~~1468~~

2052

Technical Specifications
for
Remediation Area 1, Phase II
Site Preparation Package

FDF Project No. 20711
Document No. 20711-TS-0002

May 1998
Revision 0B

Environmental Remedial Action Project
Fernald Environmental Management Project
Fernald, Ohio
FDF Subcontract No. 2-21487
Project Order 175

PARSONS

175 Tri-County Parkway
Cincinnati, Ohio 45246

000001

~~000114~~

~~1463~~

2052

Technical Specifications
for
Remediation Area 1, Phase II
Site Preparation Package

FDF Project No. 20711
Document No. 20711-TS-0002

May 1998
Revision 0B

Environmental Remedial Action Project
Fernald Environmental Management Project
Fernald, Ohio
FDF Subcontract No. 2-21487
Project Order 175

175 Tri-County Parkway
Cincinnati, Ohio 45246

000002

~~000445~~

[redacted]

2052

U.S DEPARTMENT OF ENERGY

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

REMEDIATION AREA 1, PHASE II
SITE PREPARATION PACKAGE
TECHNICAL SPECIFICATIONS

PARSONS

Approved by: _____

Carlton Schroeder, Project Manager Date

000003

[redacted]

Date: 05/06/98
Rev.: 0B RE: CS

WBS No: 1.1.1.1.5
SCEP/175/A1PII/SP

U.S. DEPARTMENT OF ENERGY
FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

WBS NO. 1.1.1.1.5
TECHNICAL SPECIFICATIONS

TABLE OF CONTENTS

~~1468~~

2052

U.S DEPARTMENT OF ENERGY

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT

REMEDIATION AREA 1, PHASE II
SITE PREPARATION PACKAGE
TECHNICAL SPECIFICATIONS

Division 2

PARSONS

Prepared by: _____

Date

Checked by: _____

Date

000005

~~000118~~

SECTION 02050
SURVEYING

PART 1 GENERAL

1.1 SCOPE

Section includes, but is not limited to:

A. Establishing survey benchmarks.

B. Setting limits and boundaries of construction activities.

C. Performing surveys for:
   1. verification of the existing conditions.
   2. support surveys during the construction activities.
   3. measurement and payment.

D. Preparing and furnishing red-line and as-built survey sketches and construction drawings.

1.2 RELATED SECTIONS AND PLANS

A. Section 02100 - Site Preparation.

B. Section 02270 - Erosion and Sediment Control.

C. Section 02720 - Storm Drain Piping

D. Part 6 - Statement of Work.

E. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

A. National Geodetic Survey Standards.

1.4 QUALIFICATION

A. Oversight for survey work shall be provided and certified by a Land Surveyor licensed in the State of Ohio.

B. Survey work shall be performed under the direct supervision of a person who has at least 3 years of experience in construction surveying.

C. Work performed in referencing or re-establishment of Fernald Environmental Management Project (FEMP) or United States survey monuments shall be stamped/certified by an Ohio licensed Land Surveyor.

1.5 SUBMITTALS

A. Provide submittals as required in Part 6. Unless specified otherwise, submittals shall be made to the Construction Manager for review and approval.

B. Submit qualifications for land surveyor licensed in the State of Ohio and the survey supervisor within 10 calendar days of Notice to Proceed.

C. Submit daily survey sketches showing the locations and elevations of newly installed and existing overhead and underground utilities and structures encountered during construction.

D. Submit as-built survey work documentation by the end of each week for the work of the preceding week, or within three work days as requested by the Construction Manager.

E. Submit survey notes, field notes, sketches and drawings for the following surveys within 7 calendar days of the completion of each survey:

1. Preliminary surveys.
2. Intermediate surveys.
3. Final surveys.

F. Submit 2 copies of field notes prepared by the licensed Land Surveyor on a weekly basis or upon request by the Construction Manager. Dated and signed field notes shall be legibly recorded in standardized field notebooks with format as defined in this section. Notation shall be consistently applied to surveying work; the stake marking format and the field book notation shall be compatible. Identify survey benchmarks on the field notes, sketches, and drawings.

G. Within 7 calendar days of completion of all of the survey work, provide the original field notebooks, layouts, computations, sketches and certified drawings.

H. Submittal requirements for the environmental health and safety requirements shall be as specified in Part 8 of Contract Documents.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain on site a complete and accurate log documenting survey work as it progresses.

B. Maintain on site drawings clearly showing survey control points and benchmarks, including coordinates and elevations. These drawings shall be updated the same day as new control points and benchmarks are set.

C. Maintain on site an accurate and current set of redline drawings with as-built locations. Data shall be incorporated within 7 calendar days of the respective construction activity or as specified by the Penetration Permit.

1.7 EXAMINATION OF EXISTING CONDITIONS

A. Prior to the start of work, verify the accuracy of the existing conditions shown on the Construction Drawings. Immediately notify the Construction Manager in writing of deviations from the existing conditions indicated on the Construction Drawings.

B. Stake the locations of earthwork, as shown on the Construction Drawings and review proposed work with the Construction Manager in the field prior to start of construction.

1.8 SURVEY BENCHMARKS

A. Locate and verify benchmarks as shown on the Construction Drawings and identify any other survey monuments in the work area in accordance with this Section. The Construction Manager will provide coordinate and elevation data for FEMP control points if not shown on the Construction Drawings. Use only FEMP approved control points.

B. Protect and preserve benchmarks.

C. Replace and verify coordinates and elevation of benchmarks disturbed or damaged by Contractor at no additional cost to FDF.

1.9 HEALTH AND SAFETY REQUIREMENTS

A. Environmental Health and Safety, and Training requirements shall be as specified in Part 8 of Contract Documents.

PART 2 PRODUCTS

A. Provide materials as required to perform the surveys, including, but not limited to: instruments, tapes, rods, measures, mounts, tripods, stakes, hubs, nails, ribbon, and other reference markers.

B. The survey instruments shall be precise and accurate to meet the needs of the project. Survey instruments shall be capable of reading to a precision of 0.01 feet with a setting accuracy of 8 seconds.

PART 3 EXECUTION

3.1 GENERAL

A. The accuracy of horizontal and vertical control shall meet or exceed Third-Order, Class I and Third-Order, respectively, as defined by National Geodetic Survey Standards. Elevation shall be referenced to National Geodetic Vertical Datum (NGVD) of 1929 and horizontal coordinates to North American Datum (NAD) 1983.

B. Establish elevations, lines, and levels that are tied into the FEMP Survey Control System. The Construction Manager shall provide data on these control points if not shown on the Construction Drawings. Field run data shall be taken to adjacent existing undisturbed area (25 ft. minimum overlap) to create a smooth contour transition.

C. Maintain accurate and complete notes of surveys in field notebooks:
   1. Handwritten survey notes and information shall be written with lead pencil(s) and entered in "write in rain" notebooks.
   2. Electronically collected field survey information shall be collected and backup equipment shall be available in the event of equipment malfunction.
      a. Electronic format for printed output of data collectors field survey notes shall be compatible with the field book notation format.
      b. Electronic format for CADD generated drawings shall be either *.dgn, *.dwg, or *.dxf.

D. Perform construction layout surveys in advance of scheduled construction activities. The Contractor is responsible for rework and/or construction delays caused by survey or staking errors.

E. Set grade stakes and slope stakes in accordance with accepted surveying practices.

000010

F. Set grade stakes for construction activities as the work progresses.

G. Establish temporary survey benchmarks (horizontal and vertical control), as necessary, to support construction activities.

H. Temporary or Permanent Benchmarks, Accuracy and Documentation:

1. Record the following information in survey notebooks for each established:
   a. Designation of survey benchmark. Coordinate designation protocol so as not to duplicate existing points.
   b. State Plane North American Datum (NAD);
   c. Elevation based on NGVD;
   d. Date of establishment;
   e. Description and sketch of each survey benchmark location; and
   f. Survey benchmarks shall be referenced to a minimum of three features that can be seen from the survey benchmark and the measurement from the feature to the survey benchmark shown on the above referenced sketch.
2. Document survey work in the field notebooks using the format and procedures described below:
   a. Title and consecutive notebook number on the front cover;
   b. Consecutively numbered pages;
   c. Table of contents, indicated by survey task, on the first numbered page;
   d. Legend indicating symbols and abbreviations used in survey notes;
   e. Names of survey team for each task;
   f. Notes on weather, equipment, etc.;
   g. Date and time on each page to indicate when work was recorded;
   h. Notes in a uniform character such that they can be interpreted and used by anyone with survey knowledge;

i. Description and/or sketches of the existing survey control used.

3.2 SUPPORT SURVEYS

A. Contractor shall mark in the Field any new underground utilities and installations until the new as-builts are obtained (per Penetration Permit Procedure).

B. Preliminary Surveys:
1. Verify location of the existing survey benchmarks and the existing conditions specified in this Section prior to starting work.
2. Establish location for the installation of the erosion and sediment control measures specified in Section 02270.
3. Establish limits of earthwork shown on the drawings. Similarly provide the location and extent of all stockpile areas. Maximum staking interval shall be 50 feet unless otherwise approved by the Construction Manager.
4. Establish work limits required for installation of construction fencing as specified in Section 02100 and as shown on the Construction Drawings unless otherwise directed by the Construction Manager.

C. Intermediate Surveys:
1. Perform surveys during progress of the construction activities to verify the accuracy of field work and as directed by the Construction Manager.
2. Perform surveys for measurement and periodic progress payment as specified in this Section.
3. Perform surveys during progress of excavation to confirm limits of the excavation.
4. Survey daily and provide survey and red-line sketches showing the location and elevation of the newly installed and existing underground and overhead utilities and structures encountered and left in place within the work area. Incorporate

this information into the as-built documentation as specified in this section.

D. Final Surveys:

1. Final topographic survey shall be at minimum one foot contour intervals. Additionally, the following points shall be surveyed and noted as applicable.
   a. Grade breaks.
   b. Points of horizontal curvature and tangency.
   c. Roads, ditches, pipes, culverts, channels and fences.
   d. Limits of final excavation.
   e. Spot elevations every 50 feet along the toe of slopes of the Conveyance Channel.
2. Perform survey for final measurement and payment.

3.3 SURVEYS FOR MEASUREMENT AND PAYMENT

A. Perform surveys for periodic progress payments and final payment to determine quantities of work.

B. Calculate and certify quantities of work and submit survey notes and calculations to the Construction Manager for review, evaluation and payment.

C. Measurement and payment surveys for elevation and for horizontal distance shall be to the nearest 0.1 foot +/- 0.05 foot, respectively.

END OF SECTION

~~1403~~

2052

SECTION 02100
SITE PREPARATION

PART 1 GENERAL

1.1 SCOPE

This Section includes but is not limited to:

A. Installation and relocation of construction fencing and access control gates.

B. Dust Control Plan.

C. Protection of existing groundwater monitoring wells and survey benchmarks.

D. Clearing, grubbing, wood chipping, and stockpiling.

E. Pavement removal and stockpiling.

F. Topsoil excavation and stockpiling.

G. Traffic Control.

H. Removal of storm drains and their appurtenances and stockpiling.

1.2 RELATED SECTIONS AND PLANS

A. Section 02050 - Surveying.

B. Section 02270 - Erosion and Sediment Control.

C. Part 6 - Statement of Work.

D. Part 8 - Environmental Health and Safety, and Training Requirements.

000014

1.3 REFERENCES

A. State of Ohio, Department of Transportation (ODOT), Construction and Material Specifications, January 1, 1997, except as supplemented or otherwise modified herein and/or shown on the Construction Drawings.

1.4 SUBMITTALS

A. Provide submittals as required by Part 6. Unless specified otherwise, submittals shall be made to the Construction Manager for review and approval.

B. Within 10 calendar days of Notice to Proceed, submit a Dust Control Plan in accordance with Part 6.

C. Within 10 calendar days of Notice to Proceed, submit, along with the Dust Control Plan, manufacturer's Material Safety Data Sheets (MSDS), and recommendations for material handling and usage for any proposed additives within the water sprays.

D. Submit within 10 calendar days from Notice to Proceed a Traffic Plan in accordance with Part 6.

1.5 HEALTH AND SAFETY REQUIREMENTS

Environmental Health and Safety, and Training requirements shall be as specified in Part 8 of Contract Documents.

PART 2 PRODUCTS

2.1 MATERIALS

A. Dust Suppression Crusting Agent: Shall be as specified in Section 02270.

B. Construction fence shall be orange, high density polyethylene fabric, opening size approximately 4 inches by 1/2 inch, minimum tensile strength of 2000 lbs/ft of width. Posts shall be steel "T" as indicated on the Construction Drawings.

~~1463~~

2052

PART 3 EXECUTION

3.1 GENERAL

A. Verify existing conditions to include underground and aboveground utilities and the GW-24" line as specified in Section 02050.

B. Verify that utilities to be removed or tapped have been properly isolated and de-energized prior to commencement of work. Construction Manager shall properly isolate and de-energize utilities that are to be abandoned, disconnected, or tied into.

C. Install erosion and sediment control measures, in accordance with Section 02270 and the Construction Drawings, within a drainage area prior to clearing, grubbing, or grading activities.

D. Contractor shall notify the Construction Manager prior to movement of material for stockpiling.

3.2 DUST CONTROL

A. Dust control shall be as specified in Part 6.

3.3 CONSTRUCTION FENCE

A. Prior to initiating excavation activities install and relocate construction fencing as shown on the Construction Drawings and as specified in Part 8. T-posts less than 4-foot high shall be capped with rebar safety cap.

B. Maintain and repair construction fences until completion of the Contract.

3.4 CLEARING AND GRUBBING

A. Clearing and grubbing shall be as specified in ODOT Item 201.

000016

~~000139~~

B. Remove trees less than four inches in diameter, shrubs, and woody undergrowth within the areas to be excavated. Except as noted on the Construction Drawings, the Contractor shall not disturb trees greater than four inches in diameter unless approved by the Construction Manager. Vegetation shall be chipped and directly discharged into trucks prior to transportation to stockpiles. Stockpiling of wood chips shall be as specified in this Section.

C. Stump Grinding: Grind stumps to a minimum depth of 12 inches below grade or to the bottom of the root-mass within 18 inches of the stump in all horizontal directions. Grind the wood chips in pieces generally smaller than 12 inch dimensions. Excavate the ground stump wood chips with the soil and haul to the OSDF Soil Pile. The volume of organic material shall be less than one-fourth of the volume of the truck, as determined by visual observation by the Construction Manager.

3.5 PAVEMENT REMOVAL

A. Pavement designated for removal and replacement shall be saw cut full depth at the limits of designated areas or removed back to the nearest construction joint. Adjacent pavement to remain shall be protected. If pavement edge at cut breaks off, the pavement is to be squared up by saw cutting at full depth.

B. Debris from the pavement removal shall be stockpiled as specified in this Section.

3.6 STORM DRAINS AND APPURTENANCES

A. Existing concrete and metal storm drains and concrete head walls shown to be removed on the Construction Drawings in the area of the STP Access Road shall be excavated, transported, and stockpiled as specified in this Section.

B. Agricultural drain tiles encountered shall be excavated, transported, and stockpiled as specified in this Section.

C. Subject to the approval of the Construction Manager, the Contractor shall furnish and install additional temporary culverts and driveways needed to access work areas and remove them when no longer required.

3.7 TOPSOIL EXCAVATION

A. Excavate the top 6 inches as topsoil within the areas to be excavated as shown on the Construction Drawings unless otherwise noted.

B. Excavate topsoil in such a manner as to prevent or minimize intermingling with underlying subsoil or other objectionable material (i.e., debris).

C. The topsoil excavated from the channels and ditches shall be stockpiled as specified in this Section. Provide erosion control in accordance with Section 02270.

3.8 STOCKPILING

A. Hauling of materials to the stockpiles at various locations on the site shall be as specified in the Traffic Plan.

B. Woodchips shall be hauled to and stockpiled in the Southern Waste Units (SWU) Woodchip Pile as shown on the Construction Drawings. The stockpile of woodchips from this work shall be turned by the Contractor every month for the duration of the contract unless otherwise directed by the Construction Manager.

C. Material from clearing and grubbing shall be hauled to and stockpiled in the On Site Disposal Facility (OSDF) Grubbing Pile.

D. Roadway pavement, including asphalt, concrete, base aggregate, and storm drain and appurtenances, removed from the South Access Road and STP Access Road crossings and any agricultural drain tile encountered shall be stockpiled in the area designated as Asphalt/ Concrete/Construction Rubble Pile. A secondary stockpile location designated as HIS-001 shall be used only as

directed by the Construction Manager. Material placed in the stockpile shall meet OSDF physical WAC as indicated below:

Item	Size
Concrete	Less than 10 feet long and 18 inches thick
Asphalt	Less than 10 feet long and 18 inches thick
Concrete pipe	Crushed to reduce void space; maximum size should be less than 10 feet long and 18 inches thick
Corrugated metal pipe	Crush to reduce void space; at maximum, it should be less than 10 feet long and 18 inches thick
Iron pipe	If greater than 12 inch diameter, split lengthwise; at maximum, it should be less than 10 feet long.

E. Stripped topsoil shall be hauled to and stockpiled in the OSDF Soil Pile as shown on the Construction Drawings.

3.9 PROTECTION OF EXISTING STRUCTURES

A. Prior to commencing site preparation and earthwork activities, install a protective barrier around existing groundwater wells and survey benchmarks designated to remain as shown on the Construction Drawings. If site preparation and earthwork activities are to occur in proximity of monitoring wells and/or extraction wells and survey benchmarks, designated to remain, hand excavate the area within the protective barrier. If damage to existing monitoring wells, extraction wells, or survey benchmarks occurs, repairs and/or replacement will be completed by the Construction Manager at the Contractor's expense.

B. Protect trees, plant growth, and features that are outside the construction area for site preparation and earthwork.

C. Protect survey benchmarks, and groundwater monitoring wells, to remain from damage or displacement. Use, at a minimum, standard construction fence offset 5-feet from the item requiring protection.

D. Locate, identify, and protect from damage utilities that are to remain. Hand dig to locate the GW-24 line and any other underground utilities with the construction area.

E. Maintain existing roadways at the construction site, and provide dust control in accordance with Part 6.

F. If damage to existing properties, utilities, or facilities occurs, repairs and/or replacement will be completed by Construction Manager at the Contractor's expense, except for FEMP survey benchmarks which shall be replaced and verified as specified in Section 02050.

3.10 TRAFFIC CONTROL

A. Traffic control and the Traffic Plan shall be in accordance with Part 6.

END OF SECTION

SECTION 02206
EARTHWORK

PART 1 GENERAL

1.1 SCOPE

This Section includes but is not limited to:

A. Excavation.

B. Excavation dewatering.

C. Stockpiling.

D. Subgrade preparation.

E. Compacted fill.

F. Trenching and backfilling.

G. General grading.

H. Material testing.

1.2 RELATED SECTIONS

A. Section 02050 - Surveying.

B. Section 02100 - Site Preparation.

C. Section 02270 - Erosion and Sediment Control.

D. Section 02506 - Aggregate Surface.

E. Section 02720 - Storm Drain Piping.

F. Section 02900 - Seeding.

G. Part 6 - Statement of Work.

H. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

A. State of Ohio, Department of Transportation (ODOT): Construction and Material Specifications, January 1, 1997, except as supplemented or otherwise modified herein and/or shown on the Construction Drawings.

B. American Society for Testing and Materials (ASTM):

1.	ASTM C136-96 (Rev. A)	Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2.	ASTM D698-91	Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft).
3.	ASTM D2487-93	Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
4.	ASTM D2922-96	Standard Test Methods for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth).
5.	ASTM E946-92	Standard Test Method for Water Absorption of Bentonite by the Porous Plate Method.

C. Occupational Safety and Health Administration, Code of Federal Regulations (CFR):

1.	29 CFR 1926.650	Subpart P - Excavations, latest revision.

D. Reference Reports addressing OSDF and borrow area site subsurface conditions:

1. *"Geotechnical Investigation Report, On-Site Disposal Facility"* [Parsons, 1995]. This report contains geotechnical data for the subsurface soils in the OSDF area.
2. *"Disposal Facility Pre-Design Geotechnical Investigation, Soil Investigation Data Report, CERCLA/RCRA Unit 2"* [Science Applications International, 1995]. This report presents

geotechnical data for the subsurface soils in the OSDF area.

3. *"Geotechnical Data and Evaluation Report for East and South Field Borrow Areas"* [Parsons, 1996]. This report contains geotechnical data for the subsurface soils in the borrow area.

1.4 SUBMITTALS

A. Provide submittals as required by Part 6. Unless specified otherwise, submittals shall be made to the Construction Manager for review and approval.

B. Within 15 calendar days from Notice to Proceed, submit for review an Earthwork Work Plan. Earthwork Work Plan shall include, at a minimum:

1. List of equipment proposed for the construction activities including earthwork, trenching, and backfilling and for work identified in Sections 02100, 02506, 02720, and 02900.
2. Construction methods for each construction activity.
3. Dewatering methods and techniques.
4. Coordination of survey requirements for earthwork activities.
5. Proposed and existing locations of soil stockpile areas.
6. Coordination of earthwork activities with surface-water management and erosion and sediment control measures.
7. Schedule for earthwork activities.
8. Coordination of dust control.
9. Plan and measures to be taken during cold weather activities below 32 degrees Fahrenheit (F).
10. Equipment calibration requirements including equipment and schedule.
11. Coordination of earthwork activities with OSDF cell and borrow activities.
12. Control of excavation and runoff between certified and uncertified areas.

C. Submit the following for review within 15 calendar days from Notice to Proceed:

1. The source of all imported materials along with written certification from the suppliers that the materials meet the requirement of this Section to include test results from ASTM C136, ASTM D2487, and ASTM E946.

D. If the source or nature of any imported materials changes during construction, provide no later than seven (7) calendar days prior to placement, the source and new written certifications from the suppliers that the materials meet the requirements of this Section, including test results from ASTMs C136, D2487, and E946.

E. Submit name, address, and qualifications of an independent soil testing laboratory within 10 calendar days of Notice to Proceed. Provide copies of all lab/field soil tests performed by soil testing laboratory and contractor within 7 calendar days of obtaining samples for performing field test, or upon request by the Construction Manager.

F. Submit equipment calibration records within 7 calendar days of calibration date.

1.5 EXAMINATION OF EXISTING CONDITIONS

A. Existing site surface and subsurface conditions, based on available site data, are indicated on the Construction Drawings and in the Reference Reports specified in this Section.

B. For examination of the existing conditions, refer to Section 02050.

1.6 QUALITY ASSURANCE QUALIFICATIONS

A. Independent Soil Testing Laboratory:

1. The Contractor shall arrange and pay for the services of a qualified, independent soil testing laboratory to perform the laboratory and on-site construction quality testing of the materials and construction activities specified in this Section.

2. The qualified independent soil testing laboratory shall have a minimum of 5 years experience in providing the construction quality testing services and shall be equipped with the required equipment. Field technician(s) shall have a minimum of 3 years experience in construction quality testing.
3. The qualifications of the laboratory and technician(s) shall be submitted to the Construction Manager and approved in writing prior to initiation of earthwork activities.

1.7 HEALTH AND SAFETY REQUIREMENTS

A. Environmental Health and Safety, and Training requirements shall be as specified in Part 8 of the Contract Documents.

PART 2 PRODUCTS

2.1 MATERIALS

A. Obtain material for compacted fill from the excavation of channels, ditches, and sediment basin as shown on the Construction Drawings unless otherwise noted.

B. Suitable compacted fill material shall be free of debris, foreign objects, large rock fragments, organics, and other deleterious materials. Visible rock particles shall be maximum dimension of 5 inches for nominal 8-inch loose lifts and 3 inches for nominal 4-inch loose lifts. Fill material shall be classified as GC, SC, SM, ML, CL, or CH according to the Unified Soil Classification System (per ASTM D2487).

C. Furnish embedment fill material for bituminous coated corrugated metal pipe (BCCMP) and polyethylene pipe (PE) meeting the requirements of Section 703.11 of the ODOT Specifications unless otherwise indicated on the Construction Drawings.

D. Obtain trench backfill material from excavation of channels, ditches, and sediment basin that meet the material requirements for compacted fill as specified in this Section unless otherwise noted on the Construction Drawings.

E. Bentonite granules shall contain at least 85 percent sodium montmorillonite and a waste adsorption of at least 500 percent when tested in accordance with ASTM E946.

F. Soil-bentonite mix for constructing bentonite soil plugs shall consist of a minimum of 10 percent by weight bentonite granules mixed with compacted fill specified in this Section.

G. Furnish a minimum 4-inch wide plastic underground warning tape with integral magnetic locator wire to mark all pipes as shown on the Construction Drawings.

H. Geotextile: Geotextile for subbase separation under dumped rock and aggregate surface shall be as specified in Section 02270 and Section 02506, respectively.

I. Erosion and Sediment Control materials shall be as specified in Section 02270.

2.2 EQUIPMENT

A. Furnish compaction equipment to achieve the required minimum soil dry density within the range of acceptable moisture contents.

B. Furnish hand compaction equipment, such as walk-behind padfoot compactor, hand tampers, or vibratory plate compactor, for compaction in areas inaccessible to large compaction equipment.

C. Furnish water tank trucks, pressure distributors, or other equipment designed to apply water uniformly and in controlled quantities to variable surface widths to provide the required in-place moisture content and to prevent drying of soil surfaces.

~~1403~~

2052

D. Furnish equipment such as scarifiers, disks, earth hauling equipment, sump pumps and hoses, and other equipment, as required for earthwork construction.

E. Furnish equipment recommended by the manufacturer/ supplier for the application of the crusting agent and other erosion and sediment control materials as specified in Section 02270.

PART 3 EXECUTION

3.1 GENERAL

A. Perform construction activities in such a manner that equipment operating in the certified areas does not operate in non-certified areas. Equipment operating in non-certified areas shall be wheel washed and surveyed by the Construction Manager prior to use in a certified area.

B. Perform construction activities in such a manner that stormwater runoff from non-certified construction does not flow into certified areas.

C. Upon the unexpected discovery of any historic, prehistoric, or archeological site, feature, or object, immediately cease ground disturbing activities at the find and contact the Construction Manager.

D. Dust control shall be in accordance with Part 6.

3.2 SITE PREPARATION

A. Surveying for earthwork activities shall be as specified in Section 02050. Verify existing conditions as specified in Section 02050.

B. Install construction fence as specified in Section 02100 and as shown on the Construction Drawings. Provide construction fence and barricades around trenches and excavated areas as specified in Part 8 of the Contract Documents.

000027

~~000140~~

C. Prior to any earthwork activity, install erosion and sediment control measures required for the drainage area and perform clearing, grubbing, topsoil excavation, pavement removal, and storm drain removal as indicated on the Construction Drawings and as specified in Sections 02100 and 02270.

D. Locate existing manholes, drop structures, survey monuments, monitoring wells, utilities, and other above grade and subsurface structures in the work area. Protect these structures and utilities during the excavation and grading activities as specified in Sections 02050 and 02100.

3.3 SURFACE-WATER CONTROL

A. Installation of surface water and erosion controls shall be as specified in Section 02270.

B. Install surface-water and erosion controls in and around work areas to control runoff and erosion and to prevent surface-water runon into excavations and from non-certified excavations into certified areas as specified in Section 02270. Perimeter controls may include small ditches, small berms, or localized regrading.

C. Berms to maintain flow in the conveyance channel and for stormwater diversion shall be constructed using compacted fill from certified areas as specified in this Section. Berms shall be constructed to the dimensions and at locations shown on the Construction Drawings.

3.4 EXCAVATION

A. Excavate designated areas to the subgrade elevations or excavation limits shown on the Construction Drawings. Stockpile excavated material in accordance with this Section.

B. Excavate material within the excavation limits, including any rock encountered, regardless of type, character, composition, and condition.

C. If during excavation, construction debris consisting of construction materials, concrete, steel, rebar, and other materials, etc., is encountered, debris shall be excavated and stockpiled as specified in this Section.

D. Blasting, including use of explosives or explosive devices, shall not be permitted.

E. Minimize sloughing and caving of the excavation. Over-excavate and fill areas of the excavation that cave or slough with compacted fill as specified in this Section.

F. Do not remove soil outside the limits of stripping, excavation, and trenching included in this Contract or dispose of soil included in this Contract except as specified or approved in writing by the Construction Manager.

G. Disturbed areas left in an exposed condition shall be stabilized in accordance with Section 02270.

3.5 EXCAVATION DEWATERING

A. Anticipate seepage of perched water into, and accumulation of surface-water runoff in excavations. Manage perched water and surface water runoff in excavations in accordance with this Section.

B. Collect perched water that accumulates in the excavation in excavated earthen sumps and pump to the nearest sediment control measure discharging to a sediment basin or sediment trap, or other location as directed by the Construction Manager.

C. Control grading around excavation to prevent surface-water runon from adjacent areas from entering the excavation.

3.6 STOCKPILING

A. Stockpile excavated and trenched soils in piles which shall not exceed 5,000 to 6,000 cubic yards in the On-site Disposal Facility (OSDF) borrow area indicated on

000029

the Construction Drawings at the location directed by the Construction Manager.

B. Construction debris encountered during excavation shall be stockpiled in the area designated as Asphalt/Concrete/ Construction Rubble Pile as indicated on the Construction Drawings. A secondary stockpile location designated as HIS-001 shall be used only as directed by the Construction Manager.

C. Construct stockpiles no steeper than 3H:1V (horizontal:vertical), grade to drain, seal by tracking perpendicular to the slope contours with a bulldozer, and dress daily during periods when fill is taken from the stockpile.

D. Sediment removed shall be placed in a stockpile located in Sector 2 as directed by the Construction Manager.

E. Stockpiles shall be stabilized as specified in Section 02270.

3.7 SUBGRADE PREPARATION

A. Prepare subgrade for roads, access drives, and aggregate surface, A1PII Sedimentation Basin in accordance with ODOT Item 203 unless otherwise specified in this Section.

B. Subgrade material shall consist of soil free of debris, foreign objects, organics, and other deleterious materials.

C. In the event saturated subgrade is encountered, localized sumps shall be constructed to facilitate removal of water.

D. In the event fill is required to construct subgrade, compact subgrade in each lift to at least 95 percent of Standard Proctor maximum dry density and within ± 3 percent of Standard Proctor optimum moisture content as determined by ASTM D698 for the subgrade material.

E. In the event cut is required to reach subgrade, compact the top 8 inches to at least 95 percent of Standard Proctor maximum dry density and within ± 3 percent of Standard Proctor optimum moisture content as determined by ASTM D698 for the subgrade material.

F. In areas where unsuitable soils are encountered, remove the soil to a minimum depth of 1 foot below the proposed subgrade elevation unless otherwise shown on the Construction Drawings. Fill areas from which subgrade has been removed with compacted fill in accordance with the requirements of this Section. Compact the fill material to at least 95 percent Standard Proctor maximum dry density with moisture content not greater than 3 percentage points wet of the standard optimum moisture content (ASTM D698).

G. Manage surface water in accordance with this Section. In excavations or other areas where water accumulates, implement measures to remove the water in accordance with this Section.

3.8 COMPACTED FILL

A. Use fill that meets the requirements of this Section. Place the fill to the limits and grades shown on the Construction Drawings.

B. Place compacted fill material on surfaces which are free of debris, branches, vegetation, mud, ice, or other deleterious material.

C. Place compacted fill material in loose lifts with a thickness of 6 inches ±1 inch. In areas where compaction is to be performed using hand-operated equipment, place the fill material in loose lifts with a loose thickness of 4 inches ±1 inch.

D. Remove visible rock particles as specified in this Section.

E. Prior to placing a succeeding lift of material over a previously compacted lift, thoroughly scarify the previous lift to a depth of 2 inches by discing, raking, or tracking with a dozer. Moisture condition the preceding lift in accordance with this Section if the moisture content of the surface of the preceding lift is not within the range of acceptable moisture contents.

F. The trafficking of scarified surfaces by trucks or other equipment, except compaction equipment, is not permitted.

G. The maximum acceptable soil clod size shall be 5 inches. Reduce clod size by discing, raking, tracking with a dozer or other means. Soil clumps, consisting of an agglomeration of smaller clods, will not be considered a clod for purposes of this Section.

H. Except as specified in this Section, compact fill material in each lift to at least 95 percent of its standard Proctor maximum dry density (ASTM D698). Compact fill at a moisture content within ±3 percentage points of the standard Proctor optimum moisture content (ASTM D698).

I. Moisture condition the soil if the moisture content of the soil to be used as compacted fill is not within ±3 percentage points of the optimum moisture content as determined by ASTM D698. Use a water truck and spray nozzle for wetting. During wetting or drying, regularly disc, rake, or otherwise mix the material to thoroughly blend the moisture throughout the lift. Use discing, raking, or other appropriate methods to dry the material as required.

J. Do not place frozen fill, nor place fill material on frozen subgrade or previously placed compacted fill.

K. Do not compact fill material at temperatures below 32°F, unless authorized in writing by the Construction Manager.

L. Do not place fill during periods of precipitation. Placement may occur during periods of misting or drizzle, but only if authorized by the Construction Manager.

3.9 TRENCHING

A. Trench subsoils for placement of pipes and culverts to depths and minimum dimensions shown on the Construction Drawings. Manage excavated material in accordance with this Section.

B. Use sheeting and bracing, or other method approved by the Construction Manager to maintain the safety and stability of slopes and trenches and to protect adjacent utilities and structures. Satisfy applicable local, state, and federal requirements for slope and trench sheeting and bracing, including requirements of the Occupational Safety and Health Administration (OSHA) Construction Standards. Provide sheeting and bracing materials on site prior to the start of trenching. Adjust spacing and arrangement of sheeting and bracing as required by conditions encountered. Remove sheeting and bracing as backfill progresses. Fill any voids left from sheeting or bracing withdrawal with compacted fill or other approved material in accordance with this Section.

C. Protect and maintain the trench bottom. Remove rock fragments or raveled materials that collect on the trench bottom. Backfill any overexcavation with compacted fill. Excavate any soft subgrade encountered at the trench bottom and backfill to trench bottom elevation with compacted fill as specified in this Section.

D. Where trenches will be excavated in fill areas, perform trenching only after compacted fill has reached at least to the spring line of the pipe.

E. The sequencing of trenching, pipe installation, and backfill for the sediment basin principal spillway by the contractor shall be designed to limit the time the South Access Road is closed to general traffic. Work that requires closure of the South Access Road shall occur outside the normal FEMP work time schedule to the extent practical. This work shall be coordinated with the Construction Manager.

F. Stockpile excess material from trenching in accordance with this Section.

3.10 BACKFILLING

A. General:
1. Do not backfill with frozen or saturated material.
2. Do not backfill over frozen, wet, or soft subgrade.
3. Do not disturb or damage piping in the trench during backfilling.
4. Do not use heavy compaction equipment which is greater than 10 pounds per square inch ground pressure, over piping that is covered by less than 12 inches of backfill material.

B. Material used for backfill shall be similar to the material for compacted fill specified in this Section.

C. Placement of embedment fill for pipes and culverts:
1. Place embedment fill in 5-inch ±1-inch thick loose lifts to the elevation of the bottom of the pipe or culvert.
2. Compact embedment fill with a minimum of 4 passes of a vibratory plate compactor prior to placing pipe.
3. Place pipe or culvert on top of the compacted embedment fill.
4. For pipes or culverts 12 inches in diameter or less, place additional embedment fill on the sides and gently hand tamp the fill around the sides as needed to insure that intimate contact between the pipe or culvert and the embedment fill is maintained below the spring line of the pipe. Continue placing embedment fill until it is even with the top of the pipe. Compact the embedment fill with a minimum of 4 passes of a vibratory plate compactor. Continue to place embedment fill above the top of pipe to a depth of 7 ±1 inch. Compact the embedment fill with a minimum of 4 passes of a vibratory plate compactor.

5. For pipes or culverts greater than 12 inches in diameter, place embedment fill in 5-inch ±1-inch thick loose lifts to the limits shown on the Construction Drawings. Compact each lift with a minimum of 4 passes of a vibratory plate compactor.

D. Placement of backfill material for pipes and culverts:
1. After placement and compaction of embedment fill, place the first lift of backfill material in a 12-inch loose lift. Place subsequent lifts of trench backfill material in 8-inch ±1-inch loose lifts.
2. Compact each lift to 95 percent of the maximum standard Proctor dry unit weight and at a moisture content within ±3 percent of the optimum moisture content as determined by ASTM D698.

E. For trenches extending from the Sediment Basin principal spillway to the outfall on the west side of the South Access Road, construct soil-bentonite plugs at the locations shown on the Construction Drawings. Prepare the soil-bentonite mixture consisting of compacted fill at its natural moisture content mixed with a minimum of 10 percent (by dry weight basis) bentonite granules. Thoroughly mix with a portable cement mixer or other suitable method. Place and compact the soil-bentonite mixture in the same manner as the compacted fill.

F. Place underground warning tape as shown on the Construction Drawings.

3.11 TESTING REQUIREMENTS

A. Subgrade:
1. Subgrade for roads and access drive - one in-place compaction test, including soil density and moisture content, per 2,000 square feet in accordance with ASTM D2922.
2. Subgrade for A1PII Sedimentation Basin and aggregate surfacing on subgrade other than for roads - one in-place compaction test, including soil density and moisture content per 2,000 square feet in accordance with ASTM D2922.

000035

~~000148~~

B. Embedment Fill:

1. One Sieve Analysis (ASTM C136) test and one Soil Classification test per 200 cubic yards of embedment fill material.
2. One compaction test (ASTM D2922) per 100 cubic yards of embedment fill or one test (ASTM D2922) per 100 linear feet of trench.

C. Aggregate Surfacing:

1. One Sieve Analysis (ASTM C136) and one Soil Classification test (ASTM D2487) per 200 cubic yards of aggregate material.
2. One in-place compaction test (ASTM D2922) per 2,000 square feet per lift or one test per 100 cubic yards of in-place aggregate.

D. Compacted fill:

1. One Soil Classification (ASTM D2487) and one Standard Density Test (ASTM D698) per 2,000 cubic yards of compacted fill or one test each of ASTM D2487 and ASTM D698 for each type of fill material.
2. One in-place compaction test, including dry density and moisture content, (ASTM D2922) per 500 cubic yards of compacted fill or one test per 10,000 square feet per lift.

E. Backfill:

1. One Soil Classification (ASTM D2487) and one Standard Density Test (ASTM D698) per 2,000 cubic yards of backfill material or one test each of ASTM D698 and ASTM D2487 for each type of backfill material.
2. One in-place compaction test (ASTM D2922) per 100 cubic yards of in-place backfill or one test (ASTM D2922) per 100 linear feet of trench.

F. Unless specified otherwise, all test locations shall be approved by the Construction Manager.

3.12 QUALITY ASSURANCE TESTING REQUIREMENTS

A. Field compaction testing shall be conducted in accordance with this Section.

~~1468~~

B. Nuclear density (ASTM D2922) equipment shall be calibrated in accordance with the manufacturer's requirements. 2052

C. Independent Soil Testing Contractor shall perform soil performance testing on subgrade, compacted fill, embedment fill, aggregate surface, and backfill to establish compliance with the requirements of this Section. Perform testing to the following frequencies whichever requires the greatest number of tests:

1. One test per each day of work filling/backfilling.
2. One test every layer of fill.
3. One test every 500 cubic yards of fill.
4. One test every 2,000 square feet in Sediment Basin.
5. One test every 200 linear feet of trench.
6. One test every 2,000 square feet of subgrade preparation.

END OF SECTION

SECTION 02270
EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.1 SCOPE

This Section includes but is not limited to:

A. Soil erosion and sedimentation control measures for work included in this contract, including additional areas disturbed by the Contractor.

B. Installation, maintenance, and removal of all temporary erosion control facilities.

C. Placement of dumped rock fill, erosion control blankets, geotextile, and rock check dams for ditches and erosion control areas.

D. Management of erosion and sediment control measures installed by this contract and existing erosion and sediment control measures and facilities as shown on the Construction Drawings.

E. Control of surface water and management of ponded water in construction and excavation areas.

1.2 RELATED SECTIONS AND PLANS

A. Section 02100 - Site Preparation.

B. Section 02206 - Earthwork.

C. Section 02900 - Seeding.

D. Part 6 - Statement of Work.

E. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

A. State of Ohio, Department of Transportation (ODOT): Construction and Material Specifications, January 1, 1997, except as supplemented or otherwise modified herein and/or shown on the Construction Drawings.

B. State of Ohio, Department of Natural Resources (ODNR): Rainwater and Land Development, Ohio's Standard for Stormwater Management, Land Development, and Urban Stream Protection - 1996.

C. Title 40, Code of Federal Regulations, Part 261, Hazardous Waste Management System, Identification and Listing of Hazardous Waste.

1.4 SUBMITTALS

A. Provide submittals as required in Part 6. Unless specified otherwise, submittals shall be made to the Construction Manager for review and approval.

B. For each product proposed for use, submit the following within 10 calendar days from the Notice to Proceed:
   1. Manufacturer's product data and recommended methods of installation and maintenance; and
   2. Certification from supplier or manufacturer that the product meets the material requirements of this Section to include test results.
   3. MSDS data, if applicable.

C. Contractor's records of inspection of erosion and sediment control measures as described herein shall be submitted weekly upon completion of the inspection report.

1.5 INSPECTION

A. Inspect erosion and sediment control measures to evaluate the effectiveness of, and need for maintenance of, the control measures. Any repairs to the erosion and sediment control measures shall be corrected within 24 hours of problem discovery. Inspections shall occur, at

a minimum, at the following frequencies by a qualified representative of the Contractor and the Construction Manager:

1. Weekly;
2. Daily after each rain event exceeding 0.5 inches at the Fernald Environmental Management Project (FEMP).
3. At least daily during prolonged rainfall events at the FEMP.

B. All inspections shall be conducted and documented in accordance with this Section. The Contractor shall maintain a copy of the inspection records on site with the original submitted as specified in this Section.

C. The inspection report shall summarize the scope of the inspection, name of the inspector(s), inspection date, observations relating to the implementation of the erosion and sediment control measures, frequency, duration, destination of pumping ponded water, estimated quantity of ponded water and corrective action measures, if any, that are required. The report shall indicate if any areas are not in compliance or contain a certification that control measures are effective and in compliance with this Section.

1.6 HEALTH AND SAFETY REQUIREMENTS

A. Environmental Health and Safety, and Training requirements shall be as specified in Part 8.

PART 2 PRODUCTS

2.1 MATERIALS

A. Silt fence shall at a minimum be composed of strong rot-proof polymeric fibers formed into a woven or non-woven fabric which meets the following requirements:

1. Have fabric and fence post properties and minimum dimensions in accordance with ODNR and as shown on the Construction Drawings.

000040

B. Dumped Rock Fill: Dumped rock fill used for channel protection and check dams shall meet the requirements of ODOT Item 601.07 for types as specified on the Construction Drawings.

C. Non-woven geotextile fabric used as a separator beneath dumped rock fill shall conform to ODOT Item 712.09, Type B.

D. Seeding shall be in accordance with Section 02900.

E. The erosion control blanket shall be constructed of 100 percent coconut fiber stitch bonded between a heavy duty UV stabilized bottom net and a heavy duty UV stabilized top net. The crimped netting shall form prominently closely spaced ridges across the entire width of the mat. The netting shall be stitched together on 1.5 inch centers with UV stabilized polyester thread to form a permanent three dimensional structure. The mat shall have the following physical properties and be rated for 2 years service life for use on 1:1 slopes.

1. Material content and strength requirements:
   a. Coconut fiber: 100 percent; 0.5 pounds per square yard.
   b. Netting: Top and bottom - Heavy UV stabilized; polypropylene; 3 pounds per 1,000 square feet.
   c. Thread: UV stabilized polyester.
   d. Shear Strength: The mat to be used in the stormwater channels and ditches shall be capable of withstanding a maximum flow-induced shear stress of 2.25 lbs/ft.^{2}.

F. Crusting agent shall be as approved by the Construction Manager and shall meet the following requirements:

1. The dust suppression/crusting agent shall be a pine sap emulsion comprised of a 100% organic emulsion produced from naturally occurring resins (pine sap). The dust suppression/crusting agent shall not be comprised of chloride, lignosulfonate, petroleum, or asphaltic type emulsions. The dust suppression/crusting agent must provide dust suppression and surface

stability for exposed soils, both disturbed and undisturbed soils. The dust suppression/crusting agent shall be compatible with application via a hydro seeder, and must not require intense cleaning of equipment after application. Once cured, the dust suppression/crusting agent shall be non-tracking (i.e., will not stick to boots or tires).

2. The dust suppression/crusting agent shall not have hazardous characteristics of ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR 261 for a hazardous waste in either its pre-applied or cured states.

3. The dust suppression/crusting agent shall have a flash point greater than 200°F. The dust suppression/crusting agent shall be neither a flammable nor combustible liquid per DOT definition. The dust suppression/crusting agent must not be susceptible to significant deterioration from exposure to the elements, including sunlight.

PART 3 EXECUTION

3.1 GENERAL

A. Construct and maintain erosion and sediment control measures as specified in this Section and as shown on the Construction Drawings. Maintain existing erosion and sediment control facilities and measures in accordance with this Section.

B. Excavations shall be sloped to sumps and/or graded to drain to ditches or channels discharging to a sediment basin, sediment trap, or other location as directed by the Construction Manager. Excavations are to be kept free of standing water.

C. As excavation progresses, excavate depressions in the excavated area to be used as temporary sumps. Water accumulated in sumps shall be pumped, via portable sump pump system and flexible hose, to the nearest ditch or

channel discharging to the sediment basin or sediment trap upon approval of the Construction Manager.

3.2 SILT FENCES

A. Install in accordance with the requirements of the ODNR Rainwater and Land Development Standards. Place at locations shown on Construction Drawings prior to start of site preparation and excavation activities as required in Section 02100 and at incidental locations downgradient from soil disturbances that do not drain to sedimentation basins or sediment trap. Remove accumulated sediment when deposition reaches one-third the height of the silt fence or sooner if accumulated sediment prevents performance of silt fence as directed by the Construction Manager; remove accumulated sediment within 24 hours of discovery. Sediment shall be removed as specified in this Section.

B. Install breaks and overlaps to allow equipment access to the construction area.

3.3 EROSION CONTROL BLANKETS

A. Install in accordance with manufacturer's recommendations in the ditches and channels or as shown on the Construction Drawings. Unless otherwise specified by the manufacturer, erosion control blankets shall be anchored with wire staples as shown on the Construction Drawings. Staple spacing on edges shall be 12-inch on center.

3.4 STABILIZATION OF INACTIVE EXPOSED EXCAVATION AND CONSTRUCTION AREAS

A. Stabilization of disturbed areas by interim seeding or by use of a crusting agent shall be performed at completion of excavation or within seven (7) calendar days of a decision to suspend excavation for more than forty-five (45) days. Soils shall be stabilized by one of the following methods as directed by the Construction Manager:

1. Crusting agents shall be applied in accordance with manufacturer's recommendations as specified in this Section.
2. Interim seeding shall be applied as specified in Section 02900.

B. Forty-five (45) calendar days shall be the maximum time that a stockpile can be left in an exposed condition without stabilization. Stockpiles that are expected to be inactive for a period of 45 calendar days or more, as determined by the Construction Manager, shall be stabilized within seven (7) calendar days. Stockpiles shall be stabilized by means of a crusting agent, as specified in this Section.

C. Any area or stockpile expected to be left exposed for more than 6 months shall be stabilized with both temporary seeding and crusting agents.

3.5 SEDIMENT REMOVAL

A. Remove accumulated sediment from ditches and the channels as directed by the Construction Manager. In no case shall sediment reduce the available depth in the ditches and channels to less than one-third the depth shown on the Construction Drawings.

B. Remove accumulated sediment from the sediment trap before available depth is reduced to one-half its design depth.

C. Dispose of sediment as specified in Section 02206.

D. Removal of sediment from Sediment Basin 1 is the responsibility of others.

3.6 DUMPED ROCK FILL

A. Place and maintain dumped rock fill material for rock channel protection as indicated on the Construction Drawings and in accordance with ODOT Item 601.08.

3.7 ROCK CHECK DAM

A. Place and maintain Rock Check Dam as indicated on the Construction Drawings.

3.8 CRUSTING AGENT

A. The material shall be applied at the rates recommended by the manufacturer or as directed by the Construction Manager. Reapply as necessary to inhibit erosion and dust.

3.9 REMOVAL OF TEMPORARY EROSION CONTROL FACILITIES

A. Remove silt fence at the direction of the Construction Manager after the disturbed areas are established with satisfactory conditions of seeding as specified in Section 02900.

END OF SECTION

~~1468~~

2052

SECTION 02506
AGGREGATE SURFACE

PART 1 GENERAL

1.1 SCOPE

This Section includes but is not limited to:

A. Material and placement of geotextile prior to aggregate surface placement.

B. Materials placement and compaction requirements for aggregate surfaces on roadways and other locations shown on the Construction Drawings.

1.2 RELATED SECTIONS

A. Section 02100 - Site Preparation.

B. Section 02206 - Earthwork.

C. Section 02270 - Erosion and Sediment Control.

D. Part 6 - Statement of Work.

E. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

A. State of Ohio, Department of Transportation (ODOT), Construction and Material Specifications, January 1, 1997, except as supplemented or otherwise modified herein and/or shown on the Construction Drawings.

B. American Society for Testing and Materials (ASTM) Standards:

000046

1. ASTM D698-91 — Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

1.4 SUBMITTALS

A. Provide submittals as required in Part 6. Unless specified otherwise, submittals shall be made to the Construction Manager for review and approval.

B. Submit the following within 30 calendar days from Notice to Proceed for review and approval:

1. Source of aggregate along with certification from the supplier that the aggregate meets the material requirements of this Section.
2. Manufacturers of geotextile along with technical data and certification from the manufacturer or supplier that the geotextile meets the material requirements specified in this Section.

PART 2 PRODUCTS

2.1 MATERIALS

A. Aggregate materials shall conform to ODOT Item 304.

B. Geotextile shall conform to ODOT Item 712.09, Type D.

PART 3 EXECUTION

3.1 GENERAL

A. Dust control during the road construction activities shall be in accordance with Part 6.

B. Install erosion and sediment controls as necessary in accordance with Section 02270 and as shown on the Construction Drawings.

C. Perform clearing, grubbing, and stripping as required and in accordance with Section 02100 prior to any earthwork activity.

D. Earthwork shall be as specified in Section 02206.

3.2 SUBGRADE PREPARATION

A. Prepare subgrade and proofroll in accordance with Section 02206.

3.3 GEOTEXTILE PLACEMENT

A. Place geotextile on the prepared subgrade under the aggregate material in accordance with manufacturer's installation instructions and as follows:

1. Take precautions to prevent damage to underlying subgrade, including rutting during placement of geotextile.
2. Geotextile shall be placed directly over the subgrade. The geotextile shall be placed and temporarily anchored in such a manner that placement of overlying materials will not excessively stretch or tear the fabric.
3. Geotextile shall be installed to limits indicated on the Construction Drawings. The geotextile shall be unrolled as smooth as possible on the prepared subgrade. Wrinkles and folds in the geotextile shall be removed by stretching and placing of sod staples or small aggregate piles as required. The fabric shall be installed according to the manufacturer's suggestion at curve locations.
4. The geotextile shall be field joined, factory seamed, or manufactured in seamless width. Methods of field joining shall include overlapping of adjacent edges and ends of geotextile a minimum of 12-inches. Sand bags or other weights may be used for temporary anchoring. Overlap at edges and ends of geotextile shall be per manufacturer's installation instructions.
5. The geotextile shall extend to the edges of the road aggregate surface.

6. Geotextile shall be covered the same day as fabric laydown.

7. End dumping or tailgate dumping shall not be permitted directly onto the geotextile. The aggregate shall be dumped adjacent to the fabric or on previously placed stone. The aggregate shall be spread from the backdumped pile using a bulldozer, loader, track hoe, or grader, with care being taken to avoid damage to the fabric by blades, tracks, tires, or buckets. The initial lift of aggregate on the geotextile shall be a minimum thickness of 6 inches after compaction and shall be compacted with a smooth drum roller to the minimum compacted density per Section 02206.

8. Construction traffic shall not be permitted directly on the geotextile.

3.4 AGGREGATE PLACEMENT

A. Construct the aggregate surface to the thicknesses, grades, and limits indicated on the Construction Drawings.

B. Place the aggregate surface in accordance with requirements of ODOT Item 304 to a minimum of 95 percent of maximum density as determined by ASTM D698.

C. Compact the aggregate in accordance with the requirements of ODOT Item 304.

D. When additional aggregate material is to be added to existing compacted aggregate, scarify existing aggregate to a depth of 3 inches.

3.5 QUALITY CONTROL

A. Tolerances:

1. Grade the aggregate surface to within 0.10 feet of the grades as shown on the Construction Drawings.

2. The thickness of the finished aggregate surface shall be no less, at any point, than the thickness indicated on the Construction Drawings.

END OF SECTION

SECTION 02720
STORM DRAIN PIPING

PART 1 GENERAL

1.1 SCOPE

This section includes, but is not limited to the requirements for:

A. Principal spillway riser and discharge pipe.

B. Culverts.

1.2 RELATED SECTIONS AND PLANS

A. Section 02050 - Surveying.

B. Section 02206 - Earthwork.

C. Section 02270 - Erosion and Sediment Control.

D. Part 6 - Statement of Work.

E. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

A. State of Ohio, Department of Transportation, (ODOT) Construction and Material Specifications, January 1, 1997, except as supplemented or otherwise modified herein and/or shown on the Construction Drawings.

B. American Association of State Highway and Transportation Officials (AASHTO):

1. AASHTO M36-91 Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains.

000051

2. AASHTO M190-88 Bituminous Coated Corrugated Metal Culvert Pipe and Pipe Arches.

1.4 SUBMITTALS

A. Provide submittals as required in Part 6. Unless specified otherwise, submittals shall be made to the Construction Manager for review and approval.

B. Submit the following within 30 calendar days from Notice to Proceed:
   1. Culvert manufacturer's product data and recommended methods of storage, handling, and proposed installation.
   2. Shop drawings showing the layout and details of joints, special connections, and fittings.
   3. Culvert manufacturer's written certification that culvert and joint material meet the material requirements specified in this section.

C. Within 7 calendar days of completion of the project, submit as-built drawings with locations and elevations of culverts and spillway.

1.5 HEALTH AND SAFETY REQUIREMENTS

A. Environmental Health and Safety, and Training requirements shall be as specified in Part 8 of Contract Documents.

PART 2 PRODUCTS

2.1 MATERIALS

A. Bituminous-Coated Corrugated Metal Pipe (BCCMP):
   1. Bituminous-coated corrugated metal pipe and fittings for culverts and the sediment basin principal spillway shall be in accordance with ODOT 707.08 (AASHTO M 36). The 48-inch diameter discharge pipes shall be fully bituminous coated with paved invert in accordance with ODOT 707.09, Type C (AASHTO M190). Corrugations and metal thickness are as follows:

Diameter in.	Corrugation, in. x in.	Thickness, in (gage)
8, 12	1 1/2 x 1/4	0.064 (16)
48, 72	2 2/3 x 1/2	0.079 (14)

2. Coupling bands shall be corrugated, galvanized steel bands in accordance with AASHTO M36. Pipe sections with rerolled ends shall be joined with annular corrugated connecting bands. Helically corrugated pipe ends shall be joined using helically corrugated connecting bands. Joints shall have gaskets for water tightness as recommended by piping manufacturer.
3. The principal spillway discharge pipe, riser, inlet pipe shall be shop fabricated 48-inch BCCMP tee with the addition of an 8-inch BCCMP stub for the inlet pipe. All joints to be welded and watertight. Welded area to be painted with a zinc-enriched paint.
4. Trash rack, bars, riser top plate and cap shall be galvanized the same as the pipe or with zinc-enriched paint as indicated for welded or damaged areas above.

B. Corrugated polyethylene (PE) smooth lined pipe, couplings and fittings shall be in accordance with ODOT 707.33 (AASHTO M294 Type S or SP).

C. Bedding and backfill material for culverts shall be in accordance with ODOT 603 and Section 02206.

D. Bentonite-soil plugs used as anti-seep collar shall be as specified in Section 02206.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install culverts, spillway riser, and discharge pipe in accordance with this Section and as shown on the Construction Drawings.

000053
~~000166~~

B. Corrugated Pipe:

1. The pipe and fittings shall be free of foreign materials and visible defects. The ends of the pipe shall be cut squarely and cleanly so as not to adversely affect joining.
2. Each piece of pipe shall be carefully inspected before it is placed and no defective pipe shall be laid in trench. Prior to laying metal pipe, coat areas where the galvanizing finish has been removed or damaged with a zinc-enriched paint. Repair damaged bituminous coating with similar bituminous material per manufacturer's recommendations. Trench bottoms found to be unsuitable for foundations after pipe laying operations have started shall be corrected and brought to specified line and grade with approved bedding materials.
3. Dumped rock used for inlet and outlet protection of culverts shall be in accordance with Section 02270.

C. Examine culvert, riser, discharge pipe and joint materials before installation for damage and do not install material which shows damage or poor workmanship.

D. Prior to installation, complete trench excavation and install embedment fill in accordance with the requirements of Section 02206 unless otherwise shown on the Construction Drawings.

E. Install culverts, discharge pipe, ditches, berms, and other storm water controls to the lines and grades shown on the Construction Drawings, to the survey tolerances specified in this Section.

F. Install joints for polyethylene (PE) pipe and BCCMP culverts and discharge pipe in accordance with the manufacturer's recommendations.

G. After placement of the culverts and discharge pipe perform backfilling as specified in Section 02206.

H. Back fill compaction shall be as specified in Section 02206.

I. Dump rock fill for culvert and discharge pipe inlet and outlet protection shall be as specified in Section 02270.

3.3 QUALITY CONTROL

A. Inspection:
   1. Inspect and survey locations and elevations of culverts, spillway riser and discharge pipe prior to backfill as specified in Section 02050.
   2. Provide survey notes to Construction Manager for review prior to backfill.

B. Prior to formal acceptance of the work, culverts and discharge piping must be free of debris, dirt, sand, silt, or other foreign matter.

C. The Contractor shall notify the Construction Manager of testing/inspection activities 5 calendar days prior to performing testing ans inspection activities.

D. Testing of backfill in place density and moisture content shall be as specified in Section 02206.

3.4 TOLERANCES

A. Construct culverts, spillway riser, and discharge pipe to within ± 0.1 feet of the invert elevations indicated on the Construction Drawings to provide positive drainage at all times.

END OF SECTION

000055

SECTION 02900
SEEDING

PART 1 GENERAL

1.1 SCOPE

This Section includes but is not limited to:

A. Soil preparation.

B. Interim seeding.

C. Fertilizer.

D. Mulch and mulch binder.

E. Use of a crusting agent.

1.2 RELATED SECTIONS AND PLANS

A. Section 02270 - Erosion and Sediment Control.

B. Part 6 - Statement of Work.

C. Part 8 - Environmental Health and Safety, and Training Requirements.

1.3 REFERENCES

A. State of Ohio, Department of Natural Resources (ODNR): Rainwater and Land Development, Ohio's Standard for Storm Water Management, Land Development, and Urban Stream Protection - 1996.

B. Sitewide Excavation Plan, current revision.

1.4 SUBMITTALS

A. Provide submittals as required in Part 6. Unless specified otherwise, submittals shall be made to the Construction Manager for review and approval.

B. Submit the following within thirty (30) calendar days from Notice to Proceed:
   1. Proposed seed mixes and application rates for seed, mulch, mulch binder, and fertilizers.
      a. Manufacturer's product data and recommended methods of application for seed, mulches, mulch binder, and fertilizer.
   2. Material Safety Data Sheet (MSDS) for fertilizer and mulch binder.

C. Provide a written statement of proposed changes to seed mix and application rate of seed mix and/or associated materials (i.e., fertilizer, mulch, and mulch binder) a minimum of ten (10) calendar days before seeding.

D. Submit certificate of compliance for the following within fifteen (15) calendar days before the seeding. Do not sow seed until the Construction Manager has reviewed and approved the certificates.
   1. Certificate stating seed mixture, guaranteed percentages of purity, weed content, germination of seed, name of seller, the test date for the seed, and the net weight and date of shipment;
   2. Manufacturer's certificate stating the available nutrients contained in the proposed fertilizer;
   3. Manufacturer's certificate stating the wood cellulose mulch meets the requirements of this Section; and
   4. Manufacturer's certificate stating the mulch binder meets the requirements of this Section.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver containerized materials in uniform packages bearing the name of the manufacturer, the net weight and a statement of content. Deliver containerized materials to the site in original, properly labeled, unopened, clean containers each showing the manufacturer's guaranteed analysis conforming to applicable regulations and standards.

B. Store materials in a dry area in a manner to prevent physical damage from the elements.

1.6 HEALTH AND SAFETY REQUIREMENTS

Environmental Health and Safety, and Training requirements shall be as specified in Part 8.

PART 2 PRODUCTS

2.1 MATERIALS

A. Furnish seed labeled in accordance with the U.S. Department of Agriculture (USDA) Rules and Regulations under the Federal Seed Act and applicable State seed laws. Furnish seed in sealed bags or containers bearing the date of expiration. Do not use seed after its expiration date. Each variety of seed shall: have a purity of not less than 90 percent, have a percentage of germination not less than 80 percent, have a weed to seed content of not more than 0.75 percent and contain no noxious weeds. The above percentages are by weight.

B. Seed mixture for interim seeding shall be as follows:
   1. Annual Rye - 60 pounds pure live seed (pls)/acre.
   2. Perennial Rye - 60 pounds pls/acre

C. Seed mixture for seeded areas that become exposed during the summer season (June - September) and for seeding that must be done outside of acceptable seeding window:
   1. Buckwheat - 60 pounds pls/acre.

D. Obtain water from the on-site sources shown on the Construction Drawings or specified in Part 6, unless otherwise approved by the Construction Manager.

E. Fertilizer:

1. Use fertilizer that is dry or liquid commercial grade fertilizer, uniform in composition that meets the requirements of all State and Federal regulations and standards of the Association of Agricultural Chemists.
2. Fertilizer shall be VCOTE 34-0-14 as manufactured by George W. Hill or equal.

F. Furnish mulch meeting the following requirements:

1. Mulch shall be straw or wood cellulose fiber, free of clay, stone, foreign substances, and reasonably free of weeds.
2. Furnish straw that does not contain sticks larger than 1/4-inch diameter or other materials that may prevent matting down during application. Use straw that is free from mold and other objectionable material and in an air-dry condition suitable for placing with mulch blower equipment or other equipment as approved by the Construction Manager. Dust control during mulch blowing shall meet the dust control requirements specified in Part 6 and the approved Dust Control Plan. Straw shall be generally 6 inches or more in length.
3. Mulch applied by hydrospraying shall be a wood cellulose processed into a uniform fibrous physical state. Use wood cellulose fiber containing a green dye that will provide for easy visual inspection for uniformity of slurry spread. The wood cellulose fiber including dye, shall contain no growth or germination inhibiting properties. The wood cellulose fiber shall be manufactured in such a manner that, after addition and agitation in slurry tanks with water, the fibers in the material become uniformly suspended to form a homogeneous material. When sprayed on

the ground, the material shall allow absorption and percolation of moisture. The wood cellulose fiber shall meet the following requirements:

Item	Specification Limit
Particle Length	0.375 inch (maximum)
Particle Thickness	0.047 inch (maximum)
pH	4.0 to 8.5
Ash Content	1.6 percent (maximum)
Water Holding Capacity (Based on fiber dry weight)	500 percent (minimum)

G. Mulch binder agent shall be as approved by the Construction Manager and shall meet the following requirements:

1. The mulch binder shall be a pine sap emulsion comprised of a 100% organic emulsion produced from naturally occurring resins (pine sap) and be nontoxic to plants. The mulch binder shall not be comprised of chloride, lingosulfonate, petroleum, or asphaltic type emulsions. The mulch binder shall be compatible with application via a hydro seeder, and must not require intense cleaning of equipment after application. Once cured, the mulch binder shall be non-tracking (i.e., will not stick to boots or tires).
2. The mulch binder shall not have hazardous characteristics of ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR 261 for a hazardous waste in either its pre-applied or cured states.
3. The mulch binder shall have a flash point greater than 200°F. The mulch binder shall be neither a flammable nor combustible liquid per DOT definition. The mulch binder must not be susceptible to significant deterioration from exposure to the elements, including sunlight.
4. The pine sap emulsion shall be provided in concentrated solution and prepared so that it will not change in transportation or storage.

H. Erosion Control Blanket and Crusting Agent shall be in accordance with Section 02270.

2.2 EQUIPMENT

A. Provide equipment of size and type to perform work specified in this Section.

PART 3 EXECUTION

3.1 GENERAL

A. Stabilization of disturbed areas by interim seeding or by use of a crusting agent shall be performed at completion of excavation or within seven (7) calendar days of a decision to suspend excavation for more than forty-five (45) calendar days.

B. Interim seeding is required for disturbed areas and soil piles which are scheduled to or may be further disturbed within 2 years, but do not have significant potential of spreading contamination.

C. Disturbed areas and soil piles which are scheduled to be significantly disturbed within 2 years and/or need effective erosion control immediately, are to be stabilized with use of a crusting agent as specified in Section 02270.

D. Stabilization of slopes exceeding 2H:1V shall utilize an erosion control blanket as specified in Section 02270 after application of seed mixture.

E. Perform soil preparation by tilling/cultivating, to a depth of approximately 2 inches, to eliminate uneven areas and low spots. Maintain lines, levels and contours.

F. Repeat cultivation in areas where equipment used for hauling and spreading has compacted subgrade.

3.2 APPLICATION

A. Apply fertilizer, seed, mulch, and mulch binder to disturbed areas and areas excavated and graded in this Contract requiring seeding unless otherwise indicated or directed by the Construction Manager. All seeding window periods and all application rates for seed and related materials are subject to adjustment as directed or approved by the Construction Manager.

B. Application of Fertilizer:
   1. Apply fertilizer at a uniform rate of 1 pound per 1000 square feet.
   2. Disc fertilizer thoroughly into upper 2 inches.
   3. Lightly water to aid the distribution of fertilizer.

C. Sequence of application of seeding mixture, mulch and mulch binder:
   1. Apply seed mixture at the minimum rate as specified in this Section. Seeding shall be done by hydroseeding, broadcasting, or by drilling to a depth of 0.25 inches followed by cultipacking.
   2. Do not seed areas in excess of that which can be mulched within 24 hours.
   3. Seeding season for interim seeding shall be October 15 through March 15. Seeding that must be done outside of the planting window shall be completed with seed mixture specified in this Section, Part 2, Article 2.1.C.
   4. Apply mulch within 24 hours of seeding.
   5. Spread straw mulch in a uniformly thick layer.
   6. Apply water with a fine spray immediately after each area has been straw mulched. Wet soil at approximately a rate of 120 gallons per 1,000 square feet.
   7. Apply mulch binder at the rate specified in this Section.

D. Spread straw mulch, either by hand or by blowing method, at the rate of 2 air-dried tons per acre. During June through September, increase straw mulch application rate to 3 air-dried tons per acre.

E. Apply sprayed wood cellulose fiber at a net dry weight of 750 pounds per acre. Mix the wood cellulose fiber with water at a ratio of 50 pounds of wood cellulose fiber per 100 gallons of water. For areas planted during June through September, increase wood cellulose fiber application rate to a net dry weight of 1,100 pounds per acre.

F. Maintain mulching material in place with a pine sap emulsion binder. Apply mulch binder according to manufacturer's directions. Unless specified otherwise by the manufacturer, dilute concentrated pine sap emulsion to ratio of 4 parts water to 1 part concentrate. Apply diluted pine emulsion at a rate of 2,500 gallons per acre.

3.3 MAINTENANCE

A. Maintain the seeded areas in satisfactory condition until acceptance of the seeding by the Construction Manager. Maintenance of the seeded areas includes repairing eroded areas, revegetating when necessary, watering and mowing (if applicable). A satisfactory condition of the vegetated area is defined as follows:

1. An area shall have a good, clean stand of perennial grass.
2. Within 3 weeks, germination must occur over 95 percent of the area with no single bare area greater than 3 square feet.
3. Within 3 months, 95 percent of the area must be covered with mature perennial grass.

B. Areas that fail to meet these requirements shall be repaired or reseeded as necessary to produce an acceptable stand of grass, as specified in this Section. Areas that become bare during June through September shall be reseeded with the seed mix specified in this Section, Part 2, Article 2.1.C.

3.4 WARRANTY

A. Seeded areas shall be subject to a warranty period of not less than 12 months from initial establishment of vegetation over 100 percent of the seeded areas.

B. At the end of the warranty period, the Construction Manager will perform an inspection upon written request by the Contractor. Seeded areas not demonstrating satisfactory condition of vegetation as specified herein, shall be repaired, reseeded and maintained to meet all requirements as specified herein at the Contractor's expense.

3.5 ACCEPTANCE

A. The seeded areas shall be accepted at the end of the warranty period if a satisfactory condition exists as defined in this Section.

B. After all disturbed areas are stabilized and all necessary corrective work has been completed, the Construction Manager will certify in writing the final acceptance of the seeded areas.

END OF SECTION