contractor when referencing design changes on the As-Built Drawings and Specifications. The Contracting Officer, Contractor, Engineer, and other appropriate governing agencies if applicable must approve design changes prior to its implementation. The Contractor will incorporate approved design changes along with the effective date on the working As-Built Drawing set and in red-lined Specifications.
2. When revised Drawings are issued as the basis of or along with Addenda, these revised Drawings shall be incorporated into the Record Drawing set with appropriate annotations. The Contractor will furnish the Contracting Officer with computer files containing the revised Drawings, if requested.

C. Shop Drawings

1. One complete set of reviewed Shop Drawings, product data and samples shall be collected and maintained for record purposes.
2. Shop Drawings shall be filed and maintained separate from Contract Drawings. Shop Drawings shall be filed in file folders to the greatest extent possible and shall be indexed in accordance with the Technical Specification-Division Format.
3. Shop Drawings shall be delivered in new paperboard boxes manufactured specifically for the storage of file folders. Boxes shall have covers and cutout handles and shall be accurately identified as to the contents.

- D. Upon completion of the Work and before application for final payment is made, the Contractor shall furnish to the Contracting Officer a complete set of Record Drawings. Such Drawings shall be acceptable to and approved by the Contracting Officer before final payment is made to the Contractor.

1.8 RECORD SPECIFICATIONS

A. Construction Specifications

1. The Technical Specifications for record purposes shall be filed in a large, 3-ring binder(s).

2. Design Changes shall be recorded in the Technical Specifications in blank area, such as page margins or on the backs of opposite pages, or on separate sheets inserted into the binder(s). All such information, changes, and notes shall be recorded with red pen or pencil. Information shall include DCR number and effective date. Complete DCR documentation shall be maintained with the red-lined Technical Specifications.
3. The Contractor shall include in the red-lined Technical Specifications a list of the materials and products used for the Work. The list shall reference the applicable Specification Section(s), the product name, and the name and address of the Supplier.
4. Once the Work is completed, the Contractor shall prepare electronic files of red-lined Technical Specifications using strikeouts for items deleted or note used and bold type for additions or changes. The DCRs shall be annotated in the margins of red-lined Specifications.

B. Requests for Information (RFIs) and Design Change Reviews (DCRs)

1. Relevant RFIs and RFI responses, DCRs and other project memoranda shall be incorporated into the back of the red-lined Technical Specifications book in chronological order. The Contractor shall use appropriate page dividers to identify attachments to the red-lined Technical Specifications.
2. In addition, the changes to the Technical Specifications effected by the RFIs and/or the DCRs shall be annotated on the affected page or pages of the Technical Specifications, or adjacent thereto.

1.9 RECORDING

A. The Contractor shall perform the following:

1. Label each document "Project Record" in neat, large printed letters.
2. Record information concurrently with construction progress.

The Contractor shall not conceal any Work until required inspections or other information is observed or recorded.

3. Legibly mark Drawings to record actual construction:
  - a) Dimension and detail field changes;
  - b) Changes made by field order or by Change Order; and
  - c) Details not on original Contract Drawings.
4. Legibly mark each Section of the Technical Specifications and Addenda to record changes made by field order or by Change Order.

#### 1.10 DOCUMENT SUBMITTAL

- A. All document submittals shall be in accordance with Section 01300, "Submittals."
- B. At the completion of all Work, and before submitting the application for final payment, the Contractor shall deliver Record Documents to the Contracting Officer. Multiple copies of the As-Built Drawings and red-lined Technical Specifications shall be submitted as required by the Contracting Officer.
- C. The Contractor shall submit full-sized black-line prints along with electronic files as requested by the Contracting Officer.
- D. Record Documents shall be delivered neatly and efficiently.
- E. Submission of Record Documents shall be accompanied with a transmittal letter, in triplicate, containing the following information:
  - 1. Date;
  - 2. Project Title and Number;
  - 3. Contractor's name and address;
  - 4. Title and number of each Record Document (shop Drawings may be grouped in basic categories or divisions of Work);
  - 5. Certification that each document as submitted is complete and accurate; and
  - 6. Signature of Contractor or Contractor's authorized representative.

#### PART 2. PRODUCTS

The Contractor shall verify that all specified Work had been completed and installed properly.

#### PART 3. EXECUTION

Upon completion of the Work, a final walk-through will be conducted by the Contracting Officer and the Contractor to verify that all Work is complete in accordance with all Contract Documents. All deficiencies shall be noted and all defects shall be repaired to meet the Contract Documents, otherwise the Work will not be considered complete.

#### PART 4. FIELD SUPERVISION AND TESTING

##### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings. Upon final inspection, the QC Engineer shall prepare documentation of compliance with Contract Documents.

- B. The Contractor shall follow the procedures outlined in the CQC Plan.
- C. Upon final inspection, the QC Engineer shall prepare documentation of operability of equipment and proper installation.

\*\*\* END OF SECTION \*\*\*

## SECTION 02050

### DEMOLITION

#### PART 1. GENERAL

##### 1.1 DESCRIPTION

- A. This Section describe the requirements for demolition and removal of two existing small wood structures and construction debris at Sites 3 and 10 as shown on the Contract Drawings or identified herein.
- B. The Contractor shall be responsible for demolition and removal of existing structures except as specified in this Section.
- C. Demolition of buried objects other than those specifically shown on the Contract Drawings or otherwise determined in-field by the Contractor and/or the Contracting Officer are not included in the Work of this Section and no payment will made be therefor.
- D. The following words and terms, for the purpose of this Section, have the following meanings:
  - 1. Demolish: shall mean the complete and correct removal of existing structures to a point below finished grade as specified on the Contract Drawings.
  - 2. Remove: shall mean the complete and correct removal of portions of existing structures or utilities, above or below grade, as specified on the Contract Drawings.
  - 3. Abandon: shall mean the complete and correct removal of existing utilities from service by fully disconnecting from portions of utility remaining in service and plugging or capping ends of piping being abandoned as specified on the Contract Drawings.
  - 4. Subcontractor: shall mean the entity contracted by the Contractor to perform the correct and complete demolition of all structures specified in these Technical Specifications and as shown on the Contract Drawings.
  - 5. Quality Control (QC) Engineer: shall mean the Foster Wheeler employee assigned such responsibilities as verifying that all Work of this Section is performed in accordance with these Technical Specifications and as shown on the Contract Drawings.

##### 1.2 RELATED SECTIONS

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

Section 01019 Mobilization and Demobilization  
Section 01155 Health and Safety Requirements

Section 01300 Submittals  
Section 01320 Submittal Register  
Section 01400 Construction Quality Control  
Section 01430 Field Sampling, Analysis and Data Evaluation  
Section 01575 Temporary Environmental Controls  
Section 01700 Project Closeout and Record Documents  
Section 02250 Off-Site Transportation and Disposal

### 1.3 SUBMITTALS

The Contractor shall submit to the Contracting Officer revised Contract Drawings showing the actual locations of demolished buildings, capped utilities and subsurface obstructions in accordance with Section 01300, "Submittals" and Section 01700, "Project Closeout and Record Documents."

### PART 2. PRODUCTS

Not used.

### PART 3. EXECUTION

#### 3.1 SITE CONDITIONS

- A. The Contractor shall verify site conditions and make all inspections necessary to determine the full extent of the Work required by these Technical Specifications and the Contract Drawings. Discrepancies or inaccuracies that may prevent the completion of the Work specified in this Section shall be reported to the QC Engineer and resolved prior to the commencement of the Work.
- B. The Subcontractor shall verify site conditions and make all inspections necessary to determine the full extent of the Work required by these Technical Specifications and the Contract Drawings. Discrepancies or inaccuracies that may prevent the completion of the Work specified in this Section shall be reported to the QC Engineer and to the Contractor and resolved prior to the commencement of the Work.
- C. The Contractor shall satisfy himself that all items covered specifically or intended by this Section have been identified, their quantities understood, and the means to execute demolition, removal or abandonment defined.
- D. All temporary barriers shall be provided, erected and maintained by the Contractor in accordance with Section 01565, "Temporary Facilities and Environmental Controls," to prevent spread of dusts, odors, and noise to permit continued neighbor occupancy and protect the Work Area.
- E. The Contracting Officer shall have the responsibility for sampling and analytical testing of suspect materials (e.g. materials suspected to contain lead or asbestos) prior to the commencement of the Work specified in this Section.
- F. If building materials containing lead or asbestos are found, it is the Contracting Officer's responsibility to provide perimeter air monitoring during demolition

activities. It is the responsibility of the Contractor to modify the HASP to reflect the new working conditions.

### 3.2 SITE PREPARATION

- A. The Contractor shall verify the location of all underground utilities and pipeline in the construction area in accordance with Section 01019, "Mobilization and Demobilization" and shall notify utility companies prior to razing operations to permit them to disconnect, remove or relocate equipment serving the existing facilities.
- B. The Contractor and Subcontractor shall verify that utilities and pipelines to be removed are de-energized, abandoned, and free of product or waste materials prior to the commencement of the Work specified in this Section.
- C. The Contractor and Subcontractor shall take precautions to protect from damage utilities, monitoring wells, and surface features that are not identified for demolition in these Technical Specifications or on the Contract Drawings.

### 3.3 DEMOLITION AND DEBRIS

- A. Buildings, foundations and other structures shall be demolished by methods required to complete the Work in accordance with governing regulations and as shown on the Contract Drawings.
- B. Pieces of wood, concrete, asphalt, and masonry shall be cut or broken up into pieces no greater than three feet in any dimension.
- C. Salvage of demolished materials is prohibited except as designated by the Contracting Officer.

### 3.4 REPAIRS

The Contractor and Subcontractor shall repair damage caused by demolition work to remaining structures, utilities, monitoring wells or other surface features outside the construction limits or otherwise designated to remain.

### 3.5 REUSE OF DEMOLITION DEBRIS

- A. Certain debris such as rocks, broken concrete or other solid and durable items may be used for general backfilling, drainage control or road base as approved by the Contracting Officer.
- B. Unless otherwise approved by the Contracting Officer, reuse of demolition debris indicated above shall not be used for general backfilling unless materials are broken down to less than two inches in maximum dimension and are placed where their entire volume is at least five feet below the planned finished subgrade surface.

### 3.6 DISPOSAL

- A. The Contracting Officer shall be responsible for the characterization sampling and analysis of demolition debris slated for off-site transportation and disposal.
- B. No open burning of materials is allowed.
- C. All debris removed during the demolition operations shall be removed in a manner that shall not create a public nuisance nor result in unsightly conditions.
- D. Demolished debris shall be disposed in accordance with Section 02250, "Off-Site Transportation and Disposal."

## PART 4. FIELD SUPERVISION AND TESTING

### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that all Work is performed in accordance with the Technical Specifications and Contract Documents.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.
- C. The QC Engineer shall verify that all Work of this Section shall conform to the requirements of regulatory agencies and utility companies.
- D. The Surveyor shall have the responsibility of verifying the disconnect points of utilities on the Contract Drawings.
- E. All construction procedures, workmanship and post-demolition grading shall adhere to the requirements set out in these Technical Specifications and on the Contract Drawings prior to the Work's final acceptance by the Contracting Officer.

### 4.2 CONSTRUCTION QUALITY CONTROL TESTING

The Contractor, at the discretion of the QC Engineer, shall perform QC testing as specified in the CQC Plan.

\*\*\* END OF SECTION \*\*\*

## SECTION 02231

### CLEARING AND GRUBBING

#### PART 1. GENERAL

##### 1.1 DESCRIPTION

- A. The Contractor shall provide all materials, labor, and equipment to perform the Work specified in this Section in accordance with the Technical Specifications and Contract Drawings.
- B. This Section covers the Work necessary to remove all deleterious material such as grass, roots, trees or other organic vegetative material from the cut and fill areas shown on the Drawings. This Section also covers removal of debris such as corrugated metal pipe, concrete sacks, shotcrete channels, and other debris found in the limits of Work. All areas of earthwork shall be cleared, grubbed and stripped as shown on the Contract Drawings.
- C. This Work shall also include the preservation from injury or defacement to all vegetation and existing objects outside the limits of disturbance, as shown or as specified herein.
- D. The Contractor should review with the QC Engineer and the Contracting Officer in the field the location, limits, and methods to be used prior to commencing the Work under this Section.
- E. The Contractor shall be prepared to perform this Work in conjunction with the installation and construction of the other components of the Work.

##### 1.2 RELATED SECTIONS

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

- Section 01019 Mobilization and Demobilization
- Section 01300 Submittals
- Section 01320 Submittal Register
- Section 01400 Construction Quality Plan
- Section 02250 Off-Site Transportation and Disposal

##### 1.3 SUBMITTALS

The Contractor shall submit tree wound paint, in cans with Manufacturer's label, in accordance with Section 01300, "Submittals":

##### 1.4 DELIVERY, STORAGE, AND HANDLING

Deliver materials to, store at the Site, and handle in a manner which will maintain the materials in their original manufactured or fabricated condition until ready for use.

## 1.5 NOTIFICATIONS

- A. The Contractor shall notify the Contracting Officer a minimum of 7 days in advance of intention to perform the Work of this Section.
- B. If Work is interrupted for reasons other than inclement weather, the Contractor shall notify the Contracting Officer a minimum of 24 hours prior to the resumption of Work.
- C. The Contractor shall notify the Contracting Officer at completion of clearing and grubbing and prior to start of cut and fill operation. The Contracting Officer should be notified at least 24 hours prior to the date of inspection and shall have final approval of the acceptability of clearing and grubbing.

## PART 2. PRODUCTS

### 2.1 TREE WOUND PAINT

Bituminous based paint of standard manufacture specially formulated for tree wounds shall be used.

## PART 3. EXECUTION

### 3.1 PROTECTION

#### A. Roads and Walks

Keep roads and walks free of dirt and debris at all times.

#### B. Trees, Shrubs, and Existing Facilities

Protection shall be in accordance with Section 01575, "Temporary Environmental Controls."

#### C. Utility Lines

Protect existing utility lines from damage. Notify the Contracting Officer immediately of damage to or an encounter with an unknown existing utility line. The Contractor shall be responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations. When utility lines which are to be removed are encountered within the area of operations, the Contractor shall notify the Contracting Officer in ample time to minimize interruption of the service.

### 3.2 CLEARING AND GRUBBING

- A. Clearing shall consist of cutting, removing, and disposing of trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. The clearing shall be performed in such a manner as to remove all evidence of their presence from the surface.

Clearing shall also include the removal and disposal of pipe, concrete sacks, shotcrete channels, trash piles, rubbish, and fencing within areas where earthwork is performed. The preservation of trees, shrubs, and vegetative growth that are not designed for removal is also included in this Work.

- B. Grubbing shall consist of the removal and disposal of wood or root matter below the ground surface remaining after clearing and shall include stumps, trunks, roots, and root systems to a depth of 6 inches below the ground surface.
- C. All cut and fill areas shall be cleared and grubbed prior to grading. These areas shall be cleared and grubbed in stages so that no more clearing and grubbing is done than necessary.

### 3.3 PRESERVATION

Protect other vegetation not designated for removal from damage resulting from the Work. The Contractor shall clear and grub only in those areas necessary to complete the Work required. Limits for clearing and grubbing shall be marked in the field by the Contractor and approved by the Contracting Officer before the Work commences.

### 3.4 DISPOSAL OF CLEARED AND GRUBBED MATERIAL

Clearing and grubbing material shall be placed on-site as directed by the Contracting Officer or disposed of off-site in accordance with Section 02250, "Off-Site Transportation and Disposal."

## PART 4. FIELD SUPERVISION AND TESTING

### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.

\*\*\*END OF SECTION\*\*\*

## SECTION 02240

### EROSION AND SEDIMENT CONTROL

#### PART 1. GENERAL

##### 1.1 DESCRIPTION

The Contractor shall furnish all labor, materials, tools, supervision, transportation, installation equipment, and incidentals required to provide erosion and sediment control during and upon completion of construction as specified herein and as shown on the Contract Drawings. The Work shall include erosion control for those areas shown on the Contract Drawings.

##### 1.2 RELATED SECTIONS

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

- Section 01052 Field Surveys
- Section 01300 Submittals
- Section 01320 Submittal Register
- Section 01565 Temporary Facilities and Temporary Environmental Controls
- Section 02231 Clearing and Grubbing
- Section 02840 Seeding

##### 1.3 SUBMITTALS

The Contractor shall submit the following items in accordance with Section 01300, "Submittals."

- A. Type and size of silt fencing material;
- B. Sieve analysis test results for Site Construction Entrance stones; and
- C. Any other data in accordance with the Erosion and Sediment Control measures as shown on the Contract Drawings.

#### PART 2. PRODUCTS

##### 2.1 MATERIALS

- A. Silt fence fabric

The width shall be 36 inches minimum. Fence fabric may be either woven or non-woven.

- B. Fence Post

Anchor posts for Silt Fence shall be wood or steel. The length shall be 54 inches; wood posts shall be 2 inches by 2 inches and steel posts shall be 1.24 inches by 1.0 inches in the shape of a T-section.

C. Site Construction Entrance stones

Stones and geotextile fabric shall be in accordance with the Erosion and Sediment Control measures as specified in the Technical Specifications and on the Contract Drawings.

PART 3. EXECUTION

3.1 INSTALLATION

- A. Posts shall be installed on 8 foot centers and the filter fabric attached. The filter fabric shall be attached to the posts on the upstream side using staples or tie wires. The bottom 12 inches of the fabric shall be covered by 6 inches of fill material, to prevent sediment escaping under the fence. All earthwork shall be on the upstream side of the fence.
- B. Fence posts shall be installed to a maximum depth of 18 inches beyond the landfill limits.

3.2 PROVISIONS FOR EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

- A. The Contractor shall take sufficient precautions during construction to eliminate the run-off of polluting substances into the water supplies and surface waters of the State. Special precautions shall be taken in the use of construction equipment to prevent operations which promote erosion.
- B. The Contractor shall prevent the flow or seepage of drainage back into the Work Areas. Particular care shall be taken to prevent the discharge of unsuitable drainage to a water supply or surface water body.
- C. As a minimum, the following shall apply:
  - 1. Silt fencing shall be provided at locations shown on the Contract Drawings to reduce the sediment content of the water.
  - 2. Drainage leaving the Site shall flow to water courses in such a manner as to prevent erosion.

3.3 PRODUCT PROTECTION

- A. The Contractor shall use all means necessary to protect all prior Work and materials and completed Work of other Sections.
- B. Sediment control measures shall be adjusted in the field to meet conditions encountered.
- C. In the event of damage to prior Work or Work completed as specified in this Section, the Contractor shall immediately make all repairs and replacement necessary, to the approval of the Contracting Officer and at no additional cost to the Navy.

- D. Remove erosion control measures upon establishment of developed vegetation.

PART 4. FIELD SUPERVISION AND TESTING

4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.

4.2 CONSTRUCTION QUALITY CONTROL TESTING

The Contractor, at the discretion of the QC Engineer, shall perform additional QC testing as specified in the QC Plan.

\*\*\*END OF SECTION\*\*\*

SECTION 02250

OFF-SITE TRANSPORTATION AND DISPOSAL

PART 1. GENERAL

1.1 DESCRIPTION

- A. The Contractor shall provide all materials, labor, and equipment to perform the Work specified in this Section in accordance with the Technical Specifications and Contract Drawings. The Contractor shall ensure that all operations in the loading and hauling of all materials are in compliance with the Federal and State Departments of Transportation (DOT) regulations, the Federal (EPA) and State (NJDEP) Environmental Agencies' Hazardous Waste regulations, and all other Local and applicable requirements.
- B. The Work specified in this Section includes transportation and off-site disposal of materials generated from the following sources:
  - 1. Clearing and Grubbing Material

Clearing and grubbing material consists of any logs, stumps, shrubs, snags, roots, grass, weeds, and brush being removed from the Site.
  - 2. Construction Debris

Construction debris consists of erosion and sediment control materials, used filter fabric, asphalt, concrete, wood, scrap metal, etc. being removed from the Site.
  - 3. Decontamination Materials and Personal Protective Equipment (PPE)

Decontamination materials consist of soiled materials generated during the decontamination of personnel or equipment exiting the Contaminated Zones including, but not limited to, brushes, tools, buckets, tubs, plastic sheets, and personal protective equipment.
  - 4. Construction Water

Construction water consists of decontamination water, water removed from contaminated areas, drilling fluids, and any other potentially contaminated water generated during construction activities.
- C. The Contractor shall not transport nor dispose of any waste material off-site without the approval of the Contracting Officer.
- D. The Contractor shall ensure that all operations in the loading and hauling of materials are in compliance with all Federal, State, and Local regulations.
- E. In the interest of conservation, salvage and/or recycling shall be pursued by the Contractor to the maximum extent possible.

## 1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

### ENVIRONMENTAL PROTECTION AGENCY (EPA)

|                           |  |
|---------------------------|--|
| EPA OSWER DN 9834.11      | (1987) "Revised Procedures for Implementing Off-Site Response Actions"   |
| 49 CFR 171-179            | US Code of Federal Regulations   |
| 40 CFR 261-263            | RCRA Generator and Transporter Regulations   |
| 40 CFR 264-265            | RCRA Hazardous Waste Management Facility Regulations   |
| 29 CFR 1904, 1910, & 1926 | OSHA Regulations   |
| EPA RCRA                  | Federal Resource Conservation and Recovery Act, as amended   |
| EPA RCRA Land Disposal    | RCRA Land Disposal Regulations   |
| EPA Memorandum            | (1988) "Off-Site Policy: RFA or Equivalent Investigation Requirement at RCRA Treatment and Storage Facilities," EPA Memorandum from J.W. Porter to Waste Management Division Directors |

### NEW JERSEY REGULATIONS

NJ Hazardous Waste Regulations  
NJ Residual Waste Regulations  
NJ Clean Streams Law

### LOCAL REGULATIONS

Posted weight limitations on roads and bridges

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

|               |                                 |
|---------------|---------------------------------|
| Section 01019 | Mobilization and Demobilization |
| Section 01155 | Health and Safety Requirements  |
| Section 01300 | Submittals                      |
| Section 01320 | Submittal Register              |
| Section 02231 | Clearing and Grubbing           |
| Section 02240 | Erosion and Sediment Control    |

### 1.3 SUBMITTALS

The following items shall be submitted in accordance with Section 01300, "Submittals":

A. Equipment and Material Handling Plan

The Contractor shall submit to the Contracting Officer an Equipment and Material Handling Plan. This plan shall consist of the Contractor's procedures for excavation and other Site Work Activities, for decontamination of equipment and for safely handling any contaminated materials.

B. Off-Site Disposal Plan

The Contractor shall submit to the Contracting Officer an Off-Site Disposal Plan, which shall provide a program for the proposed transportation and disposal of all materials requiring off-site disposal. This plan shall include Letters of Commitment from the properly licensed and insured waste haulers and disposal facilities to haul and accept shipments. This plan shall also include a Traffic/Route Plan for the proposed transportation and off-site disposal of waste materials. The Contractor shall submit documentation demonstrating that the proposed transporter(s) of all waste have current permits for such Work and are in good standing with the State. The Contractor shall also provide the following information on the disposal facilities.

1. Facility name and EPA Identification Number;
2. Facility location;
3. Name and telephone number of responsible contact at the facility;
4. Signed letter of agreement to accept wastes;
5. Unit of measure utilized at facility for costing purposes;
6. A listing of all permits, licenses, letters of approval, and other authorizations to operate held by the proposed facility as they pertain to receipt and management of wastes derived from this Contract;
7. A listing of all permits, licenses, letters of approval, and other authorizations to operate applied for by the proposed facility but not yet granted or issued. Provide dates of application(s) submitted. Planned submittals shall also be noted;
8. The Contractor shall provide the date of the proposed facility's last compliance inspection under RCRA (if applicable).; and
9. List of all acute (unresolved) compliance orders (or agreements), enforcement notices, or notices of violation issued to the proposed

facility. State the source and nature of the cause of contamination, if known.

10. The Contractor shall specify and describe the units the proposed facility will use to manage the waste and provide dates of construction and beginning of use, if applicable. Drawings may be provided. The facility shall identify the capacity available in the units and the capacity reserved for the subject waste.

11. All proposed transporters and facilities are subject to approval by the Contracting Officer, and the Navy reserves the right to withdraw its approval of a transporter or facility if it is determined that it is not in compliance with all applicable Federal, State, or Local regulations.

- C. The Contractor shall provide copies of waste profiles generated for each type of waste sent off-site.
- D. The Contractor shall submit copies of each shipping manifest or bill of lading to the Contracting Officer the same day of shipment.
- E. The Contractor shall submit two copies of each disposal manifest to the Contracting Officer within two working days following receipt from the disposal facility.

## PART 2. PRODUCTS

### 2.1 VEHICLES

The Contractor shall utilize appropriate vehicles and operating practices to prevent spillage or leakage of transported materials from occurring enroute.

### 2.2 SCALES

The Contractor shall arrange for access to certified scales to record quantities for measurement of debris quantities and off-site transportation and disposal. The Contractor shall be responsible for providing documentation showing that the scales are calibrated and operated in accordance with the Manufacturer's instructions and recommendations. The Contractor shall coordinate recording of quantities with the Contracting Officer.

## PART 3. EXECUTION

### 3.1 FACILITIES

The Contractor shall provide, install, and maintain temporary loading/staging facilities required for all material handling activities. The location and design of such facilities shall be included in the Equipment and Material Handling Plan and be submitted to the Contracting Officer for approval.

### 3.2 TRANSPORTATION

#### A. Manifests

The Contractor shall organize and maintain the material shipment records/manifests required by the Federal Resource Conservation and Recovery Act (RCRA) (Public Law 94-580), the State of New Jersey and the State where the treatment/disposal facility is located. The manifests will be signed by the Contracting Officer or its designated representative.

#### B. Schedule

The Contractor shall coordinate the schedule for truck arrival and material deliveries at the disposal site to meet the approved project schedule. The schedule shall be compatible with the availability of equipment and personnel for material handling operations.

#### C. Decontamination and Protection

1. All vehicles leaving the Exclusion Zone (EZ) shall be decontaminated at the Contamination Reduction Zone (CRZ). The Contractor shall visually inspect all vehicles to ensure that soil does not adhere to wheels or undercarriage after decontamination.
2. The Contractor shall ensure that trucks are protected by properly covering and lining them and by decontaminating them as required prior to any use other than hauling the same type of contaminated materials.
3. Liquid-containing trucks shall be sealed by the Contractor in a manner such that tampering with the contents cannot occur.

#### D. Route Inspection

1. The Contractor shall periodically inspect all routes that the vehicles take from the Job Site to ensure that no leakage or tracking of mud has occurred. Inspections shall take place at least monthly and shall be documented/certified by the Contractor.
2. The Contractor shall be responsible for inspecting the access routes for road conditions, overhead clearance, and weight restrictions.

#### E. Delivery to Disposal Facility

1. The Contractor shall not deliver waste to any facility other than the disposal facility(ies) listed on the shipping manifest and previously approved by the Contracting Officer.
2. The Contractor shall only use the transporter(s) identified in his/her bid for the performance of Work. Any use of substitute or additional transporters must have previous written approval from the Contracting

Officer and shall be at no additional cost to the Navy. Transporters shall be certified by EPA and the State of New Jersey.

F. Vehicle Inspection

The Contractor shall coordinate vehicle inspection and recording of quantities leaving the Site with the Contracting Officer. The Contractor shall arrange for access to certified scales for the recording of quantities. These quantities shall be verified with recorded quantities at the disposal facility(ies). If any deviation between the two weight records occurs, the matter is to be reported to the Contracting Officer.

G. Cleanup

The Contractor shall be held responsible for any and all actions necessary to remedy situations involving material spilled in transit or mud and dust tracked off-site. The cleanup shall be accomplished at the Contractor's expense.

H. Accident Prevention

The Contractor shall develop, document, and implement a policy for accident prevention in accordance with Section 01155, "Health and Safety Requirements."

I. Materials

The Contractor shall not combine contaminated materials from other projects with material from the Site.

J. Manifest

The Navy, or its designated representative, will provide a waste generator identification number and will sign the manifest as the generator.

3.3 OFF-SITE DISPOSAL

A. The Contractor shall use only the treatment, disposal, and recovery facility(ies) identified in his/her bid for the performance of Work. Substitutions or additions shall not be permitted without prior written approval by the Contracting Officer, and if accepted, shall be with no extra cost to the Contracting Officer.

B. The Contractor shall be responsible for all costs related to rejected loads resulting from any materials found to be nonconforming to the Specifications or requirements imposed by the disposal facility(ies).

C. The Contracting Officer reserves the right to contact and visit the disposal facilities and regulatory agencies to verify the agreement to accept the stated material and to verify any other information provided. This does not

in any way relieve the Contractor of his/her responsibilities under this Contract.

- D. In the event that the identified and accepted facility(ies) ceases operations, it is the Contractor's responsibility to locate an alternate approved and permitted facility(ies) for accepting materials. The Contractor is responsible for making the necessary arrangements to utilize the facility(ies) and the alternate facility(ies) must be approved in writing by the Contracting Officer in the same manner and with the same requirements as for the original facility(ies). This shall be accomplished at no extra charge to the Navy.

### 3.4 RECORDS

The Contractor shall obtain manifest forms, obtain material code numbers, and complete the shipment manifest records and all other associated documentation as required by the appropriate regulatory agencies for verifying the material type (Code No.) and quantity of each load in units of volume and weight. The manifests will be signed by the Navy or its designated representative. Each manifest shall be submitted to the Contracting Officer within two (2) working days following shipment and within two (2) working days after notification of receipt at the disposal facility. The Contractor must submit the original manifest form copies; photographs will not be acceptable as project record submittals. Any manifest discrepancies shall be reported immediately to the Contracting Officer and be resolved by the Contractor.

## PART 4. FIELD SUPERVISION AND TESTING

### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.

### 4.2 WASTE CLASSIFICATION SAMPLING AND TESTING

- A. Contaminated materials shall require disposal classification sampling prior to off-site transportation and disposal. Classification sampling shall be performed by the Contracting Officer at a rate which is at least as frequent as the rates required by the disposal facility(ies).
- B. The responsibility of the Contractor is to assist the Contracting Officer in the waste classification sampling as requested. The ultimate determination as to the specific tests required prior to disposal shall be determined by the approved disposal facility(ies) and shall be approved by the Contracting Officer.
- C. The Contractor, at the discretion of the QC Engineer, shall perform additional QC testing as specified in the CQC Plan.

\*\*\*END OF SECTION\*\*\*

SECTION 02310

PREPARATION OF SUBGRADE

PART 1. GENERAL

1.1 DESCRIPTION

- A. This Section covers the Work necessary for the preparation of the subgrade to achieve the grades shown on the Contract Drawings for Sites 3 and 10.
- B. The Contractor shall furnish all labor, materials, tools, supervision, transportation, and installation equipment necessary to perform cut and fill operations in order to construct the subgrade at the elevations shown on the Contract Drawings.

1.2 REFERENCES AND RELATED SECTIONS

The publications listed below for a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

|             |  |
|-------------|--|
| ASTM C 136  | (1993) Aggregates, Fine and Coarse, Sieve Analysis of  |
| ASTM D 1140 | (1992) Soils, Amount of Material in, Finer Than the No. 200 (75-Um) Sieve  |
| ASTM D 1556 | (1991) Density and Unit Weight of Soil in Place by the Sand-Cone Method  |
| ASTM D 1557 | (1998) Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort 56,000 ft-lbf/ft <sup>3</sup> (2,700 kN*m/m <sup>3</sup> ) |
| ASTM D 2487 | (2000) Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)   |
| ASTM D 2922 | (1991) Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth), Density of   |
| ASTM D 3017 | (1988) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)  |
| ASTM D 4318 | (1984) Soils, Liquid Limit, Plastic Limit, and Plasticity Index of   |

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

Section 01400 Construction Quality Control

### 1.3 SUBMITTALS

The Contractor shall submit the following items in accordance with Section 01300, "Submittals":

A. Manufacturer's Test Results of imported soils for the following:

1. Moisture Density;
2. Sieve Analysis;
3. Atterburg Limits; and

B. Field Test Results

### 1.4 NOTIFICATIONS

A. The Contractor shall notify the Contracting Officer a minimum of 7 days in advance of intention to perform the Work of this Section.

B. If the Work is interrupted for reasons other than inclement weather, the Contractor shall notify the Contracting Officer a minimum of 24 hours prior to the resumption of Work.

## PART 2. PRODUCTS

### 2.1 SUBBASE MATERIAL

A. All imported subbase material shall meet the requirements for cover soil material as stated in Section 2326.

## PART 3. EXECUTION

### 3.1 SUBGRADE PREPARATION

A. The Contractor shall prepare the subgrade by performing cut and fill operations for Sites 3 and 10. The Contractor shall construct the subgrade in accordance with the elevations shown on the Contract Drawings.

B. Imported subbase material is required for Sites 3 and 10 in order to meet the grades of the subgrade as shown on the Design Drawings.

### 3.2 PROTECTION OF SUBGRADE

A. After preparing the subgrade as specified above, all unnecessary traffic shall be kept off the area. Should it be found necessary to haul over the prepared subgrade, the Contractor shall grade and roll the traveled way as frequently as may be necessary to remove ruts, cuts, and breaks in the surface. All cuts, ruts, and breaks in the surface of the subgrade that are not removed by the above operations shall be raked and hand tamped. All

equipment used for transporting materials over the prepared subgrade shall be equipped with pneumatic tires to prevent tearing of surface.

- B. Continued use of sections of prepared subgrade for hauling, so as to cut up or deform it from the true cross-section, will not be permitted.
- C. If necessary, the Contractor will be required, at no additional expense to the Navy, to protect the subgrade before hauling materials or equipment over it as directed by the Contracting Officer.
- D. The subgrade shall be maintained in the finished condition until the first overlying layer is placed. In addition, any subsequent soft areas caused by deployment of overlying layers shall also be repaired at the Contractor's cost.

### 3.3 SUBBASE MATERIAL PLACEMENT

The subbase material placement shall be performed in accordance with Section 2326, Part 3.2.

### 3.4 TOLERANCES

Tolerances for location and grade are provided in Section 01052, "Field Surveys."

## PART 4. FIELD SUPERVISION AND TESTING

### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.

### 4.2 CONSTRUCTION QUALITY CONTROL TESTING

- A. The Contractor shall perform tests in the field to ensure that the subbase material conforms to the Technical Specifications and Contract Drawings.
- B. The subbase material testing shall be performed in accordance with Section 2326, Part 4.3.
- C. The Contractor, at the discretion of the QC Engineer, shall perform additional QC testing as specified in the CQC Plan.

\*\*\*END OF SECTION\*\*\*

## SECTION 02320

### GRANULAR GAS MANAGEMENT AND GRANULAR DRAINAGE MATERIALS

#### PART 1. GENERAL

##### 1.1 DESCRIPTION

- A. The Contractor shall provide all materials, labor, and equipment to perform the Work specified in this Section in accordance with the Technical Specifications and Contract Drawings.
- B. This Work shall consist of laying out the granular gas management material layer and the granular drainage layer in conjunction with other components of the cover system.
- C. The material specified in this Section shall be used for both the granular gas management material and the granular drainage material as shown on the Contract Drawings for Site 10.

##### 1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

#### AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

|             |   |
|-------------|---|
| ASTM D 422  | (1963) Soils, Particle-Size Analysis of                                   |
| ASTM D 75   | (1987; R 1992) Sampling Aggregates  |
| ASTM D 1140 | (1992) Soils, Amount of Material in, Finer Than the No. 200 (75-Um) Sieve |
| ASTM D 2434 | (1995) Soils, (Constant Head), Granular Permeability                      |

#### PUBLIC WORKS PUBLICATIONS

|                 |   |
|-----------------|---|
| Section 200-2.4 | Standard Specifications for Public Works Construction |
|-----------------|---|

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

- Section 01300 Submittals
- Section 01320 Submittal Register
- Section 02714 Geotextile Fabric
- Section 02771 HDPE Geomembrane Liner
- Section 15010 Gas Management Piping
- Section 15483 HDPE Geomembrane Liner Boots

### 1.3 SUBMITTALS

The following items shall be submitted in accordance with Section 01300, "Submittals":

- A. Geotechnical Test Reports for the following:
  - 1. Sieve Analysis Test;
  - 2. Permeability Test; and
  - 3. Maximum/Minimum Density.
- B. Field Test Reports for the following:
  - 1. Sieve Analysis;
  - 2. Permeability Test; and
  - 3. Maximum/Minimum Density.
- C. A letter certifying that the granular gas management and granular drainage material is clean and free from any contamination.

### 1.4 DELIVERY AND STORAGE

The Contractor shall store materials as to prevent segregation and contamination.

### 1.5 WEATHER LIMITATIONS

The granular gas management and granular drainage material layers shall not be constructed when atmospheric temperature is below 35°F or when rainfall or other weather conditions detrimentally affect the quality of the finished layers.

### 1.6 CONSTRUCTION EQUIPMENT

Equipment used shall be dependable and adequate for the purpose intended. The Contractor shall maintain equipment in satisfactory and safe operating condition. Subject to approval by the Navy, special equipment dictated by local conditions may be used. Calibrated equipment, such as scales, batching equipment, spreaders, and similar items, shall have been re-calibrated by an approved calibration laboratory within 12 months of commencing Work.

## PART 2. PRODUCTS

### 2.1 MATERIALS

- A. Granular Gas Management and Granular Drainage Material
  - 1. This material shall consist of naturally occurring rounded to sub-rounded non-carbonate particles which are free of any metals, roots,

stumps, concrete, construction debris, organic matter, and other deleterious materials as determined by the QC Engineer.

2. The material shall meet the gradation requirements given below.

| <b>TOTAL PERCENT PASSING BY WEIGHT</b> |                  |                 |
|--|------------------|-----------------|
| 1/4"<br>80-100%                        | No. 4<br>80-100% | No. 100<br>0-8% |

3. The material shall have a permeability of  $1 \times 10^{-3}$  cm/s or higher.
4. The material shall be non-acidic with a pH between 6 and 7.5. No processing is allowed for pH adjustment.

**PART 3. EXECUTION**

**3.1 FAMILIARIZATION**

- A. Prior to implementing any of the Work described in this Section, the Contractor shall become thoroughly familiar with the Site, the site conditions, and all portions of the Work falling within this Section.
- B. Inspection
  1. Prior to implementing any of the Work in this Section, the Contractor shall carefully inspect the installed Work of all other Sections and verify that all Work is complete to the point where the installation of this Section may commence without adverse impact. The Work of related Sections may need to be closely coordinated.
  2. If the Contractor has any concerns regarding the installed Work of other Sections, he/she should immediately notify the Contracting Officer in writing. Failure to notify the Contracting Officer in writing or placement of the granular gas management material will be construed as Contractor's acceptance of the related Work of all other Sections.

**3.2 INSTALLATION**

- A. The granular gas management material shall be placed to the minimum thickness requirements shown on the Contract Drawings.
- B. The granular drainage material shall be placed as shown on the Contract Drawings using equipment with sufficiently low ground pressure to prevent damage to underlying geosynthetic components.
- C. Unless authorized by the Contracting Officer, the equipment used to spread out the granular layer to the required thickness over any geosynthetic material shall comply with the following:

| Maximum Allowable Equipment Ground Pressure (psi) | Thickness of Granular Drainage Material over Geosynthetics |          |
|---|--|----------|
|   | (feet)   | (meters) |
| 5   | 1  | 0.3      |
| 10  | 1.5  | 0.45     |
| 20  | 2.0  | 0.6      |
| >20   | 3.0  | 0.9      |

3.3 PRODUCT PROTECTION

- A. After the material has been placed, the Contractor shall maintain it free of ruts, depressions, and damage resulting from the hauling of any material, equipment, tools, etc. until such time as the overlying materials are placed.
- B. The Contractor shall use all means necessary to protect all prior Work, including all materials and completed Work of other Sections.
- C. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary, to the approval of the Contracting Officer and at no additional cost to the Navy.

PART 4. FIELD SUPERVISION AND TESTING

4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan

4.2 CONSTRUCTION QUALITY CONTROL TESTING

- A. The minimum frequency of quality assurance testing by the QC Engineer shall be a sieve analysis and a permeability test (ASTM D 422, ASTM D 2434) at 1 per 5,000 cubic yards of volume in place or a minimum of 1 per borrow source. The pH testing shall be conducted at a frequency of 1 test per 2,000 cubic yards.
- B. The Contractor, at the discretion of the QC Engineer, shall perform additional QC testing as specified in the CQC Plan.
- C. The Contractor shall take this testing frequency into account in planning his/her construction schedule.

\*\*\*END OF SECTION\*\*\*

SECTION 02323

RIP-RAP

PART 1. GENERAL

1.1 DESCRIPTION

- A. The Contractor shall furnish all labor, equipment, materials and incidentals necessary to complete the installation of rip-rap as shown on the Contract Drawings, and as specified in this Section.
- B. The Contractor shall review in the field with the Engineer the location, limits, and methods to be used prior to commencing Work under this Section.
- C. The Contractor shall be prepared to perform the Work of this Section in conjunction with the installation and construction of the other components of the Contract.

1.2 REFERENCES AND RELATED SECTIONS

The publication listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

|             |   |
|-------------|---|
| ASTM D 75   | (1987; R 1992) Sampling Aggregates  |
| ASTM C 88   | (1990) Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate |
| ASTM C 136  | (1993) Aggregates, Fine And Coarse, Sieve Analysis Of   |
| ASTM D 5519 | (1994) Standard Test Method for Particle Size Analysis of Natural and Man-Made Riprap Materials       |

ENVIRONMENTAL PROTECTION AGENCY (EPA)

|                   |  |
|-------------------|--|
| EPA 530-SW-86-031 | Construction Quality Assurance for Hazardous Waste and Disposal Facilities |
|-------------------|--|

NEW JERSEY DEPARTMENT OF TRANSPORTATION (NJDOT)

|                   |                    |
|-------------------|--------------------|
| NJDOT Section 901 | (2000) Aggreagates |
|-------------------|--------------------|

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

- Section 01300 Submittals
- Section 01320 Submittal Register

Section 01430 Field Sampling, Analysis, and Data Evaluation  
Section 02310 Preparation of Subgrade  
Section 02320 Granular Gas Management and Granular Drainage Materials  
Section 02327 Drainage Ditches  
Section 02501 Reinforced Concrete Pipe and Headwalls  
Section 02714 Geotextile Fabric  
Section 02771 High Density Polyethylene (HDPE) Liner

### 1.3 SUBMITTALS

The following items shall be submitted in accordance with Section 01300, "Submittals," a minimum of 7 days prior to the placement of the rip-rap material(s):

- A. Location of source and type of rip-rap;
- B. The results of a grain-size analysis on the rip-rap, conducted in accordance with ASTM D 5519;
- C. The results of a soundness test conducted in accordance with ASTM C 88;
- D. Certification that the rip-rap meets the gradation requirements of this Specification; and
- E. A letter certifying that the rip-rap and bedding material are clean and free from any contamination.
- F. A 5 gallon bucket of material shall be made available to the Contracting Officer for inspection and sampling.

## PART 2. PRODUCTS

### 2.1 RIP-RAP

- A. Rip-rap shall be sound hard, dense, field or quarry stone resistant to action of air and water, and free from seams, cracks or other structural defects or approved clean concrete demolition free of rebar, debris, paint, oils, or other hazardous materials.
- B. The gradation shall range from 3 to 8 inches and conform to NJDOT Specifications, Section 901 – Aggregates.
- C. Weight loss shall not be more than 20 percent after 5 cycles when tested by sodium sulfate test methods (ASTM C 88).

## PART 3. EXECUTION

### 3.1 FAMILIARIZATION

- A. Prior to implementing any of the Work described in this Section, The Contractor shall become thoroughly familiar with the Site, the site conditions, and all portions of the Work falling within this Section.

B. Inspection

1. Prior to implementing any of the Work of this Section, the Contractor shall carefully inspect the installed Work of all other Sections and verify that all Work is complete to the point where the installation of this Section may commence without adverse impact. The Work of related Sections may need to be closely coordinated.
2. If the Contractor has any concerns regarding the installed Work of other Sections, he/she should immediately notify the Contracting Officer in writing. Failure to notify the Contracting Officer in writing or placement of the Work of this Section will be construed as the Contractor's acceptance of the related Work of all other Sections.

3.2 PREPARATION

- A. Areas on which rip-rap is to be placed shall be graded and dressed to the lines and grades shown on the Contract Drawings or as required by the QC Engineer in accordance with Section 02310 "Preparation of Subgrade."
- B. Eroded or washed out areas shall be repaired prior to the placement of materials.

3.3 INSTALLATION

A. Rip-rap

1. Rip-rap shall be placed in the thickness and grade lines shown on the Contract Drawings to produce a reasonably well graded mass of stone with a minimum practicable percentage of voids.
2. Rip-rap materials shall not be placed by methods which will tend to segregate particles by size within the rip-rap.
3. Rearrangement, re-shaping or placement of additional materials shall be at the discretion of the QC Engineer.
4. Larger stones shall be well distributed throughout the rip-rap area and finished protection shall be free from pockets of small or large stones.
5. Fill holes or open spots to produce well-graded protection.
6. Placement of rip-rap over any geomembrane and geotextile liner shall be by hand or by equipment that will not drop the rip-rap from a height greater than 6 inches.
7. No equipment used to place rip-rap shall be run over any geomembrane without adequate soil cover.

### 3.4 PRODUCT PROTECTION

- A. After the rip-rap has been placed, the Contractor shall maintain it free of ruts, depressions, and damage from hauling of any material, equipment, tools etc. over it.
- B. The Contractor shall use all means necessary to protect all prior Work, including all materials and completed Work of other Sections.
- C. In the event that damage occurs, the Contractor shall immediately make all repairs and replacements necessary, to the approval of the Contracting Officer and at no additional cost to the Navy.

### PART 4. FIELD SUPERVISION AND TESTING

#### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is performed in accordance with the Technical Specifications and the Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.
- C. The Contractor shall perform the tests listed in Section 1.3 at a frequency of 1 test per borrow source prior to delivery.

#### 4.2 CONSTRUCTION QUALITY CONTROL TESTING

The Contractor, at the discretion of the QC Engineer, shall perform additional QC testing as specified in the CQC Plan.

\*\*\* END OF SECTION \*\*\*

SECTION 02324  
SITE ACCESS ROAD

PART 1. GENERAL

1.1 DESCRIPTION

- A. The Contractor shall provide all materials, labor, and equipment to perform the Work specified in this Section in accordance with the Technical Specifications and Contract Drawings.
- B. This Work shall consist of the following items:
  - 1. Removal of existing crushed stone;
  - 2. Excavation of natural soil;
  - 3. Backfill for the access road; and
  - 4. Construction of the decontamination pad.
- C. The location, alignment and width of the access road shall be as shown on the Contract Drawings.

1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

|             |  |
|-------------|--|
| ASTM C 136  | (1993) Aggregates, Fine and Coarse, Sieve Analysis of  |
| ASTM D 75   | (1987; R 1992) Sampling Aggregates   |
| ASTM D 422  | (1963) Soils, Particle-Size Analysis of  |
| ASTM D 1556 | (1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method  |
| ASTM D 1557 | (1998) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. Ft. (2,700 kN-m/cu. m.)) |
| ASTM D 2217 | (1985; R 1993) Wet Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants          |
| ASTM D 2487 | (1994) Density and Unit Weight of Soil in Place by Rubber Balloon Method   |
| ASTM D 2922 | (1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)                                  |

|             |   |
|-------------|---|
| ASTM D 3017 | (1998; R 1996el) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth) |
| ASTM D 4253 | (1993) Soils Using a Vibratory Table, Maximum Index Density and Unit Weight of              |
| ASTM D 4254 | (1988) Soils and Calculation of Relative Density, Minimum Index Density and Unit Weight of  |
| ASTM D 4318 | (1995) Liquid Limit, Plastic Limit, and Plasticity Index of Soils                           |

## PUBLIC WORKS PUBLICATIONS

|                 |   |
|-----------------|---|
| SECTION 200-2.4 | Standard Specifications for Public Works Construction |
|-----------------|---|

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

Section 01300 Submittals  
Section 01320 Submittal Register  
Section 02240 Erosion and Sediment Control  
Section 02226 Cover Soil Material  
Section 02231 Clearing and Grubbing  
Section 02800 Top Soil

### 1.3 SUBMITTALS

The following items shall be submitted in accordance with Section 01300, "Submittals":

- A. Geotechnical Test Reports for the following:
  - 1. Gradation; and
  - 2. Modified Proctor Test.
- B. Field Test Reports for the following:
  - 1. Gradation;
  - 2. Relative Compaction by nuclear methods;
  - 3. Sand Cone Test; and
  - 4. Thickness.
- C. A letter certifying that the base material and the coarse aggregate are clean and free from any contamination.

1.4 DELIVERY AND STORAGE

The Contractor shall store materials as to prevent segregation and contamination.

1.5 WEATHER LIMITATIONS

The base course shall not be constructed when atmospheric temperature is below 35°F or when rainfall or other weather conditions detrimentally affect the quality of the finished course.

1.6 CONSTRUCTION EQUIPMENT

Equipment shall be dependable and adequate for the purpose intended. The Contractor shall maintain equipment in satisfactory and safe operating condition. Subject to approval by the Contracting Officer, special equipment dictated by local conditions may be used. Calibrated equipment, such as scales, batching equipment, spreaders, and similar items, shall have been re-calibrated by an approved calibration laboratory within 12 months of commencing Work.

PART 2. PRODUCTS

2.1 CRUSHED MISCELLANEOUS BASE AGGREGATE

The crushed miscellaneous base shall conform to the gradation requirements shown in Table 02324-1. It shall consist of durable and sound crushed gravel, crushed stone, or crushed slag, free of lumps or balls of clay or other objectionable matter. Crushed stone and gravel shall be free from flat, elongated, soft, or disintegrated pieces. The base course shall be of such nature that it can be compacted readily with watering and rolling to a firm, stable base and shall conform to the following size:

TABLE 02324-1

PERCENTAGE BY WEIGHT PASSING SQUARE MESH LABORATORY SIEVES

| Sieves     | Size Number 1 |
|------------|---------------|
| 2 inch     | 100           |
| 1 ½ inch   | 70-100        |
| 1 inch     | 45-80         |
| ½ inch     | 30-60         |
| Number 4   | 20-50         |
| Number 10  | 15-40         |
| Number 40  | 5-25          |
| Number 200 | 0-10          |

This portion of the material passing the Number 40 sieve shall be non-plastic as determined by ASTM D 4318.

## 2.2 GEOTEXTILE FABRIC

Geotextile fabric shall be 12 ounce and conform to the requirements of Section 02714, "Geotextile Fabric."

### PART 3. EXECUTION

#### 3.1 ACCESS ROAD INSTALLATION

##### A. Geotextile Fabric

The geotextile fabric shall be installed in accordance with the Manufacturer's installation procedures. The overlap shall be a minimum of 12 inches.

##### B. Crushed Miscellaneous Base

The crushed miscellaneous base material shall be placed in loose lifts not to exceed 8 inches. Each lift shall be compacted in accordance with the testing requirements specified in this Section.

##### C. Compaction

Immediately following the placing, the material shall be spread in a uniform layer. Compact each layer using a vibratory smooth drum roller. Compacting shall continue until the layer is compacted through the full depth to a field density of at least 95% of the maximum dry density as determined in accordance with ASTM D 1557. The final surface shall be smooth and free from waves, irregularities, and ruts or soft yielding spots.

#### 3.2 DECONTAMINATION PAD INSTALLATION

##### A. The decontamination pad shall be constructed in the following manner:

1. Place 12 ounce geotextile fabric on leveled existing grade;
2. Place at least 12 inches of 1 ½ inch to 2 inch diameter clean crushed stone;
3. Compact in the manner stated in Section 3.1 C of this Section.

##### B. The Contractor shall maintain the decontamination pad by removing and replacing stones if necessary to prevent tracking of contaminated materials off-site.

#### 3.4 MAINTENANCE

The Contractor shall maintain the site access road until construction is complete and approved by the Contracting Officer. Maintenance includes drainage, rolling, shaping, and watering, as necessary, to maintain the course in proper condition. The Contractor shall correct deficiencies in thickness, composition, construction, smoothness, and

density, which develop during the maintenance period, to conform to the requirements specified herein at no additional cost to the Navy. The Contractor shall maintain sufficient moisture by light sprinkling with water at the surface to prevent a dusty condition.

#### PART 4. FIELD SUPERVISION AND TESTING

##### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.

##### 4.2 CONSTRUCTION QUALITY CONTROL TESTING

Materials shall be approved by the Contracting Officer in advance of the use of such materials in the Work. The Contractor, at the discretion of the QC Engineer, shall perform additional QC testing as specified in the CQC Plan.

###### A. Sampling

###### 1. Materials at the Source

Prior to production and delivery of materials, take at least one initial sample in accordance with ASTM D 75. Collect each sample by taking three increment samples at random from the source material to make a composite sample of not less than 50 pounds. Repeat above sampling when source of material is changed or when unacceptable deficiencies or variations from specified grading of materials are found in testing.

###### 2. Sampling During Construction

Take one random sample from each 1,000 tons of completed course material, but not less than one random sample per day's run. Take samples in accordance with ASTM D 75.

###### B. Testing

###### 1. Materials

The Contractor shall test each sample of base course material without delay. Gradation tests from each sample shall be in accordance with ASTM D 422.

###### 2. Compaction Testing

- a) Prior to the placement of the crushed miscellaneous base, the existing soil subgrade shall be compacted to a minimum relative

compaction of 95% with respect to the maximum dry density as determined in accordance with the ASTM D 1557 testing method.

- b) The crushed miscellaneous base shall be placed in two 6 inch compacted lifts. Each lift shall be compacted to a minimum relative compaction of 95% with respect to the maximum dry density as determined in accordance with the ASTM D 1577 testing method. The testing frequency shall be performed at a rate of one test per 100 linear feet per lift. The sand cone test shall be performed at a testing frequency of 1 test per day.
- c) The 6 inch thick crushed miscellaneous base underneath the 36 inch concrete pipe shall be compacted to a minimum of 95% with respect to the maximum dry density as determined in accordance with ASTM D 1557 testing method.

\*\*\*END OF SECTION\*\*\*

SECTION 02326

COVER SOIL

PART 1. GENERAL

1.1 DESCRIPTION

- A. This Section covers the materials, tools, supervision, transportation, and installation equipment necessary for the construction of the cover soil layer.
- B. The Contractor shall provide all materials, labor, and equipment necessary to perform the Work specified in this Section. The Contractor shall be prepared to coordinate the Work specified in this Section with other construction activities.
- C. The Contractor shall be entirely responsible for inputting the cover soil with index soil properties in accordance with this Section.

1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

|             |  |
|-------------|--|
| ASTM C 136  | (1993) Aggregates, Fine and Coarse, Sieve Analysis of  |
| ASTM D 422  | (1963) Soils, Particle-Size Analysis of  |
| ASTM D 1556 | (1990; R 1996) Density and Unit Weight of Soil in Place by the Sand-Cone Method  |
| ASTM D 1557 | (1998) Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort 56,000 ft-lbf/ft <sup>3</sup> (2,700 kN*m/m <sup>3</sup> ) |
| ASTM D 2487 | (2000) Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)   |
| ASTM D 2922 | (1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)  |
| ASTM D 4318 | (1984) Soils, Liquid Limit, Plastic Limit, and Plasticity Index of   |

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

- Section 01052 Field Surveys
- Section 01400 Construction Quality Control
- Section 02231 Clearing and Grubbing
- Section 02240 Erosion and Sediment Control

Section 02250 Off-Site Transportation and Disposal  
Section 02320 Granular Gas Management and Granular Drainage Materials  
Section 02323 Rip-rap  
Section 02714 Geotextile Fabric  
Section 02800 Top Soil

### 1.3 SUBMITTALS

The Contractor shall submit the following items to the Contracting Officer in accordance with Section 01300, "Submittals." The Contractor shall submit items a minimum of five working days prior to the start of the soil cover placement.

- A. The proposed material borrow source(s);
- B. All required test results as specified in Section 4.4; and
- C. A notarized letter from the Supplier indicating that the material is free from any contaminants.
- D. A 5 gallon bucket of material shall be made available to the Contracting Officer for inspection and sampling.

### 1.4 NOTIFICATIONS

If the Work of this Section is interrupted for reasons other than inclement weather, the Contractor shall notify the Contracting Officer a minimum of 24 hours prior to the resumption of the Work.

## PART 2. PRODUCTS

### 2.1 MATERIAL

- A. All laboratory testing to evaluate the suitability or conformance of soil materials for the cover soil shall be carried out in accordance with the test methods indicated in this Section. The Contractor shall use an approved soils laboratory for soil classification testing.
- B. The cover soil material shall consist of naturally occurring, clean, approved relatively homogeneous, natural soil classified as SC-SM, SC, or ML by the Unified Soil Classification System. The cover soil material shall be free of debris, foreign objects, large rock fragments, roots, and large organic particles. No particles larger than 3 inches shall be allowed. Particles larger than 1 inch shall be relatively uniformly distributed so as to be free of "rock pockets."
- C. The cover soil material shall be imported from borrow sources to be approved by the Contracting Officer.
- D. The cover soil material shall be non-acidic with a pH between 6 and 7.5. Processing for pH adjustment shall be approved by the Contracting Officer.

## PART 3. EXECUTION

### 3.1 FAMILIARIZATION

- A. Prior to implementing any Work of this Section, the Contractor shall become thoroughly familiar with the Site, the site conditions, and all portions of the Work falling within this Section.
- B. Inspection
  - 1. Prior to implementing any Work of this Section, the Contractor shall carefully inspect the installed Work of all other Sections and verify that all such Work is complete to the point where the installation of this Section may properly commence without adverse impact.
  - 2. If the Contractor has any concerns regarding the installed work of other Sections or the Site, he/she shall notify the Contracting Officer prior to commencing the Work.

### 3.2 SOIL PLACEMENT

- A. Placement of the soil shall not commence until the QC Engineer verifies that all previous Work is complete, including evaluations of the Contractor's survey results to confirm that the previous Work was constructed to the required grades, elevations, and thickness.
- B. The Contractor shall construct the cover soil material layer to the thickness, grades, and limits shown on the Contract Drawings and as specified in this Section.
- C. The Contractor shall not place, spread, or compact soil during periods of heavy precipitation.
- D. No soil materials shall be placed or spread while the surface on which the material is to be placed is excessively wet, or during otherwise unfavorable weather conditions.
- E. The fill surface shall be made smooth and free from ruts or indentations and allow erosion free drainage when precipitation is forecast and/or at the completion of the compaction operations in that area. The Contractor is responsible for protecting all Work Areas from damage due to weather.
- F. The cover soil layer soil shall be generally placed in loose lifts that result in a compacted lift thickness of 6 inches. The minimum total thickness of the compacted cover soil layer shall be 12 inches.
- G. The cover soil shall be compacted to at least 90 percent relative compaction with respect to the maximum dry density as determined in accordance with ASTM D 1557. The Contractor will need to dry out or

moisture condition any cover soil that is too wet or too dry prior to placement.

- H. The upper surface of the soil shall be scarified or roughened prior to placing overlying lifts.

### 3.3 SURVEY CONTROL

- A. The Contractor shall verify the depth to the cover soil layer by the careful excavation of potholes on a 100 foot grid over the entire landfill. Excavation will be monitored by the QC Engineer.
- B. The soil cover layer shall be within a tolerance range of  $\pm 1$  inch.

### 3.4 PROTECTION OF WORK

- A. The Contractor shall use all means necessary to protect all prior Work, including all materials and completed Work specified in this and other Sections.
- B. In the event of damage to prior Work or Work completed as specified in this Section, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Contracting Officer and at no additional cost to the Navy.

## PART 4. FIELD SUPERVISION AND TESTING

### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.
- C. It is the responsibility of the Contractor to ensure that the materials and methods used for construction of the cover layer meet the requirements of the Contract Drawings and Technical Specifications. Any materials or method that do not conform to these documents will be rejected by the QC Engineer and shall be repaired or replaced by the Contractor at no additional cost to the Navy.
- D. The Contractor shall be aware of the monitoring of field/laboratory conformance testing required by this Section. This monitoring shall be performed by the QC Engineer. If nonconformance or other deficiencies are found in the Contractor's materials or completed Work, the Contractor will be required to repair or replace the deficiency at no additional cost to the Navy.
- E. All grades, slopes, and elevations shall be verified by the QC Engineer to conform to specified requirements. If the Contractor identifies a

discrepancy, he/she shall immediately notify the Contracting Officer. Installation in an area of discrepancy shall not proceed without the approval of the Contracting Officer.

- F. The Contractor shall be responsible for protecting all completed Work. If areas are damaged by the Contractor's operation, the Contractor will be required to correct the area at no additional cost to the Navy. Corrections may include, but are not limited to removal, replacement, and re-compaction of layers.

#### 4.2 CONSTRUCTION QUALITY CONTROL TESTING

- A. The geotechnical testing of the cover soil shall be performed by an independent testing laboratory. The testing shall include on-site and off-site testing.
- B. The Contractor, at the discretion of the QC Engineer, shall perform additional QC testing as specified in the CQC Plan.

#### 4.3 ON-SITE TESTING

On-site testing shall include field compaction to be performed at a testing frequency of 1 test per lift per grid of 100 feet x 100 feet using the Nuclear Density gauge. The Sand Cone test shall be performed at a testing frequency of 1 test per day. The Sand Cone test results shall be compared to the Nuclear values to determine the accuracy of the Nuclear gauge operation.

#### 4.4 OFF-SITE TESTING

Off-site testing shall include all required testing of the cover soil prior to delivery of the material to the Site. The testing shall be performed on each borrow site as follows:

- A. Sieve Analysis: 1 test per 2,000 cubic yards;
- B. Atterberg Limits: 1 test per 2,000 cubic yards;
- C. Modified Proctor Test: 1 test per 2,000 cubic yards; and
- D. pH: 1 test per 500 cubic yards.

\*\*\*END OF SECTION\*\*\*

SECTION 02327  
DRAINAGE DITCHES

PART 1. GENERAL

1.1 DESCRIPTION

- A. The Contractor shall provide all materials, labor, and equipment to perform the Work specified in this Section in accordance with the Technical Specifications and Contract Drawings.
- B. This Section covers the following items:
  - 1. Requirements of the subgrade fill; and
  - 2. Excavation and construction of eastern, western, and central ditches as indicated on the Contract Drawings;

1.2 REFERENCES AND RELATED SECTIONS

The publication listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 530-SW-86-031

Construction Quality Assurance for  
Hazardous Waste and Disposal Facilities

The NWS Earle Construction Quality Control Plan

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

Section 01300 Submittals  
Section 01320 Submittal Register  
Section 01430 Field Sampling, Analysis and Data Evaluation  
Section 02240 Erosion and Sediment Control  
Section 02310 Preparation of Subgrade  
Section 02501 Reinforced Concrete Pipe and Headwalls  
Section 02714 Geotextile Fabric  
Section 02771 HDPE Geomembrane Liner  
Section 02800 Top Soil  
Section 03300 Cast-In-Place Concrete

1.3 SUBMITTALS

The Contractor shall submit to the Contracting Officer the source and quality of concrete materials for pre-construction approval prior to the placement of any concrete associated with the Work of this Section.

## PART 2. PRODUCTS

### 2.1 SUBGRADE MATERIAL

Subgrade materials for all drainage ditches shall meet the requirements of Section 02310, "Preparation of Subgrade" and Section 02326, "Cover Soil."

### 2.2 RIP-RAP

Drainage ditch rip-rap materials shall meet the requirements for "Type I Rip-Rap," as described in Section 02323, "Rip-rap."

### 2.3 LINER MATERIAL

The liner material for the eastern and western ditches shall be a 12 ounce geotextile fabric in accordance with Section 02714, "Geotextile Fabric." The liner material for the central ditch of Site 3 shall be a 40 mil PVC liner.

## PART 3. EXECUTION

### 3.1 FAMILIARIZATION

- A. Prior to implementing any of the Work described in this Section, The Contractor shall become thoroughly familiar with the Site, the site conditions, and all portions of the Work falling within this Section.
- B. Inspection
  - 1. Prior to implementing any of the Work of this Section, the Contractor shall carefully inspect the installed Work of all other Sections and verify that all Work is complete to the point where the installation of this Section may commence without adverse impact. The Work of related Sections may need to be closely coordinated.
  - 2. If the Contractor has any concerns regarding the installed Work of other Sections, he/she should immediately notify the Contracting Officer in writing. Failure to notify the Contracting Officer in writing or placement of the Work of this Section will be construed as the Contractor's acceptance of the related Work of all other Sections.

### 3.2 PREPARATION

- A. Areas on drainage ditches shall be graded and dressed to the lines and grades shown on the Contract Drawings or as required by the QC Engineer in accordance with Section 02310, "Preparation of Subgrade."
- B. Eroded or washed out areas shall be repaired prior to the placement of materials.

### 3.3 INSTALLATION

Drainage ditches shall be installed to the line and grades as shown on the Contract Drawings.

### 3.4 PRODUCT PROTECTION

- A. After the rip-rap has been placed, the Contractor shall maintain it free of ruts, depressions, and damage from hauling of any material, equipment, or tools over the bedding and rip-rap.
- B. The Contractor shall use all means necessary to protect all prior Work, including all materials and completed Work of other Sections.
- C. In the event that damage occurs, the Contractor shall immediately make all repairs and replacements necessary, to the approval of the Contracting Officer and at no additional cost to the Navy.

## PART 4. FIELD SUPERVISION AND TESTING

### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is performed in accordance with the Technical Specifications and the Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.

### 4.2 CONSTRUCTION QUALITY CONTROL TESTING

- A. The Contractor, at the discretion of the QC Engineer, shall perform additional QC testing as specified in the CQC Plan.
- B. The Contractor shall take this testing frequency into account in planning his/her construction schedule.

\*\*\*END OF SECTION\*\*\*

## SECTION 02501

### REINFORCED CONCRETE PIPE AND HEADWALLS

#### PART 1. GENERAL

##### 1.1 DESCRIPTION

The Contractor shall furnish all labor, equipment, and materials to install the reinforced concrete pipe and headwalls in locations as shown on the Contract Drawings and as described in this Section.

##### 1.2 RELATED SECTIONS

Related Work and/or equipment specified in other Sections of the Contract Document includes, but is not limited to, the following:

- Section 01300 Submittals
- Section 01320 Submittal Register
- Section 02310 Preparation of Subgrade
- Section 02327 Drainage Ditches

##### 1.3 SUBMITTALS

The Contractor shall submit the following data in accordance with Section 01300, "Submittals":

- A. Manufacturer's Specifications, data sheets, and installation instructions for reinforced concrete pipe and headwalls;
- B. Other data as necessary to show compliance with these Technical Specifications; and
- C. Material certifications and test results.

#### PART 2. PRODUCTS

##### 2.1 REINFORCED CONCRETE PIPE

The reinforced concrete pipe shall be 24 inch diameter concrete pipe. The pipe walls shall be 3 inches thick. The pipe shall be fitted with a steel grate at the inlet end.

##### 2.12 HEADWALL

The headwall shall be reinforced precast concrete conforming to the dimensions shown on the Contract Drawings.

### 2.3 CRUSHED MISCELLANEOUS BASE AGGREGATE

The crushed miscellaneous base aggregate to be used underneath the reinforced concrete pipe shall conform to the requirements for base material in Section 02324, "Access Road."

## PART 3. EXECUTION

### 3.1 CONCRETE PIPE INSTALLATION

The reinforced concrete pipe shall be installed on crushed miscellaneous base as shown on the Contract Drawings.

### 3.2 HEADWALL INSTALLATION

The concrete headwalls shall be installed to meet elevations as shown on the Contract Drawings.

## PART 4. FIELD SUPERVISION AND TESTING

### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings. Upon final inspection, the QC Engineer shall provide documentation of compliance.
- B. The Contractor shall follow the procedures outlined in the CQC plan.

### 4.2 CONSTRUCTION QUALITY CONTROL TESTING

The Contractor, at the discretion of the QC Engineer, shall perform QC testing as specified in the CQC Plan.

\*\*\*END OF SECTION\*\*\*

SECTION 02600

MONITORING WELL INSTALLATION

PART 1. GENERAL

1.1 DESCRIPTION

- A. The Contractor shall provide all materials, labor, and equipment to perform the Work specified in this Section in accordance with the Technical Specifications and Contract Drawings.
- B. This Section describes the installation, abandonment, and reinstallation of 4 inch diameter PVC monitoring wells with protective casings.

1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

|             |  |
|-------------|--|
| ASTM D 1586 | (1984; R 1992) Penetration Test and Split-Barrel Sampling of Soils   |
| ASTM D 1785 | (1986) Specifications for Polyvinyl Chloride (PVC) Plastic Pipe. Schedules 40, 80, and 120   |
| ASTM D 2564 | (1996) Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems                            |
| ASTM D 5092 | (1990) Design and Installation of Ground Water Monitoring Well in Aquifers   |
| ASTM D 5787 | (1995) Standard Practice for Monitoring Well Protection  |
| ASTM F 480  | (1994) Specification for Thermoplastic Water Well Casing Pipe  |
| ASTM F 656  | (1996) Standard Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings |

AMERICAN WATER WORKS ASSOCIATION (AWWA)

|            |  |
|------------|--|
| AWWA A 100 | Standards for Water Wells                      |
| AWWA C 206 | Standard for Field Welding of Steel Water Pipe |

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

Section 01052 Field Surveys  
Section 01300 Submittals  
Section 01320 Submittal Register  
Section 01400 Construction Quality Control Plan  
Section 02310 Preparation of Subgrade  
Section 02320 Granular Gas and Drainage Management Materials  
Section 02326 Cover Soil  
Section 02714 Geotextile Fabric  
Section 02771 HDPE Geomembrane Liner  
Section 02800 Top Soil  
Section 03300 Cast-in-Place Concrete  
Section 15100 Modification of Existing Monitoring Wells

### 1.3 SUBMITTALS

The Contractor shall submit to the Contracting Officer the following information prior to monitoring well installation:

- A. Drilling Subcontractor information, including:
  - 1. Name and address of the drilling company;
  - 2. Name of Driller; and
  - 3. Copy of Drilling Company's NJ Drilling Certification.
- B. The Contractor shall submit to the Contracting Officer the Manufacturer's catalog information for all pipe casing, protective casings, covers etc.
- C. The Contractor shall submit, upon completion of all activities associated with this Section, revised Contract Drawings showing the final elevations of all groundwater monitoring wells located on-site in accordance with Section 01300, "Submittals."
- D. Within 14 days of the completion of all Work associated with this Section, the Contractor shall submit to the Contracting Officer copies of the Driller's reports for his/her records.

### 1.4 DELIVERY, HANDLING AND STORAGE

- A. Care shall be taken during transportation to ensure that all pipes are not cut, kinked, or otherwise damaged. All materials shall be delivered to the Site in protective polyethylene and corrugated boxes.
- B. All material will be transported to the Site in protective coverings and shall be virgin or new unless otherwise approved by the Contracting Officer. Reuse of previously removed materials shall not occur unless approved by the Contracting Officer.

- C. Ropes, fabric, or rubber-protected slings and straps shall be used when handling pipes. Chains, cables, or hooks inserted into the pipe ends for lifting shall not be used.

## PART 2. PRODUCTS

### 2.1 WELL CASINGS

- A. The wells shall be of the open standpipe type with PVC screen and riser pipes.
- B. Well screen and riser shall consist of 4 inch diameter schedule 40 PVC with threaded leak-proof flush joints and shall extend 2.5 feet above final grade.
- C. Pipe, fittings and couplings shall be manufactured from a PVC compound which conforms to the requirements of ASTM F 480. All PVC pipes shall be pressure rated as required by ASTM D 1785, shall be homogenous throughout, and shall be free from cracks, holes, foreign inclusions, and other defects.
- D. All joints shall be threaded and flush jointed. No glue shall be used.
- E. The wells shall be screened from approximately one foot above the groundwater level to the total screen length of 15 feet. The screen shall have machine cut slots (0.02 inch size slots).

### 2.2 CONCRETE

All concrete shall conform to the requirements on Section 03300, "Cast-in-Place Concrete."

### 2.3 PROTECTIVE STEEL CASING

- A. Protective steel casings shall be constructed of 6 inch diameter, Schedule 40, carbon steel and shall conform to ASTM D 5787.
- B. The protective steel casing shall be fitted with a lockable cap with keyed alike Master locks.

### 2.4 ANNULAR BACKFILL

Annular backfill materials shall consist of the following:

- A. Sand pack composed of clean sand placed around the well screen;
- B. Well seal consisting of bentonite pellets placed around the riser above the sand; and
- C. Remaining annular space to the surface shall consist of a cement-bentonite mixture in the ratio of 8.3 gallons potable water to 5.0 pounds of dry bentonite powder per 94 pound bag of cement.

## PART 3. EXECUTION

### 3.1 WELL INSTALLATION

The Contractor shall furnish and install 4 monitoring wells in the approximate locations and to the depths indicated on the Contract Drawings or as directed in the field. The Contractor shall obtain a New Jersey certified, licensed well driller for the well installation.

### 3.2 SOIL BORINGS

#### A. Drilling

Well borings shall be drilled using the hollow stem auger method. The auger shall be of sufficient diameter to make a boring that is a minimum of 8 inches in diameter. The borehole shall penetrate a minimum depth of 1 foot below the bottom of the well.

#### B. Installation

1. With the augers still in place in the boring, the Subcontractor shall begin well installation. A clean sand mixture shall be placed in the boring to a depth of approximately 12 inches above the bottom of the borehole. The well sump, screen, and riser shall be placed in the boring above the sand and centered.
2. The gravel pack shall be set in place by gradually adding gravel pack to fill the annular space around the screen while avoiding caving of formation materials around the screen. The augers shall be raised a minimum of 6 inches during each retraction. The gravel pack shall extend approximately two feet above the top of the screened interval.
3. A minimum two feet thick bentonite pellet seal shall be placed in the annulus above the gravel pack in a similar manner by adding the pellets while retracting the augers.
4. Potable water shall be poured on top of the pellets and they shall be allowed to hydrate. The process may include multiple additions of water over a period of at least four hours to properly hydrate the bentonite pellets.
5. After the bentonite pellets have sufficiently hydrated and have been tamped down, the cement-bentonite grout shall be placed in the remaining annulus. The grout shall be pumped through a tremie pipe to fill the annulus from the bottom up as the augers are gradually retracted. The cement-bentonite grout shall be placed to the final elevation required.
6. After placement of cement-bentonite grout, the Contractor shall install the protective steel casing based on the Contract Drawings.

C. Sampling

1. At five foot intervals or at every change in the stratification, unless otherwise directed or approved by the Contracting Officer, a sample of the strata shall be taken according to ASTM D 1586 using a split spoon sampler.
2. 1 3/8 inch diameter samples shall be obtained by driving the spoon samples by means of a 140 pound weight falling 30 inches and record shall be kept of the number of blows required to force the sample tube into the soil for each six inches of penetration.
3. Soil samples shall be recovered from below the lowest elevation to which driving operations have extended. Recovery of samples by washing, bucketing, or from the auger flights shall not be permitted.

D. Groundwater

The groundwater elevation from the top of the hole shall be obtained after completion of the borehole.

E. Refusal

1. Refusal is defined as being a rate of advance of the standard split spoon sampler of less than 12 inches per 120 blows or 1 inch per 50 blows when driven with a 140 pound weight free falling 30 inches.
2. When refusal is encountered above the required boring depth, the QC Engineer or his/her representative is to be notified prior to continuation or termination of the hole.
3. At the discretion of the QC Engineer, should the split sample spoon identify the soil as being refusal, when it is known to be a very tight glacial till with small cobbles, then the Subcontractor is required to use an auger to advance the casing between sampling points.
4. When refusal is encountered at a depth of less than 5 feet the location is to be moved a distance of 5 feet and a new boring taken.

F. Explosives

The use of explosives shall not be permitted.

3.3 WELL CONSTRUCTION

A. Monitoring Well

1. The monitoring well shall be constructed by installing threaded schedule 40 PVC pipe having a nominal inside diameter of not less than 4 inches into the earth in a vertical position.

2. The wells shall be screened from approximately one foot above the groundwater level 14 feet below the groundwater level for a total screen length of 15 feet. The screen shall have machine cut slots (0.02 inch size slots).
3. The well casings shall be extended to 3 feet above final grade.

B. Backfilling

1. The boring hole shall be backfilled with Morie #1 sand or equivalent for the total length of the well screen to an elevation two feet above the screen.
2. A two feet thick bentonite seal shall be placed above the sand pack.
3. The remaining annulus shall be filled with a cement-bentonite slurry in the ratio of 8.3 gallons of water to 5.0 pounds of dry bentonite to 94 pounds of dry Portland cement.

C. Protective Casing

1. A 6 inch diameter steel casing shall be installed around the new PVC monitoring well to a minimum depth of two feet below grade.
2. The steel casing shall be equipped with a permanently mounted lockable cap which can be accessed for sampling.
3. The casing shall be painted a high visibility blue using ultraviolet resistant paint.
4. The steel casing shall be set with a concrete collar to prevent movement of the casing.
5. Each protective casing shall include a pad lock.
6. All padlocks shall be keyed alike and two keys shall be provided to the Navy.

D. Well Completion and Development

1. Upon completion of filling and grading activities, the annulus space around the new steel casing shall be filled with concrete to final grade elevation and allowed to cure for a minimum of 24 hours.
2. After the surface grout has set at least 24 hours, each well shall be developed to remove fine grain materials from the well.
  - a. A surge block of sufficient size shall be raised and lowered through the screened interval to help develop the well.

- b. The surge block will then be removed, and a hose inserted to within a foot of the base of the well.
- c. The wells will be developed until the discharge is relatively free of sand and silt and the well yields have been optimized.

### 3.4 ABANDONED HOLES

Under the following conditions, the Subcontractor shall make an additional boring at locations selected by the Contractor or Contracting Officer at no additional cost to the Navy:

- A. The Subcontractor either removes casing or apparatus from a borehole or abandons the hole without the permission of the QC Engineer or the Contracting Officer.
- B. The Subcontractor fails to carry a boring to the depth required by the Contracting Officer, except where refusal is encountered below five feet in depth.
- C. The Subcontractor fails either to keep complete records of materials encountered or to furnish the Contracting Officer with the required samples and cores.

### 3.5 ABANDONMENT OF WELLS

- A. During excavation of the area, the Contractor shall abandon any existing monitoring wells as directed by the Contracting Officer. The Contractor shall be responsible for the abandonment of the wells and for properly managing any debris associated with them as construction debris.
- B. The Contractor shall obtain a New Jersey certified, licensed, well driller for abandonment of the monitoring wells.
- C. The Contractor shall apply to the NJDEP for approval to seal the existing monitoring wells in accordance with the rules in N.J.A.C. 7:9-9.
- D. The Contractor shall remove any protective casing from around the well prior to decommissioning the well.
- E. The Contractor shall fill the open monitoring well with neat cement from the bottom of the well up to the surface after removing the bottom end cap.
  - 1. Upon filling the monitoring well, begin pulling the casing out of the borehole.
  - 2. After removing the casing and screen, fill the remainder of the borehole to the surface with the neat cement. Allow the slurry to settle for 1 day and observe for settling.
  - 3. If settling occurs fill the remainder of the borehole with neat cement.

- F. If the riser pipe and/or well screen breaks or cannot be removed from the borehole, cut the pipe approximately 6 inches below the bottom of the excavation. Fill the monitoring well with neat cement as specified in 3.5E.
- G. Following the abandonment of each monitoring well the Contractor shall manage the debris in accordance with Section 2250, "Off-Site Transportation and Disposal."
- H. Following abandonment of the wells the Contractor shall make all submittals required under N.J.A.C. 7:9-9.

### 3.6 WELL REINSTALLATION

- A. The Contractor shall reinstall new wells in a location as directed by the Contracting Officer.
- B. Well borings shall be installed as per 3.1-3.4 above.

### 3.7 FIELD SURVEYING

Upon completion of all well installation, abandonment, and grading activities, a New Jersey licensed surveyor shall survey the final elevations and record on a scaled site plan the locations of all modified wells.

### 3.8 RECORDS AND REPORTS

As the Work progresses, the drill crew foreman shall keep a complete, neat, accurate, and legible record of each boring that shall contain the following information:

- A. General Information
  - 1. Date, weather, and time;
  - 2. QC Engineer, Subcontractor, Inspector, and Drill Foreman;
  - 3. Location and identifying number of test boring and reference to survey data;
  - 4. Ground elevation at hole as established by the QC Engineer;
  - 5. The groundwater table elevation and the length of time to record the groundwater elevation from the completion of the boring hole to the measuring of the groundwater table elevation; and
  - 6. Any additional information that may be helpful to the QC Engineer interpreting the boring results such as unusual rainfall, drought condition preceding and/or during the tests or any unusual groundwater condition such as artesian flow.

B. Soil Boring Information

1. The results of all boring details for each hole shall be arranged in graphical tabular form giving the full information on the vertical arrangement, thickness, and a description of the geologic character of the materials penetrated and depth below ground surface at which each change of stratification occurs.
2. Depth of bottom of hole, type of borehole and samples, recovery fraction, and number of each sample taken. All samples shall be numbered consecutively in the order of the progress of Work.
3. Depth below ground surface at which groundwater is encountered, together with the date when the measurement was taken and the number of hours after completion of the boring. If no water is encountered indicate it by note "No water encountered."
4. The resistance of penetration of the standard sampling spoon as indicated by the number of blows per six inches required to drive it in each stratum of soil.
5. Heights of drop and weight of drop hammer for taking drive samples and driving casing, if applicable, and size of drill rod.
6. A natural or dry sample of each five foot interval or change in strata.

PART 4. FIELD SUPERVISION AND TESTING

4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings. Upon final inspection, the QC Engineer shall provide documentation of compliance.
- B. The Contractor and Subcontractor shall follow the procedures outlined in the CQC plan.

4.2 CONSTRUCTION QUALITY CONTROL TESTING

The Contractor or Subcontractor, at the discretion of the QC Engineer, shall perform QC testing as specified in the CQC Plan.

\*\*\*END OF SECTION\*\*\*

SECTION 02714  
GEOTEXTILE FABRIC

PART 1. GENERAL

1.1 DESCRIPTION

- A. The Contractor shall provide all materials, labor, and equipment to perform the Work specified in this Section in accordance with the Technical Specifications and Contract Drawings.
- B. This Section covers the materials to be used and installation procedures for geotextiles used for protection, separation, and filtering application in lining systems.
- C. The Contractor shall be prepared to install geotextile in conjunction with the other components of the cover system and in accordance with the CQC Plan.

1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

AMERICAN SOCIETY FOR TESTING MATERIALS (ASTM)

|             |  |
|-------------|--|
| ASTM D 3776 | (1994) Fabric, Mass Per Unit Area (Weight) of  |
| ASTM D 3786 | (1987) Standard Test Methods for Hydraulic Bursting Strength of - Knitted Goods and Nonwoven Fabrics – Diaphragm Bursting Strength Test Method |
| ASTM D 4491 | (1993) Standard Test Method for Water Permeability of Geotextiles by Permittivity  |
| ASTM D 4533 | (1994) Standard Test Method for Trapezoid Tearing Strength of Geotextiles  |
| ASTM D 4632 | (1994) Standard Test Method for Grab Breaking Load and Elongation of Geotextiles   |
| ASTM D 4751 | (1994) Standard Test Method for Determining Apparent Opening Size of a Geotextile  |
| ASTM D 4833 | (1994) Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products                                   |
| ASTM D 5261 | (1996) Standard Test Method for Measuring Mass per Unit Area of Geotextiles  |

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

|               |                    |
|---------------|--------------------|
| Section 01300 | Submittals         |
| Section 01320 | Submittal Register |

Section 01400 Construction Quality Control Plan  
Section 02771 High Density Polyethylene (HDPE) Geomembrane

### 1.3 SUBMITTALS

The following items shall be submitted in accordance with Section 01300, "Submittals":

- A. The Contractor shall obtain from the Geotextile Manufacturer and submit the guaranteed "Minimum Average Roll Values" as defined by the Federal Highway Administration of the stock product to be supplied to the Contractor. This submittal must be approved by the Contracting Officer prior to shipment of the geotextile rolls.
- B. The Contractor shall obtain from the Geotextile Manufacturer and submit the following documentation on geotextile production. The submittal must be approved prior to the shipment of the geotextile rolls.
  - 1. Manufacturing quality control certificates for each shift's production. The certificates shall identify the origin of the resin and the Manufacturer of the resin. The certificates shall be signed by responsible parties employed by the Manufacturer (such as the Production Manager).
  - 2. The quality control certificate shall include:
    - a) Roll numbers and identification;
    - b) Sampling procedures;
    - c) Results of quality control tests verifying each of the properties listed in Table 02714-1; and
    - d) Descriptions of test methods used.
  - 3. The Geotextile Manufacturer quality control tests to be performed are outlined in Part 2.2 of this Section.
  - 4. The Geotextile Manufacturer shall provide results of tests performed using the procedures listed in Table 02714-1. A written certification signed by a responsible party employed by the Manufacturer, that the materials actually delivered have "minimum average roll values" properties which meet or exceed all property values guaranteed for that type of geotextile shall accompany the test results.
- C. No geotextile shall be installed prior to approval of all related submittals.

### 1.4 QUALIFICATIONS

- A. The Contractor shall contract a Geotextile Manufacturer to supply geotextile filter. The Geotextile Manufacturer shall meet the following qualification requirements.

1. The Geotextile Manufacturer shall be responsible for the production and delivery of geotextile rolls and shall be a well-established firm with more than two years experience in the manufacture of geotextiles. The Geotextile Manufacturer shall submit a statement to the Contracting Officer listing:
  - a) Certified minimum average roll values of the proposed geotextiles and the test used to determine those properties; and
  - b) Production capacity available and projected delivery dates for this Project.

## PART 2. PRODUCTS

### 2.1 GEOTEXTILE PROPERTIES

- A. The Contractor shall furnish materials whose minimum average roll values meet or exceed the criteria specified in Table 02714-1. The geotextiles shall be stock products. The Contractor shall not furnish products specifically manufactured to meet the Specifications of this Project unless authorized by the Contracting Officer.
- B. The products shall be needle punched non-woven geotextiles manufactured from continuous filaments or stable fibers.
- C. In addition to the property values listed in Table 02714-1, the geotextiles shall:
  1. Retain their structure during handling, placement, and long-term service; and
  2. Be capable of withstanding direct exposure to sunlight for a minimum of 30 days with no measurable deterioration.

### 2.2 MANUFACTURING QUALITY CONTROL

- A. The Geotextile Manufacturer shall sample and test the mechanical properties of geotextile material, at a minimum, once every 100,000 ft<sup>2</sup>. Apparent opening size and permittivity shall be tested, at a minimum, once every 500,000 ft<sup>2</sup>. The quality control tests shall demonstrate that the material conforms to all requirements in Part 2.1 of this Section.
- B. Sampling shall, in general, be performed on sacrificial portions of the material such that repair of the material is not required.
- C. Samples that do not meet the specified properties shall result in rejection of the applicable rolls.
- D. At the Geotextile Manufacturer's discretion and expense, additional testing of individual rolls may be performed to more closely identify the non-complying rolls and/or to qualify individual rolls.
- E. The Geotextile Manufacturer shall additionally comply with the certification and submittal requirements of the CQC Plan.

## 2.3 PACKING AND LABELING

- A. Geotextiles shall be supplied by the Geotextile Manufacturer in rolls wrapped in relatively impermeable and opaque protective covers.
- B. Geotextile rolls shall be marked or tagged by the Geotextile Manufacturer with the following information:
  - 1. Manufacturer's name;
  - 2. Product identification;
  - 3. Lot number;
  - 4. Roll number; and
  - 5. Roll dimensions.
- C. Geotextile rolls which cannot be identified because of missing or damaged labels shall be removed from the Job Site and replaced at no additional expense to the Navy.
- D. If any special handling is required, it shall be so marked on the rolls by the Geotextile Manufacturer.
- E. The lots for which geotextile rolls are contained must be at least 75,000 ft<sup>2</sup>. Any rolls contained in a smaller lot than 75,000 ft<sup>2</sup> will be rejected and must be removed from the Job Site and replaced at no additional expense to the Navy.

## 2.4 TRANSPORTATION

- A. Transportation of the geotextiles shall be the responsibility of the Contractor and may be provided by the Geotextile Manufacturer. The Contractor shall be liable for all damage to the material incurred prior to and during transportation to the Site.
- B. During shipping, the geotextile shall be protected from ultraviolet light exposure, precipitation or other inundation, mud, dirt, dust, puncture, cutting or any other possible cause of damage.

## 2.5 HANDLING AND STORAGE

- A. Handling, storage, and care of the geotextiles following transportation to the Site shall be the responsibility of the Contractor.
- B. The Contractor shall be liable for all damage to the materials incurred prior to final acceptance of the containment system by the Contracting Officer.
- C. The Contractor shall be responsible for storage of the geotextile at the Site after the material is delivered. As required by the Contracting Officer, geotextiles shall be stored off the ground and shall be protected from ultraviolet light exposure, mud, dirt, dust and any other possible cause of damage.

- D. Any additional storage procedures required by the Geotextile Manufacturer shall be the Contractor's responsibility.

### PART 3. EXECUTION

#### 3.1 FAMILIARIZATION

- A. Prior to implementing any of the Work described in this Section, the Contractor shall become thoroughly familiar with all portion of the Work falling within this Section.
- B. Inspection
  - 1. Prior to implementing any of the Work in this Section, the Contractor shall carefully inspect the installed Work of all other Sections and verify that all Work is complete to the point where the Work of this Section may properly commence without adverse impact.
  - 2. If the Contractor has any concerns regarding the installed Work of other Sections, he/she shall immediately notify the Contracting Officer in writing prior to the start of this Section. Failure to inform the Contracting Officer in writing will be construed as Contractor's acceptance of the related Work of all other Sections.

#### 3.2 HANDLING AND PLACEMENT

- A. Geotextiles shall be handled in such a manner as to ensure that they are not damaged in any way.
- B. Precautions shall be taken to prevent damage to underlying layers during placement of the geotextile.
- C. After unwrapping the geotextile from its opaque cover, the geotextile shall not be left exposed for a period in excess of 30 days.
- D. If white colored geotextile is used, precautions shall be taken against "snowblindness" of personnel.
- E. On slopes, the geotextile will be securely anchored and then rolled down the slope in such a manner as to continually keep the geotextile panel in tension to minimize the presence of wrinkles.
- F. No excess tensile stress should occur in geotextile during placement.
- G. During placement of geotextiles, care will be taken not to entrap stones, excessive dust, or moisture in the geotextile that could damage the adjacent geosynthetics, generate clogging of drains or filters, or hamper subsequent seaming.
- H. The Contractor shall weight the geotextile with sandbags or equivalent in the presence of wind. Do not remove weight until replaced with cover material.

- I. The geotextiles shall be cut with geotextile cutter (hook blade). Protect adjacent materials from potential damage during cutting of geotextile.
- J. The Contractor shall prevent damage to underlying lining materials and minimize slippage during placement of geotextile.
- K. The QC Engineer and Contractor shall examine the entire geotextile surface after installation to ensure that no harmful foreign objects are present. Such foreign objects shall be removed and damaged geotextile shall be replaced by the Contractor.

### 3.3 OVERLAPS

Filter geotextiles shall be overlapped a minimum of 12 inches.

### 3.4 REPAIR

- A. Any holes or tears in the geotextile shall be repaired as follows:
  - 1. On slopes steeper than 10 horizontal to 1 vertical, a patch made from the same geotextile shall be double sewn in place (with each seam  $\frac{1}{2}$  inch apart no closer than 1 inch from any edge) or heat bonded as appropriate.
  - 2. On slopes flatter than 10 horizontal to 1 vertical, a patch made from the same geotextile shall be sewn or heat bonded in place with an inch overlap in all directions.

### 3.5 MATERIALS IN CONTACT WITH GEOTEXTILES

- A. The Contractor shall take all necessary precautions to ensure that the geotextiles are not damaged during installation or other components of the cover system or by other construction activities.
- B. Soil shall be spread on top of the geotextile to cause the soil to cascade onto the geotextile rather than be shoved across the geotextile.

### 3.6 PRODUCT PREPARATION

- A. The Contractor shall use all means necessary to protect all prior Work and materials and completed Work of other Sections.
- B. In the event of damage, the Contractor shall immediately make all repairs and replacements necessary, to the approval of the Contracting Officer and at no additional cost to the Navy.

PART 4. FIELD SUPERVISION AND TESTING

4.1 CONSTRUCTION QUALITY CONTROL

- A. Field Supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.

4.2 CONSTRUCTION QUALITY CONTROL TESTING

The Contractor, at the discretion of the QC Engineer, shall perform QC testing as specified in the CQC Plan.

**TABLE 02714-1**

**GEOTEXTILE FILTER AND SEPARATOR PROPERTIES**

| Properties                            | Qualifier | Units              | Specified Values(1)  | Test Methods |
|---------------------------------------|-----------|--------------------|--|--------------|
| Polymer Composition                   | Minimum   | %                  | 95 polypropylene or polyester by weight                                | N/A          |
| Mass per unit area                    | Minimum   | oz/yd <sup>2</sup> | 8 for the cover system<br>12 for the ditches, access road, & decon pad | ASTM D 5261  |
| Filter Requirements (only for filter) |           |                    |  |              |
| Apparent opening size                 | Maximum   | mm                 | 0 <sub>95</sub> ≤ 0.2  | ASTM D 4751  |
| Permittivity                          | Minimum   | 1/s                | 1.0  | ASTM D 4491  |
| Mechanical Requirements               |           |                    |  |              |
| Grab strength                         | Minimum   | lb (N)             | 250 (1,115)  | ASTM D 4632  |
| Tear strength                         | Minimum   | lb (N)             | 95 (425)   | ASTM D 4533  |
| Puncture strength                     | Minimum   | lb (N)             | 130 (580)  | ASTM D 4833  |

Notes:

- (1) All values represent minimum average roll values (i.e. any roll in a lot should meet or exceed the values in this table).

\*\*\*END OF SECTION\*\*\*

SECTION 02771

HIGH DENSITY POLYETHYLENE (HDPE) GEOMEMBRANE LINER

PART 1. GENERAL

1.1 DESCRIPTION

- A. This Section describes all Work associated with the proper installation of the a High Density Polyethylene (HDPE) geomembrane liner at Site 10 and should be used in conjunction with the Contract Drawings.
- B. The following words and terms specified below, for the purpose of this Section, have the following meaning:
  - 1. Subcontractor – shall mean that entity contracted by the Contractor to perform the correct and complete installation of the HDPE geomembrane liner.
  - 2. Construction Quality Control (QC) Engineer – shall mean the Foster Wheeler employee assigned such responsibilities as acting on-site Quality Control (QC) Engineer who will oversee the installation of the HDPE geomembrane liner.
  - 3. Subcontractor Quality Assurance (QA) Engineer: shall mean that employee of the Subcontractor who is responsible for the quality control measures necessary for the proper installation of the HDPE geomembrane liner.
- C. The Contractor shall furnish all labor, materials, tools, and supervision necessary to prepare the sub-grade, divert surface water, dewatering, excavation and backfilling for permanent anchorage of the HDPE geomembrane liner, providing access to the construction area, and preparing an area for staging and stockpiling geosynthetics.
- D. The Subcontractor shall furnish all labor, materials, tools, supervisions, transportation, and installation equipment necessary for the installation of the double-sided textured surface HDPE Geomembrane Liner as specified herein and as shown as the Contract Drawings.
- E. The Subcontractor shall be prepared to install the HDPE geomembrane liner in conjunction with the earthwork and other components of the capping system.

1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 413

(1982) Rubber Property-Adhesion to Flexible Substrate

|             |   |
|-------------|---|
| ASTM D 570  | (1992) Standard Test Method for Water Absorption of Plastics  |
| ASTM D 638  | (1992) Standard Test Method for Tensile Properties of Plastics  |
| ASTM D 746  | (1979) Standard Test Method for Brittleness, Temperature of Plastics and Elastomers by Impact   |
| ASTM D 792  | (1993) Standard Test Methods for Density and Specific Gravity (Relative Density) and Density of Plastics by Displacement                                  |
| ASTM D 1004 | (1991) Standard Test Method of Initial Tear Resistance of Plastic Film and Sheeting   |
| ASTM D 1204 | (1985) Standard Plastics Test Method for Linear Dimensional Changes of Non-rigid Thermoplastic Sheeting or Film at Elevated Temperature.                  |
| ASTM D 1238 | (1991) Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer   |
| ASTM D 1505 | (1991) Standard Test Methods for Density of Plastics by Density-Gradient Technique  |
| ASTM D 1603 | (1994) Standard Test Method for Carbon Black in Olefin Plastics   |
| ASTM D 4437 | Standard Test Methods for Determining the Integrity of Field Seams Used in Joining Flexible Polymeric Geomembranes  |
| ASTM D 4833 | (1994) Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products   |
| ASTM D 5321 | (1992) Standard Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method |
| ASTM D 5397 | Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test                        |
| ASTM D 5596 | Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics   |

GEOSYNTHETIC RESEARCH INSTITUTE

|          |  |
|----------|--|
| GRI GM-8 | Standard Test Method for Measurement of the Core Thickness of Texture Geomembranes |
|----------|--|

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

- Section 01300 Submittals
- Section 01320 Submittal Register
- Section 01400 Construction Quality Control Plan
- Section 02310 Preparation of Subgrade
- Section 02320 Granular Gas Management and Drainage Materials

### 1.3 SUBMITTALS

- A. The Subcontractor shall submit to the QC Engineer and the Contracting Officer the following information on the Geomembrane Manufacturer in accordance with Section 01300, "Submittals":
1. Manufacturing capabilities, including:
    - a. Manufacturing quality control procedures; and
    - b. List of material properties, including test results, to which are attached liner samples.
  2. A list of completed facilities for which the Geomembrane Manufacturer has manufactured a HDPE geomembrane. The following information must be provided for each facility:
    - a. Name, location, purpose of facility, and date of installation;
    - b. The names of the Client, General Contractor, and Contractor; and
    - c. Thickness and surface area of geomembrane manufactured.
  3. Origin and identification of the polyethylene resin to be used for the roll for this Project (Resin Supplier's name, resin production plant, brand name and number).
  4. Certification that the welding rod resin consists of the same or compatible polyethylene resin to be used for the rolls for this Project.
- B. Prior to transporting any geomembrane to the Site, the Contractor shall submit to the Contracting Officer, the following documentation on the resin used to manufacture the geomembranes:
1. Copies of quality control certificates issued by the Resin Supplier including the production dates and origin of the resin used to manufacture the geomembrane for the Project;
  2. Results of tests conducted by the Geomembrane Manufacturer to verify the quality of the resin used to manufacture the geomembrane roll assigned to the Project; and
  3. Certification that no reclaimed polymer (post-consumer) is added to the resin during the manufacturing of the geomembrane for this Project. If recycled polymer (post-consumer) is used, the Manufacturer shall submit a notarized certificate signed by the Production Manager documenting the quantity of recycled material (no more than 2% by weight), including a description of the procedure used to measure the quantity of recycled polymer.

- C. The Subcontractor shall submit to the QC Engineer and the Contracting Officer the following documentation on the geomembrane roll production prior to the shipment of the geomembrane:
1. Notarized manufacturing specifics for each roll of geomembrane to be used on the Site, signed by responsible parties employed by the Geomembrane Manufacturer (such as the Production Manager).
  2. Quality control certificates. The following information shall be included on each certificate:
    - a. Roll numbers and identification;
    - b. Sampling procedures; and
    - c. Results of quality control tests, including descriptions of the test methods used.
  3. The Geomembrane Manufacturer quality control tests to be performed are outlined in Part 2.2 of this Section.
  4. The Manufacturer warranty as specified in Part 1.5.A of this Section.
- D. Prior to installing the geomembrane, the Subcontractor shall submit to the QC Engineer and Contracting Officer, the following information:
1. A drawing showing the installation layout identifying geomembrane panel configurations, dimensions, details, locations of seams, as well as any variance or additional details which deviate from the Contract Drawings. The layout shall be adequate for use as a construction plan and shall include dimensions, details, etc. The layout Drawings, as modified and/or approved by the Engineer and Contracting Officer, shall become part of these Technical Specifications.;
  2. Installation schedule;
  3. Copy of Contractor's letter of approval or license for the Geomembrane Manufacturer;
  4. Installation capabilities including:
    - a. Information on equipment proposed for use during this Project;
    - b. Average daily production anticipated for this Project; and
    - c. Quality control procedures.
  5. A list of completed facilities for which the Subcontractor has installed the HDPE geomembrane. The following information shall be provided for each facility:
    - a. The name and purpose of the facility, its locations, and dates of installation;

- b. The names of the Client, General Contractor, Geomembrane Manufacturer, and the name and phone number of a contact at the facility who can discuss the project;
  - c. Thickness and surface area of installed geomembrane; and
  - d. Type of seaming and seaming apparatus employed.
6. Resume of the installation Superintendent to be assigned to this Project, including dates and duration of employment; and
7. Resumes of all personnel who will perform seaming operations on this Project, including dates and duration of employment.
- E. A Certificate of Calibration less than 12 months old shall be submitted for the field tensiometer referenced in Part 3.5 of this Section prior to the installation of any geomembrane.
- F. During installation, the Subcontractor shall be responsible for the timely submission to the QC Engineer and the Contracting Officer of :
- 1. Quality control documentation; and
  - 2. Subgrade acceptance certificates, signed by the Geomembrane Installation Contractor, for each area to be covered by the geomembrane.

#### 1.4 QUALIFICATIONS

The Subcontractor and Geomembrane Manufacturer shall meet the qualification requirements of this Technical Specification and shall be approved by the Contractor and the Contracting Officer.

A. Subcontractor

The Subcontractor shall accept and retain full responsibility for the installation and shall be responsible for any defects in the completed geomembranes.

B. Geomembrane Manufacturer

The Geomembrane Manufacturer shall be responsible for the production of geomembrane rolls from approved resin and shall have sufficient production capacity and qualified personnel to provide material meeting the requirements of this Section and the construction schedule for this Work. The Manufacturer shall be a well-established firm with more than two years experience in the manufacture of HDPE geomembrane liner. The Manufacturer shall be prepared to furnish references and information regarding manufacturing capabilities.

C. Geosynthetics Installation

The Subcontractor shall be responsible for field handling, deploying, seaming, and temporarily restraining (against wind) of the geomembranes and other components of the cover system. The Subcontractor shall be a well-established firm with more than two years experience with geosynthetics installation. The Subcontractor shall be prepared to furnish references and information regarding installation capabilities.

1. The installation crew shall have the following experience:

- a. The Superintendent shall have supervised the installation of a minimum of 2,000,000 square feet of HDPE geomembrane.
- b. At least one seamer shall have experience seaming a minimum of 100,000 linear feet of HDPE geomembrane seams using the same type of seaming apparatus as proposed for use at this Site. Seamers with such experience will be designated "Master Seamers" and shall provide direct supervision over less experienced seamers.
- c. All other seaming personnel shall have seamed at least 10,000 linear feet of HDPE geomembrane seams using the same seaming apparatus as proposed for use at this Site. Personnel who have seamed less than 10,000 linear feet of seams shall be allowed to seam only under the direct supervision of the master seamers or Superintendent.

1.5 WARRANTY

- A. The Geomembrane Manufacturer/Subcontractor shall furnish the Contracting Officer with a 20-year written warranty against defects in materials. Warranty conditions concerning limits of liability will be evaluated and must be acceptable to the Contracting Officer.
- B. The Subcontractor shall furnish the Contracting Officer with a 1 year written warranty against defects in workmanship. Warranty conditions concerning limits of liability will be evaluated and must be acceptable to the Contracting Officer.

PART 2. PRODUCTS

2.1 RESIN PROPERTIES

- A. The geomembrane shall be manufactured from new, first-quality polyethylene resin. The use of polymer recycled during the manufacturing process (pre-consumer) shall be permitted if performed with appropriate cleanliness and if the recycled polymer does not exceed 2 percent by weight of the total polymer weight. If recycled polymer (post-consumer) is used, the Manufacturer shall submit a notarized certificate signed by the Production Manager documenting the quantity of recycled material (no more than 2% by weight), including a description of the procedure used to measure the quantity of recycled polymer.

- B. The resin shall comply with the following HDPE specified properties:
  - 1. Specific Gravity: 0.934 minimum (ASTM D 792 Method A or ASTM D 1505); and
  - 2. Melt Index: 1.0 g / 10 min, maximum (ASTM D 1238 Condition E: 190°C, 2.16 kg).

## 2.2 GEOMEMBRANE PROPERTIES

- A. The Geomembrane Manufacturer shall furnish geomembrane having the properties that comply with the required property values shown in Table 02771-1.
- B. In addition to the property values listed in Table 02771-1, the geomembranes shall contain a maximum of 1 percent by weight of additives, fillers, or extenders (not including carbon black).
- C. The geomembrane shall not have striations, pinholes, holes, bubbles, blisters, nodules, undispersed raw materials, or any sign of contamination by foreign matter on the surface or in the interior.

## 2.3 MANUFACTURING QUALITY CONTROL

- A. Resin
  - 1. The Geomembrane Manufacturer shall sample and test the resin to demonstrate that the resin complies with these Technical Specifications. The Geomembrane Manufacturer shall certify in writing that the resin does meet these Technical Specifications, and shall be held liable for any non-compliance.
  - 2. Any geomembrane manufactured from non-complying resin shall be rejected.
  - 3. The Geomembrane Manufacturer shall comply with the submittal requirements of Part 1.3 of this Section.
- B. Rolls
  - 1. The Geomembrane Manufacturer shall continuously monitor geomembranes for defects during the manufacturing process.
  - 2. No geomembrane shall be accepted which exhibits any defects.
  - 3. The Geomembrane Manufacturer shall measure the geomembrane thickness at regular intervals along the length of the roll.
  - 4. No geomembranes shall be accepted which fail to meet the specified thickness.

**TABLE 02771-1  
REQUIRED HDPE GEOMEMBRANE PROPERTY VALUES**

| <b>Properties</b>                                   | <b>Qualifiers</b> | <b>Units</b>    | <b>Test Values</b>  | <b>Method</b>   |
|---|-------------------|-----------------|---|---|
| <b>Physical Properties:</b>                         |                   |                 |   |   |
| 1. Thickness  | Minimum           | mils<br>(mm)    | 54 (1.73)   | ASTM D 5994 (textured)  |
|   | Average           | mils<br>(mm)    | 60 (1.52)   |   |
| 2. Specific Gravity                                 | Minimum           | N/A             | 0.94  | ASTM D 792 (Method A) or<br>ASTM D 1505<br>ASTM D 1248 (Condition<br>E, 190°C, 2.16 kg) |
| 3. Melt Flow Index                                  | Maximum           | g/10<br>min     | 1.0   |   |
| <b>Mechanical Properties:</b>                       |                   |                 |   |   |
| 1. Tensile Strength at Yield (Force per unit width) | Minimum           | lb/in<br>(kN/m) | 140 (25)  | ASTM D 638  |
|   | Minimum           | lb/in<br>(kN/m) | 75 (13)   | ASTM D 638  |
| 2. Tensile Strength at Break (Force per unit width) | Minimum           | %               | 73  | ASTM D 638  |
|   | Minimum           | %               | 150   | ASTM D 638  |
| 3. Elongation at Yield                              | Minimum           | lb (N)          | 42 (200)  | ASTM D 1004, Die C  |
| 4. Elongation at Break                              | Minimum           | lb (N)          | 80 (335)  | ASTM D 4833   |
| 5. Tear Resistance                                  |                   |                 |   |   |
| 6. Puncture Resistance                              |                   |                 |   |   |
| <b>Environmental Properties:</b>                    |                   |                 |   |   |
| 1. Low Temperature                                  | Minimum           | °F (°C)         | -107 (-77)  | ASTM D 746 (Procedure B)  |
|   | Range             | %               | 2-3   | ASTM D 1603   |
| 2. Carbon Black Content                             | N/A               | None            | 10 of 10 in<br>Categories 1 & 2   | ASTM D 5596   |
| 3. Carbon Black Dispersion                          | Maximum           | %               | ±3  | ASTM D1204 (212°F<br>[100°C], 15 min)   |
| 4. Dimensional Stability (each direction)           | Maximum           | %               | 0.1   | ASTM D 570 (as modified in<br>NSF Appendix A)   |
| 5. Water Absorption (% Weight Change)               | Maximum           | hours           | 200   | ASTM D 5397 (Single Point<br>Method as modified in GRI<br>GM-5)                         |
| 6. Resistance Stress Crack                          |                   |                 |   |   |
| <b>Interface Properties:</b>                        |                   |                 |   |   |
| 1. Critical Interface with Geocomposite or soil     | Minimum           | Psf             | Residual strength of 75 at confining pressure of 100 psf 150 at confining pressure of 300 psf, 230 at confining pressure of 500 psf | ASTM D 5321   |

5. The Geomembrane Manufacturer shall sample and test the geomembrane, at a minimum, once every 40,000 square feet to demonstrate that its properties conform to the values specified in Table 02771-2. At a minimum, the following tests shall be performed:

**TABLE 02771-2**

| <b>TEST</b>             | <b>METHODOLOGY</b>                 |
|-------------------------|------------------------------------|
| Specific Gravity        | ASTM D 792 Method A or ASTM D 1505 |
| Thickness               | ASTM D 5994-8 (textured)           |
| Yield Strength          | ASTM D 638                         |
| Yield Elongation        | ASTM D 638                         |
| Tensile Strength        | ASTM D 638                         |
| Tensile Elongation      | ASTM D 638                         |
| Carbon Black            | ASTM D 1603                        |
| Carbon Black Dispersion | ASTM D 5596                        |

6. Any geomembrane sample that does not comply with these Technical Specifications will result in rejection of the roll from which the sample was obtained and will not be used for the Work.
7. If a geomembrane samples fails to meet the quality control requirements of this Section the Geomembrane Manufacturer shall sample and test each roll manufactured in the same resin batch or at the same time as the failing roll. Sampling and testing of rolls shall continue until a pattern of acceptable test results is established.
8. Additional testing may be performed at the Geomembrane Manufacturer's discretion and expense, to isolate and more closely identify the non-complying rolls and/or to qualify individual rolls.
9. The following tests should be run on each batch of rolls or at the rate of 1 per 100,000 square feet frequency of resin.

| <b>TEST</b>   | <b>METHODOLOGY</b>                                     |
|---|--|
| Notched Constant Tensile Load<br>Resistance Stress Crack<br>Low Temperature Brittleness | ASTM D 5397<br>(as modified by GRI-GM5B)<br>ASTM D 746 |

10. In addition, the Geomembrane Manufacturer shall certify and provide test data from interface shear test results (ASTM D 5321) from textured sheets against a geocomposite and a foundation layer soil. The minimum values given in Table 02771-1 shall be met. Conformance with the Technical Specifications will be verified by conformance testing completed by the QC Engineer as outlined in Part 4.2 of this Section.

11. The Geomembrane Manufacturer shall comply with the submittal requirements of Part 1.3 of this Section.

- C. The Geomembrane Manufacturer shall permit the Navy's Representative to visit the manufacturing plant for work specific visits, if required. If possible, such visits will be prior to or during the manufacturing of the geomembrane roll for the specific Project.

## 2.4 PACKAGING AND LABELING

- A. Geomembrane rolls shall be labeled with the following information:

1. Thickness of material;
2. Length and width of roll;
3. Name of Geomembrane Manufacturer;
4. Product Identification;
5. Lot Number; and
6. Roll Number.

- B. The lots for which geomembrane rolls are contained must be at least 75,000 square feet. Any rolls contained in a lot smaller than specified will be rejected and must be removed from the Job Site and replaced at no additional cost to the Contractor.

## 2.5 TRANSPORTATION, HANDLING, AND STORAGE

- A. Transportation of the geomembrane shall be the responsibility of the Subcontractor.
- B. Handling and care of the geomembranes prior to and following installation at the Site shall be the responsibility of the Subcontractor. The Subcontractor shall be liable for all damage to the materials incurred prior to final acceptance of the liner system by the Contracting Officer and the Contractor.
- C. The Contractor shall be responsible for storage of the geomembrane at the Site. The geomembrane shall be protected from excessive heat or cold, dirt, puncture, cutting or other damaging conditions. Any additional storage procedures required by the Geomembrane Manufacturer shall be the Contractor's responsibility.

## PART 3. EXECUTION

### 3.1 FAMILIARIZATION

- A. Prior to implementing any of the Work in this Section, the Subcontractor shall become thoroughly familiar with all portions of the Work associated with this Section.

B. Inspection

1. Prior to implementing any of the Work in this Section, the Contractor and Subcontractor shall carefully inspect the installed Work of all other Sections and verify that all Work is complete to the point where the Work of this Section may properly commence without adverse impact.
2. If the Subcontractor has any concerns regarding the installed Work of other Sections, he/she should notify the Contractor in writing prior to the start of Work contained in this Section. Failure to inform the Contractor in writing will be construed as Subcontractor's acceptance of the related Work of other Sections.
3. Prior to any installation operations the Subcontractor shall prepare an installation schedule. This schedule must be approved by the Contracting Officer prior to the start of Work. If the Subcontractor intends to install the geomembrane after daylight hours, he/she shall notify the Contractor, QC Engineer, and Contracting Officer in writing prior to the start of Work. The Subcontractor shall indicate additional precautions which shall be taken during these installation hours. The Subcontractor shall provide adequate illumination for Work during this time period.

3.2 SURFACE PREPARATION

- A. The Subcontractor shall provide certification in writing that the subgrade on which the geomembrane will be installed is acceptable. This certification of acceptance shall be given to the QC Engineer prior to the commencement of geomembrane installation in the area under consideration.
- B. After the surface of the supporting soils has been accepted by the Subcontractor QA Engineer, it will be the Subcontractor's responsibility to indicate to the QC Engineer any change in the supporting soil condition that may require repair Work.
- C. No geomembrane shall be placed onto an area which has been significantly softened by precipitation or which has cracked due to desiccation. The soil surface shall be observed daily by the QC Engineer to evaluate the effects of desiccation cracking and/or softening on the integrity of the soils liner. At the discretion of the QC Engineer, desiccation cracking which may damage the liner and is wider than ½ inch shall be reworked.
- D. Care shall be taken to maintain the prepared soil subgrade. Any damage to the soil surface caused by installation activities shall be repaired at no additional cost to the Contractor or the Navy.

3.3 GEOMEMBRANE DEPLOYMENT

A. Layout Drawings

1. The Subcontractor shall deploy the geomembrane panels in general accordance with the submitted layout Drawings. The layout Drawings must be approved by the Engineer and the Contracting Officer prior to installation of any

geomembrane. Minor in-field modifications to the layout may be made with the approval of the QC Engineer or the Contracting Officer.

2. In general, every effort shall be made to place seams oriented parallel to the line of maximum slope (i.e. oriented down, not across, the slope). Horizontal seams shall be located, to the maximum extent possible, on access road/bench areas of the cap at least 5 feet from the toe or crest of the slope, except where approved by the Engineer. The intent is to place cross seams in the most advantageous locations while not preventing use of all material ordered for use at the Site. In this regard, the Subcontractor shall be required to deploy panels downslope and with a minimum length of 50 feet with no cross seams placed on interior access road outside slopes.
3. In corners and at odd-shaped geometrical locations, the number of field seams shall be minimized. No seams shall be located in an area of potential stress concentration unless approved by the Engineer.

#### B. Field Panel Identification

1. A geomembrane field panel is a roll or portion of a roll cut in the field.
2. Each field panel shall be given an identification code (number or letter-number). This identification code shall be agreed upon by the QC Engineer and the Subcontractor.
3. The Subcontractor shall place the following information on each field panel placed using a non-toxic spray paint or marker:
  - a. The panel identification number;
  - b. The date the panel was placed;
  - c. The time at which the panel was completely placed; and
  - d. The Manufacturer's roll identification number.

#### C. Field Panel Placement

1. Field panels shall be generally installed at the location and positions indicated in the layout Drawings as approved or modified by the Engineer. Minor modifications will be allowed in the field at the discretion of the QC Engineer and the Contracting Officer.
2. Field panels shall be placed one at a time, and each field panel shall be seamed immediately after its placement.
3. Geomembranes shall not be placed when the ambient temperature is below 40°F or above 104°F, unless otherwise authorized by the Engineer or the QC Engineer.

4. Geomembranes shall not be placed during any of the following conditions:
  - a. During precipitation;
  - b. In the presence of excessive moisture (e.g. fog, snow);
  - c. In an area of ponded water; or
  - d. In the presence of excessive winds.
5. The Subcontractor shall ensure that the following conditions are met:
  - a. No equipment or vehicular traffic shall be allowed directly on the geomembrane, unless approved by the Engineer. The Subcontractor may be required to submit a verification of exerted ground pressures for proposed equipment operating with suitable cover material on the geomembrane. Any equipment exerting a ground pressure greater than 4 psi on the geomembrane will not be allowed to operate directly on the geomembrane without suitable cover material. Refer to Part 3.6.E for a summary of allowable exerted ground pressures and required cover material depths.
  - b. Equipment used shall not damage the geomembrane by handling, trafficking or leakage of hydrocarbons (e.g. fuels).
  - c. Personnel working on the geomembrane shall not smoke, wear damaging shoes, bring glassware, or engage in other activities which could damage the geomembrane.
  - d. The method used to unroll the panels shall not scratch or crimp the geomembrane and shall not damage the supporting soils.
  - e. The prepared surface underlying the geomembrane shall not be allowed to deteriorate after acceptance, and shall remain acceptable up to the time of geomembrane placement.
  - f. The method used to place the panels shall minimize wrinkles (especially differential wrinkles) between adjacent panels.
  - g. Temporary ballast and/or anchors, such as sandbags, which are not likely to damage the geomembrane shall be placed on the geomembrane to prevent uplift by wind, as approved by the QC Engineer.
  - h. The geomembrane shall be especially protected from damage in heavily trafficked areas.
  - i. Any rub sheets used to facilitate seaming shall be removed prior to installation on subsequent panels.
6. Any field panel or portion thereof which become seriously damaged (torn, twisted, or crimped) shall be replaced with new materials at no additional cost

to the Contractor or the Navy. Less serious damage may be repaired at the QC Engineer's option and also at no cost to the Contractor or the Navy. Damaged panels or portion thereof which have been rejected shall be removed from the Work Area by the Subcontractor.

D. Field Roll Identification

Any partial rolls used must be labeled with the Manufacturer's roll identification number. Any partial rolls without any labeling due to damage caused by the initial handling must be marked or the roll will be rejected and replaced at no additional cost to the Contractor or the Navy.

3.4 FIELD SEAMING / WELDING

A. Personnel

All personnel performing seaming operations shall be qualified as indicated in this Section. No seaming shall be performed unless a "Master Seamer" is on-site.

B. Weather Conditions for Seaming/Welding

1. Unless authorized in writing by the Engineer or the QC Engineer, seaming shall not be attempted at ambient temperatures below 40°F or above 104°F. A meeting will be held with the Construction Manager, Contractor, Engineer, Contracting Officer, and QC Engineer to establish acceptable installation procedures. In all cases, the geomembrane shall be dry and protected from wind damage.
2. If the Subcontractor wishes to use methods which may allow seaming at ambient temperatures below 40°F or above 104°F, he/she shall use a procedure approved by the Engineer or the QC Engineer.
3. Ambient temperatures shall be measured 6 inches above the geomembrane surface.

C. General Seaming/Welding Requirements

1. Seaming shall extend the full length of the panels.
2. If required, a firm substrate such as a flat board or similar hard surface may be placed directly under the seam overlap to achieve proper support.
3. Fishmouths or wrinkles at the seam overlaps shall be cut along the ridge of the wrinkle to achieve a flat overlap. The cut fishmouths or wrinkles shall be seamed and any portion where the overlap is insufficient for proper seaming shall be patched with an oval or round patch of geomembrane that extends a minimum of 6 inches beyond the cut in all directions.
4. Electric generators shall be placed outside of the area to be lined or mounted in such a manner as to protect the geomembrane from damage. The electric

generator shall be properly grounded by following the Manufacturer's recommendations and any Local, State or Federal regulations.

D. Trial Seams

1. Trial seams shall be made on fragment pieces of geomembrane to verify that seaming conditions are adequate. Trial seams must be conducted on the same materials to be installed and under similar field conditions as production seams. Such trial seams shall be made at the beginning of each seaming period, and at least once every five hours, for each seaming apparatus used that day. The trial seams shall be a minimum of 15 feet long by 1 foot wide after seaming with the seam centered lengthwise for fusion equipment and at least 3 feet long by 1 foot for extrusions equipment. Seam overlap shall be as indicated in Part 3.4E of this Section.
2. Four specimens, each 1 inch wide, shall be cut from the trial seam sample by the Subcontractor. Two specimens shall be tested in shear and two in peel (inside and outside tracks for double fusion weld), using a calibrated field tensiometer. The test specimens shall not yield or break in the seam. If a specimen fails the criteria set forth in Table 02771-3, the entire operation shall be repeated. If the additional specimen fails, the seaming apparatus or seamer shall not be accepted and shall not be used for seaming until the deficiencies are corrected and two consecutive successful trial seams are achieved. A seamer may start production seaming prior to testing of the trial seams. In the event that the trial seams fail, all production seams will be treated as failed seams and repaired in accordance with Part 3.5 of this Section.

**TABLE 02771-3**

**REQUIRED HDPE GEOMEMBRANE SEAM PROPERTIES**

| <b>Properties</b>                               | <b>Qualifiers</b> | <b>Units</b>    | <b>Test Values</b> | <b>Method</b>          |
|---|-------------------|-----------------|--------------------|------------------------|
| 1. Thickness                                    | Minimum           | Mils<br>(mm)    | 54 (1.37)          | GRI GM-8<br>(textured) |
| 2. Shear Strength <sup>(1)</sup> at yield point | Minimum           | lb/in<br>(kN/m) | 113 (30)           | ASTM D<br>4437         |
| 3. Peel Adhesion Fusion and Extrusion Max       | Minimum           | lb/in<br>(kN/m) | 70 (12)            | ASTM D<br>4437         |

Notes: (1) Also called "Bonded Field Strength"

E. Overlapping and Temporary Bonding

1. Geomembrane panels shall be overlapped by a minimum of 4 inches, or to the minimum required for welding and testing and approved by the Engineer. Any seams which cannot be destructively tested because of insufficient overlap shall be treated as failed seams.

2. The procedure to temporarily heat bond adjacent panels together shall not damage the geomembrane. The temperature of the air at the nozzle of heat bonding apparatus shall be controlled such that the geomembrane is not damaged.

F. Seam Preparation

1. Prior to seaming, the seam area shall be clean and free of moisture, dust, dirt, debris of any kind, and foreign materials.
2. If seam overlap grinding is required, the process shall be completed according to the Manufacturer's instructions within 20 minutes of the seaming operation and in a manner which does not damage the geomembrane. The grind depth shall not exceed ten percent of the geomembrane thickness. Grinding marks shall not appear beyond ¼ inch of the extrudate after it is placed.
3. Seams shall be aligned with the fewest possible number of wrinkles and fishmouths.

G. Seaming Process

1. Approved processes for field seaming are extrusion welding and fusion welding. Seaming equipment shall not damage the geomembrane. Only equipment identified as part of the approved submittals in Part 1.3 shall be employed. Proposed alternative processes shall be documented and submitted to the Engineer, Contractor, QC Engineer, and the Contracting Officer for approval.
2. Extrusion Equipment and Procedures
  - a. The Subcontractor shall maintain at least one spare operable seaming apparatus on-site.
  - b. Extrusions welding apparatus shall be equipped with gauges giving the temperature in the apparatus and at the nozzle.
  - c. All seams shall be abraded per paragraph 3.4.E of this Section prior to extrusion welding.
  - d. Prior to beginning a seam, the extruder shall be purged until all heat-degraded extrudate has been removed from the barrel. Whenever the extruder is stopped, the barrel shall be purged of all heat-degraded extrudate.
  - e. The Subcontractor shall provide documentation to the QC Engineer to confirm that the welding rod or resin meets Section 1.3 of this Section.
3. Fusion Equipment and Procedures
  - a. The Subcontractor shall maintain at least one spare operable seaming apparatus on-site.

- b. Fusion-welding apparatus shall be automated vehicular-mounted devices equipped with gauges giving the applicable temperatures and pressures.
- c. A moveable protective layer may be used directly below each geomembrane overlap to be seamed to prevent contamination by dust or soil between the sheets.

### 3.5 DEFECTS AND REPAIRS

- A. The geomembrane shall be inspected before and after seaming for evidence of defect, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter. The surface of the geomembrane shall be clean at the time of inspection. The geomembrane surface shall be swept or washed by the Subcontractor if surface contamination inhibits inspection. The Contractor shall ensure that an inspection of the geomembrane precedes any seaming of that section.
- B. Each suspect location, both in seam and non-seam areas, shall be nondestructively tested using the methods described in Part 4.3 of this Section, as appropriate. Each location which fails nondestructive testing shall be marked by the QC Engineer and repaired by the Contractor.
- C. When seaming of a geomembrane is completed (or when seaming of a large area of a geomembrane is completed) and prior to placing overlying materials, the QC Engineer shall identify all excessive geomembrane wrinkles. The Subcontractor shall cut and re-seam all wrinkles so identified. The seams thus produced shall be tested as outlined in this Section of the Technical Specifications.
- D. Repair Procedures:
  - 1. Any portion of the geomembrane exhibiting a flaw, or failing a destructive or nondestructive test, shall be repaired by the Subcontractors. Several repair procedures exist and the final decision as to the appropriate repair procedure shall be agreed upon between the QC Engineer and the Subcontractor. The procedures available include:
    - a. Patching: used to repair large holes and panel tee sections, tears, undispersed raw materials and contamination by foreign matter;
    - b. Abrading and re-seaming: used to repair small sections of extruded seams;
    - c. Spot seaming: used to repair minor, localized flaws;
    - d. Capping: used to repair long lengths of failed seams;
    - e. Topping: used to repair areas of inadequate seams, which have an exposed edge less than 4 inches in length; and
    - f. Removing bad seams and replacing with a strip of new material seamed into place: used with long lengths of fusion seams.

2. In addition, the following shall be satisfied:
  - a. Surfaces of the geomembrane that are to be repaired shall be abraded no more than 20 minutes prior to the repairs.
  - b. All surface must be clean and dry at the time of repair.
  - c. All seaming equipment used in repair procedures must be approved.
  - d. The repair procedures, materials, and techniques used shall be approved in advance, for the specific repair, by the QC Engineer.
  - e. Patches or caps shall extend at least 6 inches beyond the edge of the defect, and all corners of patches shall be rounded with a radius of at least 3 inches.
  - f. The geomembrane below large caps shall be appropriately cut to avoid water or gas collection between the two sheets.
  - g. Caps, toppings and reconstructions over 150 feet will require destructive testing.
  - h. Each repair shall be nondestructively tested using the methods described in Part 4.3.A of this Section, as appropriate. Repairs that pass the nondestructive test shall be taken as an indication of adequate repair. Failed tests will require the repair to be redone and re-tested until passing test results are obtained. At the discretion of the QC Engineer, destructive testing may be required for larger caps.

### 3.6 COMPONENTS OVERLYING THE GEOMEMBRANE

- A. The Subcontractor shall take all necessary precautions to ensure that the geomembrane is not damaged during the installation of overlying components of the cover system or by other construction activities.
- B. Granular materials shall not be placed on the geomembranes at ambient temperatures below 40°F or above 104°F.
- C. Placement of soils above the geomembrane will be done in such a manner as to avoid creating waves in the geomembrane that are large enough to be folded over. The maximum allowable height for a wrinkle/wave shall be 12 inches.
- D. Soils must be free of objects that could cause damage to the geosynthetics.
- E. In heavy traffic areas, such as access ramps, and in areas trafficked by rubber tire vehicles, the thickness of overlying compacted fill should be at least 3 feet. Roads shall be at least twice the width of the largest piece of equipment.

### 3.7 GEOMEMBRANE ACCEPTANCE

- A. The Subcontractor shall retain all ownership and responsibility for the geomembrane until accepted by the Contractor.
- B. The geomembrane shall be accepted by the Contractor when:
  - 1. The installation is complete.
  - 2. Verification of the completeness of all quality control documents for field seams and repairs, including associated testing, is received.
  - 3. All required documentation is submitted.
  - 4. All warranties are submitted.
  - 5. A written certification report, including Record Drawings, sealed by the Subcontractor's QA Engineer's Engineer of Record has been received by the Contractor.

### 3.8 PRODUCT PROTECTION

- A. The Subcontractor shall use all means necessary to protect all prior Work, all materials, and all completed Work of other Sections.
- B. In the event of damage, the Subcontractor shall make all repairs and replacements necessary, to the approval QC Engineer and at no additional cost to the Contractor or the Navy.

## PART 4. FIELD SUPERVISION AND TESTING

### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.
- C. The Subcontractor shall be aware of the activities in the CQC Plan and shall account for these QA activities in the installation schedule.

### 4.2 CONSTRUCTION QUALITY CONTROL TESTING

- A. Samples of the geomembrane will be removed and sent to a Geosynthetics laboratory for testing to ensure conformance with the requirements of this Section. The Subcontractor shall account for this testing in the installation schedule. Only material which meets the requirements of Part 2.2 of this Section shall be installed.

- B. Samples will be collected by the QC Engineer in accordance with this Section.
- C. The Subcontractor, at the discretion of the QA Engineer, shall perform additional QC testing as specified in the CQC Plan.
- D. The QC Engineer and/or the Contracting Officer may increase the frequency of sampling to one test per 50,000 square feet in the event that test results do not comply with the requirements of Part 2.2 of this Section. The additional testing shall be performed at the expense of the Subcontractor.
- E. Sampling Procedures
  - 1. Samples will be taken across the entire width of the roll and will not include any of the geomembrane that is exposed upon shipping and is considered part of the first full wrap around the roll. Samples collected will be 3 feet long by the roll width.
  - 2. Samples will be taken at a rate of one per lot or one per 100,000 square feet, whichever is more stringent.
- F. Test Procedures
  - 1. At a minimum, tests shall be performed by the QC Engineer to check the thickness, specific gravity, tensile properties, carbon black content, and carbon black dispersion of the geomembrane at a rate of one per lot or one per 100,000 square feet, whichever is more stringent. In addition, samples of the actual foundation layer (subgrade) soils, geocomposite, and geomembrane shall be taken and interface tests run per ASTM D 5321. A minimum of one interface test series per material will be completed. Appropriate test methods are summarized in Table 02271-1.
  - 2. At a minimum, the following laboratory tests shall be performed to determine the following characteristic of the geomembrane sheet:
    - a. Specific Gravity (ASTM D 792 Method A or ASTM D 1505);
    - b. Carbon black content (ASTM D 1603);
    - c. Carbon black dispersion (ASTM D5596) (laboratory tests to be supplemented by visual inspection to evaluate carbon black dispersion);
    - d. Thickness (GRI-GM 8 for texture geomembrane) measured at several random locations on the sample;
    - e. Tensile strength (ASTM D 638) with no requirement for sample conditioning time (yield strength, elongation at yield, break strength, elongation at break); and
    - f. Interface strength with foundation layer soils and geocomposite (ASTM D 5321).

3. Where optional procedures are noted in the test method, the requirements of these Technical Specifications shall prevail.

G. Procedures for Conformance Test Failure

1. Any geomembranes that are not certified in accordance with Part 1.4 of this Section, or that conformance testing results indicate noncompliance with Part 2.2 of this Section, will be rejected by the QC Engineer. The Subcontractor shall replace the rejected material with new material, at no additional cost to the Contractor.
2. The following procedure will apply whenever a sample fails a conformance test:
  - a. The Subcontractor will remove and replace, at no additional cost to the Contractor, any roll of geomembrane that is in nonconformance with these Technical Specifications.
  - b. The QC Engineer will take additional conformance samples for testing by a Geosynthetics Laboratory from the closest numerical roll on both sides of the failed roll. If either of these samples fail, conformance samples will continue to be obtained from the closest numerical rolls until the failing samples are isolated by rolls meeting the Technical Specifications.
3. Any lot that has more than 50% of the rolls failing conformance testing will be rejected and must be replaced at no additional cost to the Contractor.

#### 4.3 NONDESTRUCTIVE SEAM TESTING

The Subcontractor shall nondestructively test for continuity of all field seams over their full length. Continuity testing shall be carried out as the seaming work progresses, not at the completion of all field seaming. The Subcontractor shall complete any required repairs in accordance with Part 3.5 of this Section. The following procedures shall apply. Vacuum box testing shall be used for extrusion welds. Air pressure testing shall be used for double fusion seams.

A. Vacuum Box Testing

1. The equipment shall comprise the following:
  - a. A vacuum box assembly consisting of a stiff housing, a transparent viewing window, a soft neoprene gasket attached to the bottom, port hole or valve assembly, and a vacuum gauge;
  - b. A system for applying a 5 psi vacuum to the box; and
  - c. A bucket of soapy solution and applicator.
2. The following procedures shall be followed:
  - a. The vacuum pump shall be energized and the tank pressure reduced to approximately 5 psi absolute gauge.

- b. An area of the geomembrane seam larger than the vacuum box shall be wetted with the soapy solution.
- c. A box shall be placed over the wetted area.
- d. The bleed valve shall be closed and the vacuum valve opened.
- e. A leak tight seal shall be ensured.
- f. The geomembrane shall be examined through the viewing window for the presence of soap bubbles for not less than 15 second.
- g. If no bubbles appear after 15 seconds, the vacuum valve shall be closed, and the bleed valve opened, the box shall be moved over to the next adjoining area with a minimum 3 inch overlap, and the process shall be repeated.
- h. All areas where soap bubbles appear shall be marked with a marker that will not damage the geomembrane, repaired in accordance with Part 3.5 of this Section, and nondestructively re-tested.

B. Air Pressure Testing (For Double Fusion Seams Only)

- 1. The following items are applicable to those processes which produce a double seam with an enclosed space.
- 2. The equipment shall comprise the following:
  - a. An air pump (manual or motor driven) or an air reservoir, equipped with a pressure gauge, capable of generating and sustaining a pressure between 25 and 30 psi, mounted on a cushion to protect the geomembrane;
  - b. A rubber hose with fittings and connections; and
  - c. A hollow needle or other approved pressure feed device.
- 3. The following procedures shall be followed:
  - a. Both ends of the seam to be tested shall be sealed.
  - b. A needle, or other approved pressure feed device, shall be inserted into the tunnel created by the fusion weld.
  - c. A protective cushion shall be inserted between the air pump and the geomembrane.
  - d. The air pump shall be energized to a pressure between 25 and 30 psi, the valve closed, and the pressure sustained for not less than 5 minutes.

- e. If loss of pressure exceeds 3 psi, or does not stabilize, locate faulty area and repair in accordance with Part 3.5 of this Section. Repairs shall be nondestructively tested.
- f. Opposite end of air channel from pressure gauge shall be cut and observed release of pressure shall ensure air channel is not blocked.
- g. The needle, or other approved pressure feed device, shall be removed and the repair sealed in accordance with Part 3.5 of this Section.

#### 4.4 DESTRUCTIVE SEAM TESTING

- A. Destructive tests shall be performed on samples collected from selected locations to evaluate the seam strength and integrity. Destructive test sampling and testing shall be carried out as the seaming work progresses, not at the completion of all field sampling.
- B. Sampling
  - 1. Destructive test samples shall be collected at a minimum frequency of one test per 500 feet of seam length. The QC Engineer will be responsible for choosing and marking the locations. The Subcontractor shall not be informed in advance of the locations where the seam samples will be taken. The Contracting Officer, Contractor, Engineer, or QC Engineer reserves the right to increase the sampling frequency.
  - 2. Prior to cutting or removing samples, the Subcontractor shall verify that all non-destructive testing has been performed on the seam. Samples shall be cut by the Subcontractor at the locations designated by the QC Engineer as the seaming progresses in order to obtain laboratory test results before the geomembrane is covered by another material. Each sample shall be numbered and the sample number and location identified on the panel layout Drawing. All holes in the geomembrane shall be immediately repaired in accordance with Part 3.5 of this Section. The continuity of the new seams in the repaired areas shall be tested according to Part 4.3 of this Section.
  - 3. Destructive samples shall be 12 inches wide with the seam centered parallel to the width and 48 inches long. Upon satisfactory field testing, the sample shall be distributed as follows:
    - a. One portion (1 foot long) to the Subcontractor;
    - b. One portion (1.5 feet long) to the Geosynthetic Laboratory for testing; and
    - c. One portion (1 foot long) to the Contracting Officer for Archival storage.
  - 4. The Engineer shall be responsible for storing archived samples for the Navy.
  - 5. The QC Engineer shall be responsible for shipping the samples to a Geosynthetics Laboratory for testing.

C. Field Testing

Two 1 inch wide strips shall be removed from the destructive sample: one from each end of the sample or at a location selected by the QC Engineer. Each coupon shall then be tested in peel using a tensiometer. Both inside and outside tracks shall be tested for double track fusion welds. The QC Engineer has the option to request an additional test in the shear mode. If any field test samples fail to meet the requirements in Table 02771-3, then the procedures outlined in Part 4.4E of this Section shall be followed.

D. Laboratory Testing

1. Ten coupons will be tested for "Shear Strength" and "Peel Adhesion" (ASTM D 4437) by a Geosynthetics Laboratory. Specimens will be selected alternately by test from the samples (i.e. peel, shear, peel, shear) five for peel and five for shear. Both inside and outside welds shall be tested for double track fusion welds. The minimum acceptable values to be obtained in these tests are those identified in Table 02771-3. If any laboratory test sample fails to meet the requirements of Table 02771-3, the procedures outlined in Part 4.4E shall be followed.
2. The Geosynthetics Laboratory shall provide test results within 24 hours after receiving the samples. The QC Engineer will review laboratory test results as soon as they become available, and make appropriate verbal recommendations to the Engineer, Contractor, and Subcontractor. The verbal recommendations will be followed by written recommendations, as deemed appropriate by the QC Engineer.
3. The Geosynthetics Laboratory will be selected by the Geosynthetics Engineer and approved by the Engineer and the Contracting Officer.

E. Destructive Test Failure

1. The following procedures shall apply whenever a sample fails a destructive test, whether the test is conducted in the field or laboratory. The Subcontractor shall have two options:
  - a. The Subcontractor can reconstruct the seam (e.g. remove old seam and re-seam) between any two passed test locations.
  - b. The Subcontractor can trace the welding path to a location in each direction a minimum of 10 feet from the location of the failed test. A sample for additional field testing at each location shall be taken as outlined in Part 4.4C of this Section. If these additional samples pass, the samples shall be distributed as outlined in Part 4.4B of this Section. If these laboratory samples pass the tests, then the seam shall be reconstructed between the locations. If either sample fails, then the process shall be repeated to establish the zone in which the seam should be reconstructed. In any case, failing seams must be bounded on either side by two locations from which samples passing laboratory destructive tests have been taken. In cases

exceeding 150 feet of reconstructed seam, a sample taken from within the reconstructed zone must pass destructive testing.

2. Whenever a sample fails, the QC Engineer may require additional tests for seams that were formed by the same seamer and/or seaming apparatus or seamed during the same time shift.

\*\*\* END OF SECTION \*\*\*

SECTION 02800

TOP SOIL

PART 1. GENERAL

1.1 DESCRIPTION

- A. The Contractor shall provide all materials, labor, and equipment to perform the Work specified in this Section in accordance with the Technical Specifications and Contract Drawings.
- B. This Work shall consist of the distribution of suitable quality soil on areas to be vegetated.

1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

|             |  |
|-------------|--|
| ASTM C 136  | (1993) Aggregates, Fine and Coarse, Sieve Analysis Of  |
| ASTM D 1140 | (1992) Amount of Material in Soils Finer Than the No. 200 (75-Micrometer) Sieve  |
| ASTM D 1556 | (1990) Density and Unit Weight of Soil in Place by the Sand-Cone Method  |
| ASTM D 1557 | (1998) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. Ft. (2,700 kN-m/cu. m.)) |
| ASTM D 1586 | (1984; R 1992) Penetration Test and Split-Barrel Sampling of Soils   |
| ASTM D 2487 | (2000) Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)     |
| ASTM D 2922 | (1996) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)                                  |
| ASTM D 3017 | (1998; R 1996e1) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)                            |
| ASTM D 4318 | (1995) Liquid Limit, Plastic Limit, and Plasticity Index of Soils  |

ARMY CORPS OF ENGINEERS (COE)

|                |  |
|----------------|--|
| COE EM-385-1-1 | (1992) Safety and Health Requirements Manual |
|----------------|--|

DEPARTMENT OF AGRICULTURE (DOA)

DOA SSIR

(1984) Soil Survey Investigation Report No. 1, Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples, Soil Conservation Service

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

Section 01300 Submittals  
Section 01350 Submittal Register  
Section 02231 Clearing and Grubbing  
Section 02326 Cover Soil

1.3 SUBMITTALS

The following items shall be submitted in accordance with Section 01300, "Submittals":

- A. The proposed material source or sources;
- B. Top soil composition tests (reports and recommendations). The Contractor shall submit reports for test specified in DOA SSIR.; and
- C. Test reports for acid producing soil test.
- D. A 5 gallon bucket of material shall be made available to the Contracting Officer for inspection and sampling.

1.4 DELIVERY AND STORAGE

The Contractor shall store materials as to prevent segregation and contamination.

PART 2. PRODUCTS

2.1 TOP SOIL

- A. Top soil shall be naturally occurring, friable, loamy, free of debris, subsoil, brush, objectionable weeds and stones, and contain no toxic substance or adverse chemical or physical condition that may be harmful to plant growth.
- B. Top soil shall be fertile soils possessing the characteristics of good soil which produce heavy crops of grass or other vegetation.
- C. Top soil shall be non-acidic with a pH between 6 and 7.5. No processing shall be allowed for pH adjustment.
- D. Top soil hauled in from off-site shall have a minimum organic content of 4 percent and a maximum organic content of 20 percent. Organic matter

content may be raised by additives. The top soil shall be obtained from naturally well-drained areas.

- E. Oven-dried samples of top soil shall conform to the gradations of Table 02800-1.

**TABLE 02800-1**

**REQUIREMENTS FOR TOP SOIL**

| <b>Passing</b> | <b>Retained On</b>     | <b>Percentage</b> |
|----------------|------------------------|-------------------|
| 1" screen      |                        | 100               |
| 1" screen      | 1/4" screen (gravel)   | 0-3               |
| 1/4" screen    | No. 100 Mesh Sieve     | 40-60             |
| No. 100 Sieve  | (sand (silt and clay)) | 40-60             |

**2.2 ACID PRODUCING SOIL**

- A. The following soils are unacceptable for any purpose and are not to be brought on Site for any use. These soils are acid producing soils and are known locally by the following common names: Acid Producing Marl, Black Marl, Glauconitic Soils, Ferric Sulfide Soils, Ferrous Sulfide Soils, Iron Pyrite Soils, etc. Any mixture of these soils with other soils is unacceptable.
- B. A test for the presence of iron sulfide shall be performed. At least three different samples shall be taken and tested from each soil type. The soil testing shall be performed by the Rutgers University Soil Testing Laboratory. The required test is Rutgers Soil Testing Laboratory "Soil Test #6 for acid producing soils (presence of iron sulfide)."

**PART 3. EXECUTION**

**3.1 STRIPPING AND STOCKPILING**

- A. Field exploration shall be made to determine whether quantity and/or quality of surface soil justifies stripping.
- B. Stripping shall be confined to the immediate construction area.
- C. Where feasible, lime may be applied before stripping at a rate determined by soil tests to bring the soil pH to approximately 6.5.
- D. The Contractor shall strip to a depth of 6 inches.
- E. Stockpiles of soils shall be situated as not to obstruct natural drainage or cause off-site environmental damage. Weeds shall not be allowed to grow on stockpiles.

### 3.2 SITE PREPARATION

- A. The Contractor shall grade at the onset of the optimal seeding period as to minimize the duration and area of exposure of disturbed soil to erosion. Vegetative cover shall be established immediately after grading in accordance with the specified seed mixture.
- B. The Contractor shall grade as needed and feasible to permit the use of conventional equipment for seedbed preparation, seeding, mulch application and anchoring, and maintenance.
- C. As guidance for ideal conditions, subsoil shall be tested for lime requirement. Limestone, if needed, shall be applied to bring soil to a pH of approximately 6.5 and incorporated into the soil as nearly as practical to a depth of 4 inches.
- D. Immediately prior to top soiling, the surface shall be scarified 6 – 12 inches where there has been soil compaction. This will help ensure a good bond between the top soil and subsoil.
- E. The Contractor shall employ needed erosion control practices such as diversions, grade stabilization structures, channel stabilization measures, sedimentation basins, and waterways.

### 3.3 TOP SOIL

- A. Top soil shall be handled only when dry enough to work without damaging soil structure. Do not spread top soil when frozen or excessively wet or dry.
- B. Top soil shall be spread evenly to a minimum depth of 6 inches.
- C. Irregularities shall be corrected in finish surface to eliminate depressions.
- D. The Contractor shall protect the finished top soil area from damage by vehicular or pedestrian traffic.

## PART 4. FIELD SUPERVISION AND TESTING

### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.

## 4.2 CONSTRUCTION QUALITY CONTROL TESTING

### A. Sampling of Materials at the Source

1. Prior to production and delivery of materials, take at least one initial sample in accordance with ASTM D 75. Collect each sample by taking three increment samples at random from the source material to make a composite sample of not less than 50 pounds. Repeat above sampling when source of material is changed or when unacceptable deficiencies or variations from specified grading of materials are found in testing.
2. The Contractor shall obtain an approved soils laboratory for the soil classification testing.
3. Off-site testing shall include all required testing of the top soil prior to delivery of the material to the Site. The testing shall be performed on each borrow site as follows:
  - a. Sieve Analysis: 1 test per 2,000 cubic yards;
  - b. Atterberg Limits: 1 test per 2,000 cubic yards; and
  - c. pH: 1 test per 500 cubic yards.

### B. Sampling During Construction

Take one random sample from each 1,000 tons of completed material, but not less than one random sample per day's run. Take samples in accordance with ASTM D 75.

### C. Additional Testing

The Contractor, at the discretion of the QC Engineer, shall perform additional QC testing as specified in the CQC Plan.

\*\*\*END OF SECTION\*\*\*



## PART 2. PRODUCTS

### 2.1 STEEL PLATE PLATFORM

The steel plate platforms shall be hot rolled in sheets of 4 foot by 4 foot and ½ inch thick.

### 2.2 CASING

Steel casings shall be constructed of 4 inch diameter, Schedule 40, carbon steel and shall conform to ASTM A 211.

### 2.3 CONCRETE

All concrete shall conform to the requirements on Section 03300, "Cast-in-Place Concrete."

## PART 3. EXECUTION

### 3.1 SETTLEMENT MONUMENT INSTALLATION

- A. The monuments shall be installed in locations as shown on the Drawings with a minimum of one monument per acre. All trenching shall be completed so monuments are not seated on the trench.
- B. Steel plate platforms shall be placed prior to placing components of the landfill cap.
- C. The casing shall be welded to the steel plate platform. The casings shall be filled with concrete and the concrete leveled at the top of the casing.
- D. Unless otherwise indicated, extend settlement monuments 3 feet above final grade.
- E. All settlement monuments shall be painted a high visibility yellow.
- F. Prior to subgrade preparation activities and after settlement monument installation, the settlement monuments shall be surveyed. The surveying shall continue until completion of the construction activities with surveys being conducted every two weeks.

## PART 4. FIELD SUPERVISION AND TESTING

### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.

\*\*\*END OF SECTION\*\*\*

SECTION 02830

CABLE FENCE WITH WARNING SIGNS AND VEHICLE GATE

PART 1. GENERAL

1.1 DESCRIPTION

- A. The Contractor shall provide all materials, labor, and equipment to perform the Work specified in this Section in accordance with the Technical Specifications and Contract Drawings.
- B. This Section covers the materials to be used and installation procedures for cable fencing, warning signs, and vehicle gate.

1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

|             |   |
|-------------|---|
| ASTM A 569  | (1991) Standard Specification for Steel, Carbon (0.15 Maximum Percent), Hot-Rolled Sheet and Strip Commercial Quality |
| ASTM A 875  | Specification Sheet Steel, Zinc-5 percent Aluminum Alloy Metallic-Coated by the hot Dip Process                       |
| ASTM C 150  | Specification for Portland Cement   |
| ASTM F 1083 | (1991) Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structure                 |

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

Section 01300 Submittals  
Section 01320 Submittal Register

1.3 SUBMITTALS

The following items shall be submitted in accordance with Section 01300, "Submittals":

- A. Product data in the form of Manufacturer's technical data, Specifications, and installation instructions for vehicle gate posts, cable fence posts, cable fencing, accessories, and warning signs.
- B. As-Built Drawings showing the installed location of fence, gates, each post, and details of post installation, extension arms, gate swing, hardware, and accessories.

## PART 2. PRODUCTS

### 2.1 VEHICLE GATE

Each leaf of the vehicle gate shall be 10 feet wide.

#### A. Gate Posts

1. The gate posts shall be 4 inch OD type II steel pipe. The gate posts shall be manufactured from steel conforming to ASTM A 569 or A 226, grade D, cold formed, electric welded with minimum yield strength of 50,000 psi and triple coated with a minimum of 0.9 ounces of zinc per square foot after welding, a chromate conversion coating and a clear polymer overcoat. Corrosion protection on inside surfaces shall protect the metal from corrosion when subjected to salt spray test of ASTM B 117 for 300 hours with the end point of 5 percent Red Rust.
2. Concrete shall be in accordance with Section 03300, "Cast-in-Place Concrete."

#### B. Gate Tubing

1. The gate tubing shall be 1 ½" diameter Aluminum.
2. The gate fabric shall be 9-gage (0.148 inch diameter) wire and shall be in accordance with ASTM A 392, Class 1, with not less than 1.2 ounces of zinc per square foot of uncoated wire surface.

### 2.2 CABLE FENCE

#### A. Cable Posts

1. Type II Pipe: Manufactured from steel conforming to ASTM A 569 or A 446, grade D, cold formed, electric welded with minimum yield strength of 50,000 psi and triple coated with minimum 0.9 ounces of zinc per square foot after welding, a chromate conversion coating and a clear polymer overcoat. Corrosion protection on inside surfaces shall protect the metal from corrosion when subjected to salt spray test of ASTM B 117 for 300 hours with the end point of 5 percent Red Rust.
2. Concrete

Concrete shall be in accordance with Section 03300, "Cast-in-Place Concrete."

#### B. Cable Fence

The cable fence shall be a ¼ inch steel cable wrapped with plastic coating.

### 2.3 WARNING SIGNS

The signs shall be 18 inches x 18 inches and 1/8 inch thick. The sign shall be black with 2 inch high visibility yellow letters. The warning shall read as follows:

Landfill  
Keep Out

## PART 3. EXECUTION

### 3.1 CABLE FENCE INSTALLATION

- A. The cable fence shall be installed in locations as shown on the Drawings and installed in compliance with ASTM F 567. All excavation for posts holes shall be completed so fence posts are not seated on the trench.
- B. Installation and erection shall not start before completion of all site activities, unless otherwise permitted.
- C. Cable fence alignment shall be as shown on the Drawings and shall be approved by the Contracting Officer prior to installation.
- D. Install cable through posts 2 inches below the top of the post.
- E. Posts shall be centered and aligned in holes. Space maximum 20 feet o.c., unless otherwise indicate. Posts shall be centered in holes approximately 6 inches from the base of excavation. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations. Unless otherwise indicated, extend concrete posts 42 inches above grade and trowel to a crown to shed water. All fencing and gate posts shall be painted a high visibility red
- F. The Contractor shall prepare As-Built Drawings upon completion to indicate the installed location of cable fence, gates, each post, and details of post installation, extension arms, gate swing, hardware, and accessories.

### 3.2 EXCAVATION

- A. Excavation for Gate Posts

Drill or hand-excavate (using post-hole digger) holes for posts to diameters and spacings shown on the Drawings, in firm, undisturbed or compacted soil. Holes are to be advanced to a minimum depth of 30 inches below grade unless directed otherwise by the Contracting Officer.

B. Excavation for Cable Posts

Drill or hand-excavate (using post-hole digger) holes for posts to diameters and spacings shown on the Drawings, in firm, undisturbed or compacted soil. Holes are to be advanced to a minimum depth of 24 inches below grade unless directed otherwise by the Contracting Officer.

3.3 WARNING SIGN INSTALLATION

Warning signs shall be installed on the cable fencing spaced every 200 feet. The signs shall be hung from the cable wire and installed in accordance with the Manufacturer's instructions.

PART 4. FIELD SUPERVISION AND TESTING

4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.

\*\*\*END OF SECTION\*\*\*

SECTION 02840

SEEDING

PART 1. GENERAL

1.1 DESCRIPTION

- A. The Contractor shall provide all materials, labor, and equipment to perform the Work specified in this Section in accordance with the Technical Specifications and Contract Drawings.
- B. The Work covered in this Section consists of scarifying the seed bed, furnishing and placing pulverized agricultural limestone, commercial fertilizer, seed, mulching, and maintaining the seeded area.
- C. Erosion and Sediment Control Notes, Temporary and Permanent Vegetation notes are included on the Contact Drawings. The Contractor shall comply with these notes.

1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

DEPARTMENT OF AGRICULTURE (DOA)

- DOA FSA (1985) Federal Seed Act Rules and Regulations of the Secretary of Agriculture
- DOA SSIR (1984) Soil Survey Investigation Report No. 1, Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples, Soil Conservation Service

NEW JERSEY DEPARTMENT OF AGRICULTURE (NJDA)

- NJDA SE&SC Standards for Soil Erosion and Sediment Control in New Jersey

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

- Section 01019 Mobilization and Demobilization
- Section 01300 Submittals
- Section 01320 Submittal Register
- Section 02231 Clearing and Grubbing
- Section 02240 Erosion and Sediment Control

### 1.3 SUBMITTALS

The following items shall be submitted in accordance with Section 01300, "Submittals":

- A. The Contractor shall submit a certificate of seed purity and germination analysis under the current State and Federal rules for testing.
- B. The Contractor shall submit information on the fiber mulch to be used with a brief description.
- C. The Contractor shall submit the Manufacturer's catalog data for the fertilizer including physical characteristics and recommendations.
- D. The Contractor shall collect soil samples for testing at his/her expense to determine the fertilizer and soil nutrient requirements. The tests shall be those specified in DOA SSIR. The results shall be submitted to the Contracting Officer. The Contractor shall also submit results of all factory tests.

### 1.4 DELIVERY AND STORAGE

#### A. Seed

The Contractor shall ensure that seed is protected from drying out and from contamination during delivery, on-site storage, and handling. Seed shall be furnished fully tagged and separately packaged or bagged. Label in conformance with DOA FSA and applicable State seed laws. Seed shall be stored in cool, dry locations away from any possible contaminants.

#### B. Fertilizer and Lime

Fertilizer and lime shall be delivered to the Site in original, unopened containers bearing Manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to State and Federal laws. Fertilizer and lime may be furnished in bulk with certificate indicating the above information. Storage shall be in cool, dry locations away from any possible contaminants.

## PART 2. PRODUCTS

### 2.1 SEED

- A. The grass seed shall meet the requirements listed in the Soil Erosion and Sediment Control Plan.
- B. The Contractor shall provide State-certified seed of the latest season's crop in original sealed packages, bearing producer's guaranteed analysis for percentage of mixtures, purity, germination, weed seed content, and inert material.

- C. Subject to the approval of the Contracting Officer, the Contractor may add other grass seeds to the mixture to secure a cover crop, but no additional payment shall be made thereof. No seed shall contain any of the following noxious weed seeds: Canada thistle, field bindweed, Johnson grass, perennial peppergrass, perennial sowhistle, quackgrass, horse nettle, bedstraw, corn cockle, Brassica kaber, Brassica nigra, wild onion or wild garlic.
- D. No seed shall be used that has a mix date of older than six months. No seed shall be used unless it has been inspected and sampled as described, or sampled by individual species and mixed on the Project under the Contracting Officer supervision.
- E. The seed shall have been tested for germination not more than six months prior to seeding operations. A certificate of test shall be furnished to the Contracting Officer before approval for use of the seed is given.
- F. Seed which has become wet, moldy, or otherwise damaged in transit or storage shall not be accepted for use.

## 2.2 TOP SOIL

Top soil shall be furnished that meets the requirements of Section 02800, "Top Soil."

## 2.3 COMMERCIAL FERTILIZER

Commercial fertilizer shall be uniform in composition, free-flowing material suitable for application with approved standard equipment. The composition fertilizer shall conform to applicable State fertilizer laws. For the spring application fertilizer shall be (10-6-4 analysis) granular free flowing type. No less than 1/3 the nitrogen shall be in a water insoluble form.

## 2.4 PULVERIZED AGRICULTURAL LIMESTONE

Pulverized agricultural limestone shall be agricultural ground limestone and shall contain not less than 85% total carbonates and be ground to such fineness that at least 95%, 60%, and 50% by weight shall pass standard 20, 60, and 100 mesh sieves, respectively. If moisture content exceeds 5%, the maximum percentage of moisture shall be clearly indicated and the application rates shall be adjusted accordingly to reflect moisture content. Such limestone shall contain a minimum of 3% MgO or a supplemental amount of magnesium (Mg) shall be applied with limestone to achieve a total minimum equivalent application rate of 240 pounds/acre of Mg.

## 2.5 MULCHING MATERIAL

- A. All mulching material shall be free from mature seed-bearing stalks or roots of prohibited or noxious weeds.
- B. Mulches for seeded areas shall be either marsh hay or grain straw, or a combination of both.

- C. Hay or straw mulching material shall be well cured to less than 15% moisture by weight, and shall contain no stems of tobacco, soybeans, or other coarse or woody material. Mulch material may not contain any moldy material.

2.6 WATER

Water shall be fresh and free from injurious amounts of oil, acid, alkali, salts, or other materials harmful to the growth of grass. Water shall also be suitable quality for irrigation. The source shall be approved by the Contracting Officer.

PART 3. EXECUTION

3.1 PREPARATION OF SEED BED

- A. The Contractor shall provide soil preparation, fertilizing, seeding, and surface topdressing of all newly graded finished earth surfaces, unless indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.
- B. After areas have been brought to finish subgrade elevation, thoroughly till to minimum depth of 6 inches by scarifying, disking, narrowing, or other methods approved by the Contracting Officer. Remove debris and stones larger than one inch in any dimension remaining on surface after tillage.
- C. If erosion occurs between the time of final grading and time of seeding, the Contractor shall replace the soil materials which were eroded away and regrade all eroded areas to reestablish the final grade. The Contractor shall also reapply and reincorporate soil supplements in the eroded areas.
- D. Spreading of top soil shall be in accordance with the Section 02800, "Top Soil."

3.2 TEMPORARY HYDROSEEDING

The Contractor may, with the approval of the Contracting Officer, perform temporary hydroseeding operations in order to maintain finished graded areas until optimum time for performing permanent seeding in accordance with the Table 02840-1:

**TABLE 02840-1**

**TEMPORARY SEEDING SPECIFICATIONS**

| Species                | Application Rate | Seeding Dates              | Seeding Depth | Fertilizer Rate                     | Lime Rate        |
|------------------------|------------------|----------------------------|---------------|-------------------------------------|------------------|
| Perennial Rye<br>Grass | 100 lbs./acre    | 2/15 – 5/1<br>8/15 – 10/15 | ½ inch        | 500 lbs./acre<br>(11 lbs./1,000 sf) | 90 lbs./1,000 sf |
| Pearl Millet           | 20 lbs./acre     | 5/1-9/1                    | 1 inch        |                                     |                  |

- A. Apply ground limestone at a rate of 90 lbs. per 1,000 square feet;

- B. Apply fertilizer (10-20-10 or 10-6-4 in the spring) at a rate of 11 lbs. per 1,000 square feet;
- C. Apply perennial ryegrass seed at 100 lbs. per acre and pearl millet at 20 lbs. per acre and cover to a depth of approximately ¼ inch by light raking followed by light rolling;
- D. Apply hay or straw mulch at a rate of 90 lbs. per 1,000 square feet; and
- E. Apply a non-staining liquid mulch binder or tack to straw or hay mulch.

**3.3 PERMANENT HYDROSEEDING**

Permanent hydroseeding shall be performed as soon as possible following the completion and approval of final grading, and the incorporation of soil supplements. It shall comply with the requirements of Table 02840-2:

**TABLE 02840-2**

**PERMANENT SEEDING SPECIFICATIONS**

| Species     | Application Rate | Seeding Dates              | Seeding Depth | Fertilizer Rate                     | Lime Rate                              |
|-------------|------------------|----------------------------|---------------|-------------------------------------|--|
| Tall Fescue | 75 lbs./acre     | 3/15 – 4/30<br>8/15 – 9/30 | ¼ - ½<br>inch | 870 lbs./acre<br>(20 lbs./1,000 sf) | 2,178 lbs./acre<br>(50 lb.s./1,000 sf) |
| Sericea     | 60 lbs./acre     | 3/15 – 4/30                | ¼ - ½         |                                     |  |
| Lespedeza   |                  | 8/15 – 9/30                | inch          |                                     |  |

- A. Apply top soil to a depth of 6 inches (unsettled);
- B. Apply ground limestone to a rate of 50 lbs./1,000 sf and work four inches into the soil;
- C. Apply fertilizer (10-20-10 or 10-6-4 in the spring) at a rate of 20 lbs./1,000 sf;
- D. Apply tall fescue seed at a rate of 75 lbs./acre and sericea lespedeza at 60 lbs./acre and cover to a depth of approximately ¼ inch by light raking followed by light rolling;
- E. Apply hay or straw mulch at a rate of 90 lbs./1,000 sf; and
- F. Apply a non-staining liquid mulch binder or tack to straw or hay mulch.

**3.4 PROTECTION OF TURF AREAS**

Immediately after turving, protect area against traffic and other use.

### 3.5 RESTORATION

The Contractor shall restore to original condition existing turf areas which have been damaged during turf installation operations. Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when Work in adjacent areas is complete.

### 3.6 MAINTENANCE

Maintenance shall begin immediately after planting. Seeded areas shall be protected and maintained until formal acceptance by the Contracting Officer. Maintenance shall consist of watering activities and other necessary operations adequate to insure the survival of the planted materials and seeded areas for the duration of the maintenance period.

## PART 4. FIELD SUPERVISION AND TESTING

### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that Work is being performed in accordance with the Technical Specifications and Contract Documents.
- B. The Contractor shall follow the procedures outlined in the QC Plan.

### 4.2 CONSTRUCTION QUALITY CONTROL TESTING

- A. The Contractor shall collect soil samples for testing at his/her expense to determine the fertilizer and soil nutrient requirements. The Contractor shall obtain an approved soils laboratory for soil classification testing. The tests shall be those specified in DOA SSIR. The results shall be submitted to the Contracting Officer.
- B. The Contractor, at the discretion of the QC Engineer, shall perform additional QC testing as specified in the CQC Plan.

\*\*\*END OF SECTION\*\*\*

SECTION 03200

CONCRETE REINFORCEMENT

PART 1. GENERAL

1.1 DESCRIPTION

- A. The Contractor shall provide all materials, labor, and equipment to perform the Work specified in this Section in accordance with the Technical Specifications and Contract Drawings.
- B. The concrete reinforcement shall be placed as shown on the Contract Drawings. Each steel reinforcement type shall be in accordance with the Technical Specifications and Contract Drawings.

1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

ACI INTERNATIONAL (ACI)

|              |   |
|--------------|---|
| ACI 318/318R | (1995) Building Code Requirements for Structural Concrete and Commentary          |
| ACI-318M     | (1995) Building Code Requirements for Structural Concrete and Commentary (Metric) |

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

|                     |   |
|---------------------|---|
| ASTM A 615 / A 615M | (1996a) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement                   |
| ASTM A 675 / A 675M | (1990a; R 1995e1) Steel Bars, Carbon, Hot-Wrought, Special quality, Mechanical Properties |
| ASTM A 706 / A 706M | (1998) Low-alloy Steel Deformed and Plain Bars for Concrete Reinforcement                 |
| ASTM A 767 / A 767M | (1997) Zinc-Coated (Galvanized) Steel Bars in Concrete Reinforcement                      |

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

|            |                                    |
|------------|------------------------------------|
| CRSI MSP-1 | (1996) Manual of Standard Practice |
|------------|------------------------------------|

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

- Section 01300 Submittals
- Section 01320 Submittal Register

## Section 03300 Cast-in-Place Structural Concrete

### 1.3 SUBMITTALS

Prior to execution of the work, the Contractor shall submit certified copies of mill reports attesting that the reinforcing steel furnished has been produced in the United States, contains no less than 25 percent recycled scrap steel, and meets the requirements specified herein.

### 1.4 DELIVERY AND STORAGE

- A. In order to prevent damage during shipment, the supplier shall carefully pack and brace all material either within shipping containers or on the carrier.
- B. The Contractor shall provide delivery of material undamaged in original containers or packaging, with identifying labels intact and legible, to the project/work site as directed. The Contractor shall provide additional protection during shipping as necessary to prevent scraping, marring, or damaging materials or surrounding surfaces. The Contractor shall handle materials by methods to prevent bending or overstressing during fabrication and delivery.
- C. Reinforcing materials shall be stored off of the ground and shall be protected from weather elements.

## PART 2. PRODUCTS

### 2.1 REINFORCING STEEL

Reinforcing steel shall conform to ASTM A 615/A 615M or ASTM A 706/A 706M, grades and sizes as indicated on the Contract Drawings. Cold drawn wire used for spiral reinforcement shall conform to ASTM A 82. In highly corrosive environments or when directed by the Department, reinforcing steel shall conform to ASTM A 767/A 767M or ASTM A 775/A 775M as appropriate.

## PART 3. EXECUTION

### 3.1 REINFORCEMENT

- A. Reinforcement shall be fabricated to shapes and dimensions shown on the Contract Drawings and shall conform to the requirements of ACI 318M ACI 318/318R. Reinforcement shall be cold bent unless otherwise authorized. Bending may be accomplished in the field or at the mill. Bars shall not be bent after embedment in concrete. All exposed ends of vertical concrete reinforcement bars that pose a danger to life safety shall be covered/capped by the Contractor in accordance with the approved Health and Safety Plan and all applicable codes and standards. Wire tie ends shall face away from the forms.

B. Placement

Reinforcement shall be free from loose rust and scale, dirt, oil, or other deleterious coating that could reduce bond with the concrete. Reinforcement shall be placed in accordance with ACI 318M ACI 318/318R at locations shown plus or minus one bar diameter. Reinforcement shall not be continuous through expansion joints and shall be as indicated through construction or contraction joints. Concrete coverage shall be as indicated or as required by ACI 318M ACI 318/318R.

PART 4. FIELD SUPERVISION AND TESTING

4.1 CONSTRUCTION QUALITY CONTROL

A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that Work is being performed in accordance with the Technical Specifications and Contract Documents.

B. The Contractor shall follow the procedures outlined in the QC Plan.

4.2 CONSTRUCTION QUALITY CONTROL TESTING

The Contractor, at the discretion of the QC Engineer, shall perform additional QC testing as specified in the CQC Plan.

\*\*\*END OF SECTION\*\*\*

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1. GENERAL

1.1 DESCRIPTION

- A. The Contractor shall provide all materials, labor, and equipment to perform the Work specified in this Section in accordance with the Technical Specifications and Contract Drawings.
- B. The cast-in-place concrete shall have a minimum compressive strength of 2500 psi and shall be placed within the limits as shown on the Contract Drawings.

1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

|               |   |
|---------------|---|
| ASTM C 31/31M | (1998) Making and Curing concrete Test Specimens in the Field   |
| ASTM C 33     | (1999a) Concrete Aggregate  |
| ASTM C 39     | (1996) Compressive Strength of Cylindrical Concrete Specimens   |
| ASTM C 94     | (1999) Ready-Mixed Concrete   |
| ASTM C 131    | (1996) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine |
| ASTM C 136    | (1996a) Sieve Analysis of Fine and Coarse Aggregates  |
| ASTM C 143    | (1998) Slump of Hydraulic Cement Concrete   |
| ASTM C 150    | (1998a) Portland Cement   |

ARMY CORPS OF ENGINEERS (COE)

|               |  |
|---------------|--|
| COE CRD-C 104 | (1980) Method of Calculation of the Fineness Modulus of Aggregate                  |
| COE CRD-C 400 | (1963) Requirements for Water for Use in Mixing or Curing Concrete                 |
| COE CRD-C 521 | (1981) Standard Test Methods for Frequency and Amplitude of Vibrators for Concrete |

NATIONAL READY-MIXED CONCRETE ASSOCIATION (NRMCA)

|                |   |
|----------------|---|
| NRMCA CPMB 100 | (1996) Concrete Plant Standards   |
| NRMCA TMMB 100 | (1994) Truck Mixer Agitator and Front Discharge Concrete Carrier Standards  |
| NRMCA QC 3     | (1984) Quality Control Manual: Section 3, Plant Certifications Checklist: Certification of Ready Mixed Concrete Production Facilities |

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

Section 01300 Submittals  
Section 01320 Submittal Register

1.3 SUBMITTALS

The Contractor shall submit the mix design studies for a 2500 psi concrete along with a statement giving the maximum nominal coarse aggregate size and the proportions of each ingredient that will be used to make the concrete at least 14 days prior to execution of the Work. Aggregate weights shall be based on the saturated surface dry condition. The statement shall be accompanied by test results from an independent commercial testing laboratory, approved by the Contracting Officer, showing that mixture design studies have been made with materials proposed for the Project and that the proportion selected will produce concrete with a minimum compressive strength of 2500 psi;

PART 2. PRODUCTS

2.1 CONCRETE

The cast-in-place structural concrete shall conform to the mix design as proposed by the Contractor. The concrete mix design shall provide a minimum compressive strength of 2500 psi.

2.2 ADDITIVES

Concrete may contain admixtures other than air entraining agents, such as water reducers, superplasticizers, or set retarding agents to provide special properties to the concrete, if specified or approved by the Contracting Officer.

PART 3. EXECUTION

3.1 PREPARATION FOR PLACING

Before commencing concrete placement, the following shall be performed. Surfaces to receive concrete shall be clean and free from frost, ice, mud, and water. Forms shall be in place, cleaned, coated, and adequately supported. Reinforcing steel shall be in place, cleaned, tied, and adequately supported. Transporting and conveying equipment shall be in-place, ready for use, clean, and free of hardened concrete and foreign material. Equipment for consolidating concrete shall be at the placing site and in proper working order. Equipment and material for curing and for protecting concrete from weather or

mechanical damage shall be at the Site, in proper working condition and in sufficient amount for the entire placement.

### 3.2 CONCRETE PRODUCTION

Concrete shall be delivered on-site or shall be furnished from a ready-mixed concrete plant. Ready-mixed concrete shall be batched, mixed, and transported in accordance with ASTM C 94, except as otherwise specified. Truck mixers, agitators, and non-agitating transporting units shall comply with NRMCA TMMB 100. Ready-mix plant equipment and facilities shall be certified in accordance with NRMCA QC 3. Approved batch tickets shall be furnished for each load of ready-mixed concrete.

### 3.3 TRANSPORTING CONCRETE TO PROJECT SITE

Concrete shall be transported to the Site in truck mixers.

### 3.4 PLACING CONCRETE

#### A. Discharging Concrete

Mixed concrete shall be discharged within 1-1/2 hours or before the mixer drum has revolved 300 revolutions, whichever comes first after the introduction of the mixing water to the cement and aggregates. When the concrete temperature exceeds 85°F, the time shall be reduced to 45 minutes. Concrete shall be placed within one minute after it has been discharged from the transporting unit. Concrete shall be handled from mixer or transporting unit to forms in a continuous manner until the approved unit of operation is completed. Adequate scaffolding, ramps, and walkways shall be provided so that personnel and equipment are not supported by in place reinforcement. Placing will not be permitted when the sun, heat, wind, or limitations of facilities furnished by the Contractor prevent proper consolidation, finishing and curing. Sufficient placing capacity shall be provided so that concrete can be kept free of cold joints.

#### B. Depositing Concrete

Concrete shall be deposited as close as possible to its final position in forms. Concrete shall be deposited continuously in one layer. Fresh concrete shall not be deposited on concrete that has hardened sufficiently to cause formation of seams or planes of weakness within the section.

#### C. Consolidation

Immediately after placing, each layer of concrete shall be consolidated by internal vibrators. The vibrators shall at all times be adequate in effectiveness and number to properly consolidate the concrete; a spare vibrator shall be kept at the Job Site during all concrete placing operations. The vibrators shall have a frequency of not less than 10,000 vibrations per minute, amplitude of at least 0.025 inch, and the head diameter shall be appropriate for the structural member and the concrete mixture being placed. Vibrators shall be inserted vertically at uniform spacing over the

area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator so that the area being vibrated will overlap the adjacent just-vibrated area by a reasonable amount. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the preceding layer if there is such. Vibrator shall be held stationary until the concrete is consolidated and then vertically withdrawn slowly while operating. Form vibrators shall not be used unless specifically approved by the Contracting Officer and unless forms are constructed to withstand their use. Vibrators shall not be used to move concrete within the forms.

D. Cold Weather Requirements

Special protection measures shall be used if freezing temperatures are anticipated before the expiration of the specified curing period. The ambient temperature of the air where concrete is to be placed and the temperature of surfaces to receive concrete shall be not less than 40°F. The temperature of the concrete when placed shall be not less than 50°F or more than 75°F. Heating of the mixing water or aggregates may be required to regulate the concrete placing temperature. Materials entering the mixer shall be free from ice, snow, or frozen lumps. Salt, chemicals or other materials shall not be incorporated in the concrete to prevent freezing. Upon written approval, an accelerating admixture conforming to ASTM C 494, Type C or E may be used, provided it contains no calcium chloride. Calcium chloride shall not be used.

E. Hot Weather Requirements

When the ambient temperature during concrete placing is expected to exceed 85°F, the concrete shall be placed and finished with procedures previously submitted and as specified herein. The concrete temperature at time of delivery to the forms shall not exceed the temperature shown in the table below when measured in accordance with ASTM C 1064/ 1064 M. Cooling of the mixture water or aggregates or placing concrete in the cooler part of the day may be required to obtain an adequate placing temperature. A retarder may be used, as approved, to facilitate placing and finishing. Steel forms and reinforcements shall be cooled as approved prior to concrete placement when steel temperatures are greater than 120°F. Conveying and placing equipment shall be cooled if necessary to maintain proper concrete placing temperature.

**TABLE 03300-1**

**MAXIMUM ALLOWABLE CONCRETE PLACING TEMPERATURE**

| <b>Relative Humidity, Percent, During Time of Placement</b> | <b>Concrete</b> | <b>Maximum Allowable Concrete Temperature, Degrees</b> |
|---|-----------------|--|
| Greater than 60   |                 | 90 F   |
| 40-60   |                 | 85 F   |
| Less than 40  |                 | 80 F   |

PART 4. FIELD SUPERVISION AND TESTING

4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.

4.2 CONSTRUCTION QUALITY CONTROL TESTING

The Contractor, at the discretion of the QC Engineer, shall perform additional QC testing as specified in the CQC Plan.

\*\*\*END OF SECTION\*\*\*

## SECTION 15010

### GAS MANAGEMENT PIPING

#### PART 1. GENERAL

##### 1.1 DESCRIPTION

- A. The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to install the Gas Management High Density Polyethylene (HDPE) piping for Site 10.
- B. The Contractor shall be required to obtain air permit equivalencies for the gas management piping under the Clean Air Act and in accordance with the NJDEP requirements.
- C. Variations to this Section, including Material Specifications and testing requirements, shall be approved by the Contracting Officer.

##### 1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. In case of contradiction, the most stringent code applies.

#### AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

|            |   |
|------------|---|
| ASTM A 153 | (1982) Zinc Coating (Hot-Dip) On Iron and Steel Hardware                    |
| ASTM A 307 | (1994) Bolts and Studs, Carbon Steel, 60 000 Psi Tensile Strength           |
| ASTM A 563 | (1993) Nuts, Carbon, and Alloy Steel  |
| ASTM B 16  | (1981) Pipe Flanges & Flanged Fittings, Cast Iron, Class 25, 125, 250 & 800 |

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

- Section 01300 Submittals
- Section 01320 Submittal Register
- Section 02231 Clearing and Grubbing
- Section 02250 Off-Site Transportation and Disposal
- Section 02310 Preparation of Subgrade
- Section 02320 Granular Gas and Drainage Management Materials

##### 1.3 SUBMITTALS

The Contractor shall submit, in accordance with Section 01300 "Submittals," Manufacturer's catalog information confirming the pipes and fittings conform to the requirements of the Specifications

#### 1.4 DELIVERY, STORAGE, AND HANDLING

##### A. Transportation

Care shall be taken during transportation of the pipe to ensure that it is not cut, kinked, or otherwise damaged.

##### B. Materials

Materials shall be new or reused from on-site storage of previously removed materials when approved by the Contracting Officer.

##### C. Handling Pipe Length

1. Ropes, fabric or rubber-protected slings and straps shall be used when handling pipes.
2. Chains, cable, or hooks inserted into the pipe ends for lifting shall not be used. Two slings spread apart shall be used for lifting each length of pipe. Pipe or fittings shall not be dropped onto rocky or unprepared ground.

#### PART 2. PRODUCTS

##### 2.1 HDPE PIPING MATERIALS

All HDPE pipes shall be SDR 11 with a diameter of 6 inches. The pipe through the gas management layer shall be perforated with 0.02 inch diameter perforations and the pipe through the remaining upper layers of the landfill shall be non-perforated.

##### 2.2 BOLLARDS

Each HDPE pipe shall be protected with 3 bollards. Each bollard shall be 4 inches in diameter with a 6 inch steel casing. Each bollard shall be filled with 2500 psi cast-in-place concrete.

#### PART 3. EXECUTION

##### 3.1 PIPE INSTALLATION

- A. All pipes shall be inspected for cuts, scratches, gouges, etc., prior to installation. Any imperfections shall be removed as a complete cylinder.
- B. All taps in the pipe shall be made, and necessary plugs shall be inserted as shown on the Contract Drawings.
- C. Pipe and fittings shall be selected such that there is as small a deviation as possible at the joints and inverts present a smooth surface. Pipe and fittings which do not fit together to form a tight-fitting joint shall be rejected.

- D. Pipe cutting shall be done only with mechanical cutters.

Soil placed over gas management piping shall be compacted using hand equipment.

- E. The perforated PVC pipe through the gas management layer shall be surrounded by clean sand pack Morie #1 or equivalent extending in a 6 inch radius around the pipe.

### 3.2 BOLLARD INSTALLATION

All bollards shall be embedded to a minimum depth of 2 feet. The bollards shall be evenly spaced 3 feet away from the HDPE pipe in a circular pattern.

## PART 4. FIELD SUPERVISION AND TESTING

### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.
- C. Each pipe and fitting delivered to the Job Site shall be inspected by the Contractor in the presence of the QC Engineer for flaws, cracks, dimensional tolerances, and compliance with referenced standards. Only pipe and fittings accepted by the QC Engineer shall be installed.
- D. During installation activities, the QC Engineer is responsible for the following:
  - 1. Deficiencies in the Contractor's Work shall be identified to the Contractor by the QC Engineer. Repairs, replacements, rework or other corrective action shall be made prior to proceeding with ensuing Work that may be affected by the Work inspected.
  - 2. Other inspections will be based on visual observations and qualitative assessments of the Work. Results of such inspections, when necessary for continuation of Work, will be verbally relayed to the Contractor within 24 hours. Inspection reports documenting the results shall be maintained by the QC Engineer.
- E. Upon completion of the PVC piping system, the QC Engineer shall verify the following:
  - 1. The piping system has been constructed in accordance with the Contract Drawings and Technical Specifications.
  - 2. The piping system has not been damaged during the backfilling operation or construction.

#### 4.2 CONSTRUCTION QUALITY CONTROL TESTING

The Contractor, at the discretion of the QC Engineer, shall perform QC testing as specified in the CQC Plan.

\*\*\*END OF SECTION\*\*\*

## SECTION 15100

### MODIFICATION OF EXISTING MONITORING WELLS

#### PART 1. GENERAL

##### 1.1 DESCRIPTION

- A. The Contractor shall furnish all labor, materials, and equipment to extend all groundwater monitoring wells impacted by the construction of the three-foot soil cap at Site 3 and the multi-layer soil cap at Site 10 as designated on the Contract Drawings.
- B. This Section describes all Work associated with the complete and proper modification of existing groundwater monitoring wells by extending them to the proposed final grades and should be used in conjunction with the Contract Drawings.
- C. The Contractor shall perform all activities associated with extending the riser of each well casing and the protective steel casing prior to and concurrently with site grading activities.
- D. It shall be the Contractor's responsibility to protect the well extension from damage throughout the construction duration.

##### 1.2 REFERENCES AND RELATED SECTIONS

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. IN case of contradiction, the most stringent code applies.

#### AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

|             |  |
|-------------|--|
| ASTM D 1586 | (1984; R 1992) Penetration Test and Split-Barrel Sampling of Soils   |
| ASTM D 1785 | (1986) Specifications for Polyvinyl Chloride (PVC) Plastic Pipe. Schedules 40, 80, and 120   |
| ASTM D 2564 | (1996) Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems                            |
| ASTM D 5092 | (1990) Design and Installation of Ground Water Monitoring Well in Aquifers   |
| ASTM D 5787 | (1995) Standard Practice for Monitoring Well Protection  |
| ASTM F 480  | (1994) Specification for Thermoplastic Water Well Casing Pipe  |
| ASTM F 656  | (1996) Standard Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings |

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA A 100  
AWWA C 206

Standards for Water Wells  
Standard for Field Welding of Steel Water Pipe

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited, to the following:

Section 01052 Field Surveys  
Section 01300 Submittals  
Section 01320 Submittal Register  
Section 01400 Construction Quality Control Plan  
Section 02310 Preparation of Subgrade  
Section 02320 Granular Gas and Drainage Management Materials  
Section 02326 Cover Soil  
Section 02714 Geotextile Fabric  
Section 02771 HDPE Geomembrane Liner  
Section 02800 Top Soil  
Section 03300 Cast-in-Place Concrete

1.3 SUBMITTALS

- A. Prior to all monitoring well modifications, the Contractor shall submit to the Contracting Officer the following information regarding the Drilling Subcontractor:
  - 1. Name and Address of Drilling Company;
  - 2. Name of Driller; and
  - 3. Copy of the Drilling Company's NJ Drilling Certification.
- B. The Contractor shall submit to the Contracting Officer the Manufacturer's catalog information for all pipe casing, protective casings, covers etc.
- C. Prior to commencing any Work contained in this Section, the Contractor shall submit to the Contracting Officer a well modification plan for review and approval.
- D. The Contractor shall submit, upon completion of all activities associated with this Section, revised Contract Drawings showing the final elevations (extended elevations) of all groundwater monitoring wells located on-site in accordance with Section 01300, "Submittals."
- E. Within 14 days of the completion of all Work associated with this Section, the Contractor shall submit to the Contracting Officer copies of the Driller's reports for his/her records.

1.4 DELIVERY, HANDLING AND STORAGE

- A. Care shall be taken during transportation to ensure that all pipes are not cut, kinked, or otherwise damaged. All materials shall be delivered to the Site in protective polyethylene and corrugated boxes.

- B. All material will be transported to the Site in protective coverings and shall be virgin or new unless otherwise approved by the Contracting Officer. Reuse of previously removed materials shall not occur unless approved by the Contracting Officer. All materials not utilized in well modifications shall remain the property of the Navy.
- C. Ropes, fabric, or rubber-protected slings and straps shall be used when handling pipes. Chains, cables, or hooks inserted into the pipe ends for lifting shall not be used.

## PART 2. PRODUCTS

### 2.1 RISER CASING

- A. All well riser casings shall be 4 inches in diameter and Schedule 40 PVC with threaded leak-proof flush joints and shall extend 3 feet above final grade.
- B. Pipe, fittings and couplings shall be manufactured from a PVC compound which conforms to the requirements of ASTM F 480. All PVC pipes shall be pressure rated as required by ASTM D 1785, shall be homogenous throughout, and shall be free from cracks, holes, foreign inclusions, and other defects.

### 2.2 CONCRETE

All concrete shall conform to the requirements on Section 03300, "Cast-in-Place Concrete."

### 2.3 LOCKING WELL CAPS

Each monitoring well shall be equipped with a 4 inch diameter locking well cap that shall be air tight. The cap shall be constructed of nylon with a neoprene O-ring seal and shall be a Brainard-Kilman TC-102 or approved equal.

### 2.4 PROTECTIVE STEEL CASING

- A. Protective steel casings shall be constructed of 10 inch diameter, Schedule 40, carbon steel and shall conform to ASTM D 5787.
- B. The protective steel casing shall be fitted with a lockable, water-tight cap. Keyed alike Master locks.

## PART 3. EXECUTION

### 3.1 EXTENSION OF PVC WELL CASING

- A. The Contractor shall install additional 6 inch diameter, Schedule 40 casing as necessary to raise the existing casing to an elevation where the newly added well casing is approximately 3 feet above the finished grade.
- B. The PVC casing shall be extended by the use of a female to female friction slip fit coupling.

- C. All well casings shall be decontaminated prior to installation.
- D. After the well casing has been extended, the well shall be tested for plumbness and alignment.

### 3.2 INSTALLATION OF NEW STEEL PROTECTIVE WELL CASING

- A. A 10 inch diameter steel protective casing shall be installed over the extended well casing for protection during filling and grading operations and shall be installed such that it extends approximately 6 inches above the top of the riser casing (approximately 3 feet above finished grade).
- B. During installation of the protective steel casing, the top shall be held plumb while the bottom is centered around the base and anchored in place by either mounding and compacting soil around the base or by pouring a concrete foundation. The Contractor shall be responsible for ensuring that the protective steel casing remains stable and plumb throughout the filling and grading activities.
- C. The steel casing shall be painted a high visibility blue using ultraviolet resistant paint
- D. Equalizers shall be used to the center the extended PVC well casing within the steel casing.
- E. The method used to stabilize the well casing shall be adequate to support the height of casing standing above grade without movement and shall be subject to the approval of the Contracting Officer.

### 3.3 FILL REQUIREMENTS

- A. All fill proximal to the well shall be compacted via hand compaction equipment such as jumping jacks, with soil placed in horizontal thin lifts of not more than 8 inches loose thickness. In no case shall large compaction and grading equipment be allowed to operate within 3 feet of the well.
- B. Placement of soil fill around the well shall be accomplished in such a manner as to maintain the vertical position of the 10 inch steel casing without displacement or damage to the well.
- C. Once the initial mound of soil has been placed, all subsequent filling shall be performed contemporaneously with all filling and grading activities associated with the construction of the cap.

### 3.4 COMPLETION OF WELL MODIFICATIONS

- A. Upon completion of filling and grading activities, the annulus space between the existing steel protective casing and the new 10 inch diameter steel casing shall be filled with grout to final grade elevation and allowed to cure for a minimum of 24 hours.

- B. A locking steel protective cover shall be installed on each steel casing upon the completion of well Modification activities.
- C. All locks shall be keyed alike and two keys shall be provided to the Navy
- D. It shall be the Contractor's responsibility to record the volume and elevation of the grout and then record said information on the well completion diagram.

### 3.5 CAP PENETRATION

Penetration of the steel casing through the site cap shall be performed in accordance with the Contract Drawings and these Technical Specifications.

### 3.6 FIELD SURVEYING

Upon completion of all well modifications and grading activities, a New Jersey licensed surveyor shall survey the final elevations and record on a scaled site plan the locations of all modified wells in accordance with Section 01052, "Field Surveys."

### 3.7 LOGS AND REPORTS

- A. A Driller's Report shall be submitted upon completion of all well Modification activities and shall consist of the following information.
  - 1. Daily driller's log to describe work progress, equipment problems, downtime, daily activities, etc.;
  - 2. An accounting of all materials used to extend the well casings and protective casings; and
  - 3. At the request of the Contracting Officer, an accounting and description of the decontamination procedures.

## PART 4. FIELD SUPERVISION AND TESTING

### 4.1 CONSTRUCTION QUALITY CONTROL

- A. Field Supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being done in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.
- C. All well modification activities will be completed by a New Jersey licensed well driller and shall be performed in the presence of the QC Engineer.

### 4.2 CONSTRUCTION QUALITY CONTROL TESTING

The Contractor, at the discretion of the QC Engineer, shall perform QC testing as specified in the CQC Plan.

\*\*\* END OF SECTION \*\*\*

## SECTION 15483

### HDPE LINER BOOTS

#### PART 1. GENERAL

##### 1.1 DESCRIPTION

- A. This Contractor shall furnish all labor, equipment, and materials necessary to install the HDPE geomembrane liner boots as shown on the Contract Drawings.
- B. The HDPE geomembrane liner boots shall be installed onto landfill gas management piping, monitoring wells and other surface penetrating device installed into the refuse layer of the landfill to create a seal preventing air or landfill gas leakage around the penetrating device.
- C. It is the intent of this Section of the Technical Specifications that the liner boots be supplied as a pre-fabricated unit.
- D. Variations on this Section including Material Specifications and testing, shall be approved by the Contractor, Engineer, and the Contracting Officer prior to its use on-site.

##### 1.2 RELATED SECTIONS

Related Work and/or equipment that is specified in other Sections of the Contract Document includes, but is not limited to, the following:

- Section 01300 Submittals
- Section 01320 Submittal Register
- Section 15010 Gas Management Piping
- Section 15100 Modification of Existing Monitoring Wells

##### 1.3 SUBMITTALS

- A. The Contractor shall submit to the Contracting Officer the following information, in accordance with Section 01300, "Submittals":
  - 1. The liner boot Manufacturer's installation instructions;
  - 2. An isometric Drawing showing the components and dimensions of the geomembrane seal; and
  - 3. Manufacturer's warranty information.

#### PART 2. PRODUCTS

##### 2.1 PRODUCT DESCRIPTION

- A. The HDPE liner seal shall be a Landtec WBSTM wellbore seal, LFG&E WelGard membrane well seal or approved equivalent.

- B. The HDPE liner seal shall consist of a PVC membrane panel, integral pipe boot, fittings and clamps are required to connect the wellbore seal to the casing.
- C. The HDPE liner seal for single completion landfill gas management pipes shall be suitable for use with a 4 or 6 inch nominal diameter well casing.
- D. The HDPE liner seal for dual completion landfill gas management pipes shall be suitable for use with two 4 or 6 inch nominal diameter well casings approximately 18 inches on center.

## 2.2 APPLICABLE DESIGN CODES

The Contractor shall be responsible for providing all labor, equipment and materials necessary to backfill each borehole with the required fill materials as specified on the Contract Drawings.

## 2.3 MATERIALS

### A. Membrane Seal

1. For single completion landfill gas management pipe installations, the membrane seal shall consist of a 10 foot by 10 foot PVC geomembrane panel with an integral pipe boot located at or near the center of the panel.
2. For dual completion landfill gas management pipe installations, the membrane seal shall consist of a 10 foot by 10 foot PVC membrane seal with an integral pipe boot and a second pipe boot welded on by the Manufacturer.

### B. Pipe Boot

The PVC pipe boot shall fit over a 4 or 6 inch diameter PVC casing and be approximately 24 to 30 inches high in its uncompressed state.

### C. Well Casing Seal

The pipe boot shall be sealed to the PVC casing by extrusion welding.

### D. Hose Clamp

The hose clamp used to secure the boot to the PVC casing shall be stainless steel and have a nominal width of at least ½ inch. It shall be adjustable with a standard screwdriver and nut driver.

### E. Gasket

Butyl tape or an adhesive gasket shall be used to form an airtight seal between the PVC casing and pipe boot.

### PART 3. EXECUTION

#### 3.1 LANDFILL GAS MANAGEMENT PIPE CONSTRUCTION

- A. The landfill gas management pipes shall be installed per the Contract Drawings.
- B. The borehole shall be sealed with clay and a PVC geomembrane as shown on the Contract Drawings.

#### 3.2 MANUFACTURER'S INSTRUCTIONS

All Work of this Section shall be performed in accordance with the Manufacturer's written instructions and installation detail drawings.

#### 3.3 INSTALLATION

- A. The Contractor shall prepare an isometric Drawing showing the components and dimensions of the geomembrane seal for review. The Contractor shall not proceed with installation until the Drawings are approved by the Contracting Officer.
- B. The geomembrane seal shall be handled in such a way as to prevent damage to the membrane and joints.
- C. The finished grade shall be smooth and free of all rocks and other hard objects prior to installing the membrane seal.
- D. The surrounding landfill surface shall be graded with a positive slope (minimum 2% gradient) to promote runoff away from the landfill gas management piping.
- E. The pipe boot shall be attached to the pipe with ½ inch hose clamps and the gasket material. The exposed portion of the boot shall be collapsed or "accordioned" down as far as possible to accommodate settling.
- F. The wellbore seal shall be sealed to the landfill by excavating and burying the wellbore seal 18 inches deep in the landfill. The wellbore seal shall be covered with clay compacted with a hand operated compactor, wheel rolling, or track walking. Permanent exposure of the geomembrane panel to sunlight is not allowed.
- G. Field adjustments to the wellbore installation are to be approved by the Engineer and the Contracting Officer prior to its use on-site.

PART 4. FIELD SUPERVISION AND TESTING

4.1 CONSTRUCTION QUALITY CONTROL

- A. Field supervision shall be performed by the QC Engineer and his/her staff to ensure that the Work is being performed in accordance with the Technical Specifications and Contract Drawings.
- B. The Contractor shall follow the procedures outlined in the CQC Plan.
- C. Prior to acceptance of Work, the QC Engineer shall verify the following:
  - 1. The geomembrane seal is installed per the Technical Specifications and as shown on the Contract Drawings.
  - 2. Submittal requirements have been met.

4.2 CONSTRUCTION QUALITY CONTROL TESTING

The Contractor, at the discretion of the QC Engineer, shall perform QC testing as specified in the CQC Plan.

\*\*\* END OF SECTION \*\*\*

**APPENDIX C**  
**INSPECTION AND RECORDKEEPING FORMS**

**SITE 3**  
**NWS EARLE - COLTS NECK, NEW JERSEY**  
**FACILITY INSPECTION REPORT**

**LEAD INSPECTOR NAME:**

**POST-CLOSURE YEAR**

**SIGNATURE:**

**DATE OF INSPECTION**

| COMPONENT/FREQUENCY   | WHAT TO INSPECT   | INSPECTION EVENT |    |    |    |    |    |   |   | OBSERVATIONS/COMMENTS |
|---|---|------------------|----|----|----|----|----|---|---|-----------------------|
|   |   | Q1               | Q2 | Q3 | Q4 | S1 | S2 | A | E |                       |
| Landfill cap inspection<br>Quarterly - Year 1 and 2<br>Semiannually - Year 3 to 30                    | Erosion, differential settling, vegetation coverage, vegetation maintenance and animal burrowing.   |                  |    |    |    |    |    |   |   |                       |
| Storm drainage system inspection<br>Quarterly - Year 1 and 2<br>Semiannually - Year 3 to 30           | Sediment accumulation, subsidence, erosion, vegetative growth, ponding, and obstructions to flow.   |                  |    |    |    |    |    |   |   |                       |
| Settling monument survey<br>Annually - Year 1 to 30   | Survey the elevations of the benchmark points on the settling monuments. Compare the elevations to the as-built elevations at the completion of construction. |                  |    |    |    |    |    |   |   |                       |
| Access ramp inspection<br>Quarterly - Year 1 and 2<br>Semiannually - Year 3 to 30                     | Potholes, ruts, settlement, vegetative growth, and erosion.   |                  |    |    |    |    |    |   |   |                       |
| Perimeter fence, sign and gate inspection.<br>Quarterly - Year 1 and 2<br>Semiannually - Year 3 to 30 | Damage to fence and gate, rusted or damaged locks, signs of intrusion, damaged or illegible signs.  |                  |    |    |    |    |    |   |   |                       |
| Vegetation inspection<br>Quarterly - Year 1 and 2<br>Semiannually - Year 3 to 30                      | Bare spots larger than 6" square, vehicle ruts, erosion, need for maintenance such as mowing, watering, hydroseeding, planting, mulching, etc.                |                  |    |    |    |    |    |   |   |                       |
| Groundwater monitoring system inspection<br>Quarterly - Year 1 and 2<br>Semiannually - Year 3 to 30   | Rusted locks, subsidence, well casing damage or vandalism.  |                  |    |    |    |    |    |   |   |                       |

**Q - Quarterly, S - Semi-annual, A - Annual, E - Event specific**

**SITE 10**  
**NWS EARLE - COLTS NECK, NEW JERSEY**  
**FACILITY INSPECTION REPORT**

**LEAD INSPECTOR NAME:**

**POST-CLOSURE YEAR**

**SIGNATURE:**

**DATE OF INSPECTION**

| COMPONENT/FREQUENCY   | WHAT TO INSPECT   | INSPECTION EVENT |    |    |    |    |    |   |   | OBSERVATIONS/COMMENTS |
|---|---|------------------|----|----|----|----|----|---|---|-----------------------|
|   |   | Q1               | Q2 | Q3 | Q4 | S1 | S2 | A | E |                       |
| Landfill cap inspection<br>Quarterly - Year 1 and 2<br>Semiannually - Year 3 to 30                    | Erosion, differential settling, vegetation coverage, vegetation maintenance and animal burrowing.   |                  |    |    |    |    |    |   |   |                       |
| Storm drainage system inspection<br>Quarterly - Year 1 and 2<br>Semiannually - Year 3 to 30           | Sediment accumulation, subsidence, erosion, vegetative growth, ponding, and obstructions to flow.   |                  |    |    |    |    |    |   |   |                       |
| Settling monument survey<br>Annually - Year 1 to 30   | Survey the elevations of the benchmark points on the settling monuments. Compare the elevations to the as-built elevations at the completion of construction. |                  |    |    |    |    |    |   |   |                       |
| Access ramp inspection<br>Quarterly - Year 1 and 2<br>Semiannually - Year 3 to 30                     | Potholes, ruts, settlement, vegetative growth, and erosion.   |                  |    |    |    |    |    |   |   |                       |
| Perimeter fence, sign and gate inspection.<br>Quarterly - Year 1 and 2<br>Semiannually - Year 3 to 30 | Damage to fence and gate, rusted or damaged locks, signs of intrusion, damaged or illegible signs.  |                  |    |    |    |    |    |   |   |                       |
| Vegetation inspection<br>Quarterly - Year 1 and 2<br>Semiannually - Year 3 to 30                      | Bare spots larger than 6" square, vehicle ruts, erosion, need for maintenance such as mowing, watering, hydroseeding, planting, mulching, etc.                |                  |    |    |    |    |    |   |   |                       |
| Groundwater monitoring system inspection<br>Quarterly - Year 1 and 2<br>Semiannually - Year 3 to 30   | Rusted locks, subsidence, well casing damage or vandalism.  |                  |    |    |    |    |    |   |   |                       |
| Gas monitoring vents inspection<br>Quarterly - Year 1 and 2<br>Semiannually - Year 3 to 30            | Damage to riser pipes, vents, screen on vents, valves on risers, and settlement in surrounding areas.   |                  |    |    |    |    |    |   |   |                       |

**Q - Quarterly, S - Semi-annual, A - Annual, E - Event specific**